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Working in Long-Term Residential Care: A Qualitative Metasummary Encompassing Roles, Working Environments, Work Satisfaction, and Factors Affecting Recruitment and Retention of Nurse Aides

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Abstract

By means of the Cumulative Index to Nursing and Allied Health Literature (CINAHL), MEDLINE, EMBASE and Ageline (AARP) database searches, the author presents a review of the literature addressing residential care aides- their roles, working environments, work satisfaction, and factors affecting recruitment and retention. Using the method of qualitative metasummary, eight broad themes emerged: job dissatisfaction, low wages, attrition and retention difficulties, threats to personal safety, the experience of hierarchy (devaluation and domination), the importance of relationships and collegial support, excessive workloads and inadequate training. Heavy reliance on American research is a limitation, but there appears to be general agreement across eight countries that residential care aide work can be arduous, demanding and demoralizing. At the same time, given the constraints that most aides work under, many aides care greatly about their clients and are very concerned about the quality of care that they are able to provide. Their voices, however, remain relatively overlooked or ignored.

Keywords: Nurse Aide, Metasummary, Role, Work environment, Work satisfaction, Recruitment, Retention, Long term care

1. Background

Over the past three decades, Canada has experienced a dramatic increase in the number of persons living beyond age 65. In 2000, life expectancy at age 65 reached 16.8 years for males and 20.5 years for females, an increase of 0.3 years and 0.2 years respectively compared with 1999 (Statistics Canada, 2002, p.52). By the year 2030, Canada's aging population is predicted to form nearly one-quarter of Canada's entire population (Statistics Canada, 2002). The change in life expectancy is anticipated to bring many economic, social, political and health care challenges but the greatest of these will be the challenge to provide quality long term nursing care to the increasing population of persons who will require it. Over the past decade, there have been dramatic shifts in staffing patterns in long term care facilities in Canada and in other countries. Nurse aides are being employed in escalating numbers. In Canada, this increase is said to be related to three important factors: the need to control health care costs, a current and projected shortage of regulated health care professionals and an ageing population which requires new approaches to health-care delivery (Canadian Nurses Association -CNA, 2008, p. 2). In the United States, aides now provide 90% of the care to residents who live in long term care facilities (Castle, 2007; Friedman, Daub, Cresci, & Keyser, 1999; Riggs, & Rantz, 2001).

In long term care institutions, aides provide basic resident care. This includes but is not limited to answering calls for assistance, assisting in all activities of daily living (bathing, dressing and grooming, serving meals and feeding residents), taking measurements such as resident's weight, blood pressure, temperature and pulse, collecting urine and stool specimens, administering suppositories and enemas, administering non prescription medications, emptying ostomies and catheters, applying prosthetics or orthotics, assisting with oxygen equipment, assisting with bi-level positive airway pressure (BIPAP) or continuous positive airway pressure (CPAP), and care of a body after death (BC Ministry of Health, 2007; Work Futures BC, 2005).

2. Purpose

The purpose of this qualitative metasummary is to expose tensions, map diversity and communicate the complexity of how different research traditions and investigators from different countries have contributed to our understanding of nurse aides as a whole (Greenhalgh et al., 2005, p. 427).

3. Qualitative Metasummary

Qualitative metasummary (also known as mixed research synthesis) is a technique developed by Sandelowski, Barroso and Voils (2007). Initially, the method was used exclusively to review and summarize qualitative findings presented in the form of surveys. In contrast to solely descriptive literature reviews, these qualitative metasummaries were analytical as well as descriptive. They reflected “a quantitative logic” (p.101) because the authors would assess the relative magnitude of each abstracted finding and then arrange and present all abstracted findings in a mathematical manner.

Throughout the process of completing several qualitative metasummaries, Sandelowski et al. observed that lists contained in qualitative reports were very similar “in form (and)...the degree of interpretation” (p.102) to lists offered in quantitative studies. In addition, the authors observed fewer “methodological differences (between qualitative and quantitative) than might be expected” (p.103). Although qualitative and quantitative studies are widely viewed as dissimilar with regards to sampling, the same authors became aware that the samples in qualitative and quantitative reports often converged in the homogeneity of composition (p.103). Therefore, they expanded their technique to include synthesis of both qualitative and quantitative reports.

The method of qualitative metasummary appears to be particularly appropriate for a review of the literature concerning nurse aides: First, the literature is mixed but predominantly quantitative. Second, the qualitative studies rely heavily on surveys or questionnaires. Third, both qualitative and quantitative studies converge in the homogeneity of the sample composition:

- more than 90% of all nurse aides world wide are women
- the majority of the studies about nurse aides report that the aides belong to minority groups
- the majority of all nurse aides world wide belong to low or lower middle income categories.

4. Method

4.1 Extraction

Each metasummary begins with a comprehensive search using multiple strategies. For this metasummary, the electronic databases CINAHL (1982 to present), MEDLINE (1966 to present), EMBASE (1988 to present) and AARP (1978 to present) were searched using a combination of the different titles used to represent nurse aides namely: residential care attendant, certified nursing assistant, personal care aide/worker, geriatric aide, residential care aide, nurse aide, and personal support aide/worker. Searches were restricted to English language articles. Unpublished dissertations were excluded. Forty-six journal articles were identified at first. A separate search of key journals followed, and a ‘snowball’ search of references contained within all previously obtained empirical papers completed the process. A total of 138 articles and eight trade or organizational reports published between 1983 and 2007 were sampled in this way.

Of these, 16 were published in the 1980s, 60 were published in the 1990s and 68 were published from 2000 onwards. One hundred and four articles were written by American authors, 15 articles were British, thirteen were Canadian, two were Australian, five were Swedish, one was Dutch, four articles were from Taiwan and two were from the Netherlands. Twenty-six were qualitative studies, 72 were quantitative studies, six were mixed methods, ten were literature reviews and 23 were descriptive or opinion papers (including articles theorizing about the practice or modeling the practice of nurse aides). For the full contribution (origin, authors, date, methods and findings) of the different sources to the final metasummary, please refer to Table One.

In a qualitative metasummary, the bias is towards inclusion and not exclusion of reports (Sandelowski et al. 2007) therefore no report was excluded because my own “paradigmatic lens” directed me to an ‘obvious’ body of literature with a preferred methodology (Greenhalgh et al., 2005, p.427).

4.2 Abstraction and Grouping

After an initial reading each primary source was annotated (reduced to a single page or less of single spaced type). This approach facilitated systematic comparison of specific issues, variables or sample characteristics (Whittemore & Knafl, 2005). The next step was “data display” (Whittemore & Knafl, 2005, p. 551). The annotations were grouped by gathering comparable studies together which allowed for “visualization of patterns and relationships within and across primary data sources (and) a starting point for interpretation” (p.551). The data display (abstraction and grouping) follows (See Table 2.).

Sandelowski et al. (2007) caution that every metasummary is subjective and negotiable because at every stage of a review, judgements have to be made regarding “what constitutes a finding, which findings are unique enough to be listed separately, which findings are similar enough to be grouped together, and what categories (they) represent” (p.109).

4.3 Calculating Frequency Effect Sizes

To assess the relative magnitude of the abstracted findings, the frequency effect size was calculated by “taking the number of reports containing a finding (minus any reports derived from a common parent study and representing a duplication of the same finding) and dividing this number by the total number of reports (minus any reports derived from a common parent study and representing a duplication of the same finding)” (Sandelowski et al, p.107). Frequency effect size “moves the interpretive effort from the description of patterns and relationships to higher levels of abstraction” (Whittemore & Knafl, 2005, p.551). (See Table 3.).

5. Interpretation of Synthesis Results

Eight broad themes emerged from the metasummary: job dissatisfaction, low wages, attrition and retention difficulties, threats to personal safety, the experience of hierarchy (devaluation and domination), the importance of relationships and collegial support, excessive workloads and inadequate training.

5.1 Job Dissatisfaction

Researchers in 25 studies investigated various aspects of job satisfaction. Of these studies 18 were American. In general, investigators observed that organizational factors, the working environment, facility characteristics, the supervisory style, and the aide's feelings or beliefs all influence the degree to which care aides are satisfied with their jobs.

Multiple factors seem to promote job dissatisfaction, such as sharp divisions of labour (Grau & Wellin, 1992), inadequate staffing levels (Beck, Ortigara, Mercer, & Shue, 1999), traditional bureaucratic organizational structure (Riggs & Rantz), dismissive, demeaning supervisors (Bowers, Esmond, & Jacobson, 2003) and lack of rewards for performance (Anderson, Bailey, Corazzini & Piven, 2005). In addition, investigators point to the fact that aides often feel undervalued and unappreciated by their supervisors and perceive that their efforts are unrecognized (Ahmed & Kitson, 1993; Dewar & McCleod-Clark, 1992; Jervis, 2002a).

Aides collectively feel dissatisfied with rigid care routines and time constraints that inhibit them from providing personalized care (Brannon, Streit, & Smyer, 1992; Krovach & Krejci, 1998). They complain that they are not listened to (Moyle, Skinner, Rowe, & Gork, 2003); they complain that they are not involved in the care planning process (Beck et al. 1999); they complain that they are unable to make changes or improvements that they feel would benefit the residents because they lack any decision-making authority (Parson, Simmons, Penn, & Furlough, 2003; Monahan & McCarthy, 1992).

Burdened by minimal supervision coupled with inadequate information (Eaton, 2000) and a heavy workload (Chappell & Novak, 1992), some aides break rules out of desperation (Bowers & Becker, 1992). Others bundle tasks to accomplish several tasks at once but feel guilty about it (Bowers, Esmond, & Jacobson, 2000).

5.2 Low Wages

Lack of financial compensation also shapes general job dissatisfaction in the United States, where wages are less than a living wage and not competitive with the fast food industry (Harrington et al. 2003). Many American aides work extra shifts or have a second job just to cover basic expenses (Mercer, Heacock, & Beck, 1993). Some nurse aides set firm boundaries on their work: “I will do no more and no less. I'm not going up and above my way because y'all ain't gonna pay me for it” (quote from aide, Jervis, 2002a, p.19). Low wages are associated with high turnover rates (Banaszak-Holl & Hines, 1996; Bowers et al. 2000; Caudill & Patrick, 1989; Harrington & Swan, 2003) and reduced quality of care (Jervis, 2002a). In some studies, approximately 17-20% of nurse aides report an intention to quit (Broughton & Golden, 1995; Caudill & Patrick, 1989). Harrington et al. (2003) reported that the average annual turnover rate for aides in the US in 2001 was 78%. Concern about low wages is not limited to American aides. In Taiwan, the monthly wage is also less than service industries (Hsieh & Su, 2007). In Mexico, the average salary per day is just adequate for necessities (Douglas, Meleis, Eribes, & Kim, 1996). In Canada wages vary between provinces. In British Columbia, aides currently earn \$19.73 per hour (as per the Hospital Employees Union Facilities Subsector Wage Schedule, 2008).

5.3 Attrition and Retention Difficulties

Care aides who leave blame inadequate staffing levels, excessive work loads, lack of training and lack of problem-solving skills necessary to cope with demands (Ahmed & Kitson, 1993; Beck et al. 1999; Lin, Yin, & Li, 2002; Riggs & Rantz, 2001). Aides often feel alone, unsupported and inadequately informed about the residents' conditions (Ahmed & Kitson, 1993; Anderson et al. 2005; Barney, 1983; Jervis, 2002b). Foner (1994) described the everyday work of nurse aides as physically straining and emotionally wearing. Other authors have characterized the work as routine, repetitive and of low complexity (Brannon, Cohn, & Smyer, 1990; Brannon et al. 1992). The sheer physical effort of lifting and bathing multiple fragile and often immobile patients is combined with constant noise (Kristiansen, Hellzen, & Asplund, 2006), multiple, simultaneous demands (Eaton, 2000) and frequent, wide ranging complaints from residents and/or their families (Grau & Wellin, 1992; Secrest, Iorio, & Martz, 2005).

Care aides who stay employed cite being around elderly people – helping and caring for them, being part of a team, feeling valued and needed by the residents and feeling virtuous as motivational factors (Berdes & Eckert, 2001; Douglas et al. 1996; Hsieh & Su, 2007; Kristiansen et al. 2006). Research also indicates that caring relationships between aides and residents or aides and families, and collegial connections are very important motivational factors that reduce turnover rates and increase quality of care (Bowers et al. 2000; Brannon et al. 1990; Grau, Chandler, Burton, & Kolditz, 1991; Parsons et al. 2003). Several investigators found that a uniform culture (religious, ethnic, social and/or economic) between residents/families and staff contributes to harmony and/or decreased staff turnover (Berdes & Eckert, 2001; Foner, 1994; Grau & Wellin, 1992; Jervis, 2002a). Satisfied aides feel respected and supported (Grau et al. 1991; Friedman et al. 1999). They believe that they are competent and that they are able to affect residents (Parsons et al. 2003).

In summary, care aides who stay are more likely to be older (Cotton & Tuttle, 1986) and of the same social, cultural, religious or ethnic background as the residents and their families (Grau & Wellin, 1992). They become involved in care planning and decision-making (Banaszak-Holl & Hines, 1996; Broughton & Golden, 1995; Friedman et al. 1999) and they are more likely to feel that their contributions are valued and acknowledged by the residents, families and supervisors (Broughton & Golden, 1995). As a consequence, they feel that they are able to provide care in a way that is like family (Bowers et al. 2000). Feelings more strongly determine whether aides are dissatisfied than the more objective features of the job (Grieshaber, Parker, & Deering, 1995).

Although low turnover rates may appear desirable, the metasummary also revealed that very low turnover rates are undesirable. Some aides stay precisely because middle management is lacking or the supervisors are untrained (Brannon, Zinn, Mor, & Davis, 2002). Other aides stay because they have become demoralized and have developed a cynical and callous detachment to the job (Tellis-Nayak & Tellis-Nayak, 1989).

5.4 Threats to Personal Safety

There are major concerns in the literature about violence and aggression in the workplace posing a threat to the personal safety of the care aide. Nineteen articles focused specifically on nurse aides' experiences of assault by residents in long term care. Many other articles mentioned assault as a source of stress. The subject of assault is delicate one. Multiple authors describe residents who are bitter and hostile towards the aides (Brodaty, Draper, & Low, 2003; Foner, 1994; Gates, Fitzwater, & Succop, 2003; Kristiansen et al. 2006; Ramirez, Teresi, & Holmes, 2006). Psychological aggression such as shouting, name calling, threats and inappropriate sexual remarks have been found to be significantly related to nurse aides' feelings of reduced personal accomplishment and feelings of emotional exhaustion (Evers, Tomic, & Brouwers, 2002; Ramirez et al. 2006). These authors suggest that caregivers who experience aggressive behaviour feel isolated and demoralized. Several authors describe how residents or family members make demeaning racist remarks to aides (Berdes & Eckert, 2001; Foner, 1994; Mercer et al. 1993) or treat aides as servants (Grau & Wellin, 1992).

On top of this, aides endure physical violence (Burgio, Jones, Butler, & Engel, 1988; Foner, 1994; Freyne & Wrigley, 1996; Gates et al. 2003; Kristiansen et al. 2006). More than half of all aides report receiving an injury from a resident at some point during their employment (Fitzwater & Gates, 2002). The experiences of physical assault include being squeezed against a wall, pinched, scratched, spat at, hunted, hit or having objects thrown towards a person (Burgio et al. 1988; Kristiansen et al. 2006). "It is not little...not small smacks we get. They are in fact quite heavy punches and pinches and bruises...There are times when you want to scream for help" (quotes from support workers, Kristiansen et al. 2006, p. 248-249). These authors found that physical assault "was regarded as a very trying and unpleasant part of the job" (p.248) and resulted in feelings of humiliation.

Whether physical or verbal assault is intentional or not, many nurse aides regard it as violence (Gates et al. 2003) and sometimes view the residents' aberrant behaviour as deliberate (Brodaty et al. 2003). These same authors concluded that nursing home staff generally perceive residents in more negative ways than positive ways.

5.5 The Experience of Hierarchy: Devaluation and Domination

Most care aides are employed in highly structured, complex, hierarchical systems that resist change. A number of studies report very distressing findings of nurse aides' perceptions of hierarchies, leading to devaluation and domination (Helmer, Olsen, & Heim, 1993; Jervis, 2002a; Kristiansen et al. 2006). Nurse aides have been found to have feelings of humiliation, vulnerability, insignificance, invisibility, uncertainty and insecurity (Dewar & McCleod-Clark, 1992; Kristiansen et al. 2006). Kristiansen et al. (2006) refer to the "employer's meta message" (p.252) which is interpreted by nurse aides as "not feeling valued" or "confirmed" by their employer (p.252). The same authors refer to a gap "between the current economic and moral reality and the ideal moral desire, resulting in nurse aides' awareness of their own feelings of inadequacy and failure" (p.252).

Jervis (2002a) explored the relationships among nurses and nurse aides in an urban nursing home in the United States and found a militaristic paradigm for staff organization in which nurse aides served as subordinates. Nurse aides were assigned rank-specific duties and were held accountable to individuals higher in the staff hierarchy. In describing this

hierarchy, one staff member utilized a feudal system metaphor: "Nursing homes are like little principalities. You've got your royalty, your minor nobility, and your peasants. Everybody is trying to get in with the royalty and the peasants are getting screwed" (quote from staff member, Jervis, 2002a, p.14). The administration's embrace of hierarchy was reflected in their choice of words such as "delegate down" and "down at the unit level" (p.14).

5.6 *The Importance of Collegial Support*

Generally, nurse aides express strong feelings of mutuality with their co-workers. "My work-mates are the most positive thing about working here...you are never alone" (quote from support worker, Kristiansen et al. 2006, p.251). Job tasks and job process are less important to institutional loyalty than the warmth, friendliness, support and caring of co-workers and superiors (Brannon et al. 1990; Grau et al. 1991). "If it wasn't for these nurses aides socializing with one another, somebody would crack" (Quote from nurse aide, Jervis, 2002a, p. 18).

5.7 *Excessive Workload*

There is not enough time in the day for nurse aides to get everything done (Bowers et al. 2000; Krovach & Krejci, 1998). Workload is affected by a high ratio of residents to aides or a high acuity level of the residents (Garland, Oyabu, & Gipson, 1988; Mercer et al. 1993). Time saving measures include not allowing the resident to choose clothing, hurrying their dressing, cutting back on grooming, eliminating oral care and abbreviating the bath (tops and tails only) (Bowers et al. 2000). "They'll get washed up, they're kept dry and turned over, but they don't get lotion, they don't get the one on ones, they don't get walks" (quote from aide, Bowers et al. 2000, p.60). Inadequate equipment or lack of supplies also prevents aides from doing their job effectively (Garland, Oyabu, & Gipson, 1989; Mercer, Heacock, & Beck, 1994). Experienced aides find ways to get the job done by integrating demands, maximizing efficiency through organization and knowing when to safely cut corners (Bowers & Becker, 1992).

5.8 *Inadequate Training*

Three quarters of all aides feel inadequately trained for the job (Mercer et al. 1993). Due to heavy workloads and time constraints, aides receive varied and limited orientations and limited in-service education (Banaszak-Holl & Hines, 1996; Eaton, 2000; Lin et al. 2002).

It has been well documented that most aides lack basic mental health training and the skills to understand and manage challenging behaviours (Evers, Tomic, & Brouwers, 2002; Feldt & Ryden, 1992; Grant, Kane, Potthoff, & Ryden, 1996; Teresi, Holmes, Ramires, & Kong, 1998). Aides may experience exhaustion, tension and burn-out due to turmoil and disruption (Chappell & Novak, 1994; Dougherty, Bolger, Preston, Jones, & Payne, 1992).

In the United States, a 75 hour training course and certification testing is federally mandated (Castle, Engberg, Anderson, & Men, 2007), although some states (for example, California) require up to 160 hours of training (Harrington, O'Meara, Collier, & Schnelle, 2003). Aides in Taiwan are supposed to receive 100 hours of training and a certification exam, but not all aides receive minimum training and certificates (Sung, Chang, & Tsai, 2005). In Mexico, aides receive "some on the job training" (Douglas, Meleis, Eribes, & Kim, 1996). In Canada, the length of the care aide program varies from seven weeks in Ontario (personal support worker) to 32 weeks in the Northwest Territories (long term care attendant) (Health Employers Association of British Columbia, 2000). Canadian care aides are not regulated by provincial legislation and regulations seen for other members of the nursing team (LPNs, RPNs and RNs).

6. Discussion

Of the total articles (138), the frequency effect size was greatest for caring relationships and/or connectedness between aides and residents or aides and families, and collegial connections which appear to be very important motivational factors that may reduce turnover rates and increase quality of care (44.8%). A number of nurse aides remain committed and motivated to remain on the job even though the working conditions appear to be deplorable. These aides are not motivated by solely by wages or the working environment but by a combination of intrinsic factors such as a belief that their job is important (Parsons et al. 2003) or a belief that they are needed (Monahan & McCarthy, 1992).

This finding was followed closely by the concern regarding lack of financial compensation and rewards which shape general job dissatisfaction (frequency effect size 38.0%), supervisory styles that are generally hierarchical, demeaning and dismissive (frequency effect size 37.3%) and violence and aggression in the workplace which pose serious threats to the personal safety of the aide (frequency effect size 36.6%). As a group, nurse aides have complained that they very little voice. They are rarely directly consulted about their opinions and experiences. They are marginalized by frequent episodes of assault and by feelings of degradation and humiliation resulting from bureaucracy. Poor working conditions lead to feelings of guilt because most genuinely care about the residents.

There is a cost to society for overlooking the work of nurse aides, portraying nurse aide work as unskilled or ignoring aides as valuable sources of information. As the population ages, the care aide role will become a pivotal issue. Aides serve a very vulnerable segment of our society therefore "some interest must be taken in (aides)...if the care provided to the elderly is truly a concern" (Atchison, 1998, p.137).

Although care aides are most commonly utilized in residential continuing care they are also now being introduced to acute care settings. Job/role descriptions are continuously being updated and rewritten as part of the process of introducing the care aide to medical and surgical nursing units (nursing service aide). These are the same aides who report not feeling valued or nourished by their organizations. "I know I am dispensable" (quote from aide, Jervis, 2002a, p. 18). "It's like you're low class as a nursing assistant, you're on the bottom – which I don't like" (quote from aide, Jervis, 2002a, p.17).

Research about nurse aides is important because there are so many qualities of care issues and so many unsolved problems in their working environments. If organizations are concerned about positive outcomes for patients in acute and long term care and if they are concerned about improving the performance of individual workers and the organizations themselves, then they should address the needs voiced by the aides (Liu, 2006, p.56). Finally, heavy reliance on American research regarding the work as arduous, demanding and often demoralizing is a limitation. Further work is required to determine if American findings are truly generalizable to other countries.

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Table 1. The Full Contribution of the Different Sources to the Final Metasummary

Author(s) Year Country	Study Design	Subjects	Method	Results
Advisory Committee on Health Human Resources 2000 Canada	Government sponsored report addressing nurse shortage in Canada			National absence of data about nurse aides Nurse aides are non-regulated Nurse aides are not defined as nurses Basic policy questions are unanswerable because of the absence of a national data bank. In comparison to national data banks available to US investigators
Ahmed, & Kitson 1993 England	Qualitative	2 community hospitals and 2 units for people with learning disabilities Mixed staff N=48	“a multi-method approach” Semi-structured interviews, Informal opinions, non-participant observation, field notes	To provide quality care, effective leadership and efficient teams rather than primary nursing are needed
Anderson, Ammarell, Bailey, Clon-Emeric, Corazzini, Lillie, Piven... 2005 USA	Qualitative	11 nurse aides and 89 “other” staff members	Observation and interview data	“Mother wit” guides aides who treat residents as their own children = infantilization and misinterpretations of depression and pain. The Golden rule: respond to residents as you would want someone to respond to you. Aides act without the benefit of professional interpretations. Aides possess raw data that can be interpreted by RNs. Aides should be involved in care planning.
Anderson, Bailey, Corazzini, & Piven 2005 USA	Opinion			What contributes to poor quality of care? RNs who have minimal interaction with aides, LPNs who have minimal interaction with aides, aides in small cliques, no rewards for team work, heavy reliance on rules and rule enforcement, managers who have inadequate information and managers who fail to acknowledge good behaviour
Anderson, Corazzini, & McDaniel 2004 USA	Quantitative	2317 aides in 164 nursing homes in Texas	survey	Lower turnover is dependent on interaction climate and communication. Reward based climates, communication openness and accuracy = lower turnover rates.

Anderson, Issel, & McDaniel 2003 USA	Quantitative	DONS and RNs in 164 Texas nursing homes	Surveys given to DON and RNs regarding NA patterns of behaviour	Relationship oriented leadership and less formalization resulted in decreased use of restraints, decreased incidence of fractures
Astrom, Nilsson, Norberg, Sandman, & Winblad 1991 Sweden	Quantitative	RNs, LPNs, NAs in one somatic long term care clinic and one psycho-geriatric clinic n = 358	Empathy scale, burnout measure	Staff with highest empathy rated close contact with patients as most important. Staff with lowest empathy rated improvement in patients' health and contact with colleagues as most important. Those who have less positive outcomes in work risk more burnout.
Atchison 1998 USA	Quantitative	Nurse aides N=283 in 24 nursing homes	Questionnaire 5 point Likert scale	Socialization at work is an important factor for job satisfaction
Baldwin, Roberts, Fitzpatrick, While, & Cowan 2003 British	Review of existing literature			Lack of role clarification of roles: support workers saw their work as similar to RNs. RNs saw support workers' roles as basic care
Banazak, Mickus, Averill, & Colenda 2000 USA	Review of lessons learned in implementing an education intervention	92 nurse aides, 35% attendance rate		Actual staff attendance at the in-service training was marginal due to lack of time and requirement to forgo patient care in order to attend.
Banaszak-Holl & Hines 1996 USA	Quantitative	254 nursing homes in 10 states	Telephone survey of DONs and administrators plus access data bank (RAI)	Involvement of aides in care planning can significantly reduce turnover. Intensity of work demands does not result in increased turnover. Training for aides does not reduce turnover
Barney 1983 USA	Opinion		Author spent two days doing the work of a nurse aide	Aides are well motivated. Supervision is limited. Author concludes best care given in a home with a family or social quality. Community involvement is important. Cultural homogeneity contributes to better care
Barry, Brannon, & Mor	Quantitative	Directors of nursing n=156, day shift	survey	Higher number of rewards given to nurse aides resulted in lower incidence of pressure ulcers. Nurse aides who had more influence resulted in higher

2005 USA		charge nurses n=430 In 156 facilities		social engagement for residents
Beck, Baldwin, Modlin, & Lewis 1990 USA	Quantitative	21 RNs 20 aides	Guided interview	Information on characteristics & management of aggressive behaviour. Aggression occurs more often in the morning, during dressing. Soothing, using comfort measures and reasoning were commonly used by aides to reduce aggression.
Beck, Doan, & Cody 2002 USA	Opinion/discussion			Aides provide 8 of 10 hours of paid care. Discussion of challenges (specifically organizational...hierarchical structures)
Beck, Ortigara, Mercer, & Shue 1999 USA	Literature Review			Most nursing homes organized hierarchically, aides receive few rewards for performance, aides have few opportunities to feel successful, aides minimally involved in care planning, aides are mostly African American or Hispanic and supervisors are mostly White, residents are primarily White.
Berdes & Eckert 2001 USA	Qualitative	10 residents and 10 aides in three homes (n = 60)	Face to face interviews	75% of aides experience racism on the job. Job characterized by low wages, few or no benefits, low opportunity for advancement, job instability, over-representation of minorities
Borson, Reichman, Coyne, Rovner, & Sakaue 2000 USA	Quantitative	Nursing directors of medicare certified facilities N=899	survey	Nursing directors felt that only 32% of nurse aides possessed expertise in managing residents' "disruptive behaviours"
Bowers 1989 British	Opinion			Primary nursing has some serious repercussions: over-involvement, disagreements about care strategies, divisions in nursing team, lack of communication, weakening of the team as a whole
Bowers, & Becker 1992 USA	Qualitative	Nurse aides in 3 urban nursing homes N=30	Participant observation, in-depth interviews, grounded theory	Each nurse aide develops his or her own working strategy in order to survive by cutting corners and breaking rules
Bowers, Esmond & Jacobson 2000	Qualitative	Nurse aides n = 38	Participant observation and in-depth interviewing	Relationships between nurse aides and residents are an essential determinant of quality of care. Adequate staffing is essential to allow NAs to nurture relationships with residents.

USA			Grounded theory, constant comparative	
Bowers, Esmond & Jacobson 2003 USA	Qualitative	Nurse aides, n = 41	Grounded theory dimensional analysis	Aides do not necessarily quit because of hard work or poor pay. Rather, it is the way aides are treated by their employers that accounts for their leaving. Dismissing experiences will override positive experiences. Managers must develop a culture of respect, instead of demeaning or humiliating aides.
Brannon, Cohn, & Smyer 1990 USA	Quantitative	388 aides	Employee survey of 21 Pennsylvania nursing homes	When compared with women in small organizations: aides less satisfied with pay, less satisfied with skill variety, more satisfied with co-workers, more satisfied with task significance
Brannon, Smyer, Cohn, Borchardt, Landry, Jay et al. 1988 USA	Quantitative	388 aides and 101 LPNs in 46 nursing homes in Pennsylvania	Job diagnostic survey	Aide positions have less motivating potential than LPN positions, aides receive inadequate feedback, routines and hierarchies result in self limiting contracts that inhibit motivation. Wage structure plagues staff recruitment and retention.
Brannon, Streit, & Smyer 1992 USA	Quantitative	Observation of 214 aides in 4 nursing homes	Functional job analysis technique of 3371 tasks	Orientation of tasks is not predominantly toward the residents. Complexity of tasks is low. Tasks with greatest psychosocial quality are performed less frequently
Brannon, Zinn, Mor, & Davis 2002 USA	Quantitative	308 nursing facilities in 8 states. 288 DONs	Telephone survey	Predictors of low turnover: untrained supervisors, low RN turnover, flat management structure, presence of a union. Very low turnover rates are undesirable. Predictors of high turnover: high RN turnover, training site, investor owned facility rather than non-profit
Brodaty, Draper & Low 2003 Australia	Quantitative	253 staff in 12 nursing homes: no differentiation between types of "staff"	Questionnaire survey	91% of "staff" reported that they were happy in their job. 25% reported that the residents provided no job satisfaction
Broughton & Golden 1995 USA	Quantitative	Random samples from 38 nursing homes	Telephone interview	83% would value more training about managing behaviours of Alzheimer's disease. 90% interested in further training regarding dementias. 89% value a support group. Suggest acknowledge the

		Aides = 273		contributions of aides, include aides in care planning, provide support groups
Burgio, Engel, Hawkins, McCormick, & Scheve 1990 USA	Quantitative	Sampling of aide behaviours in one 223 bed nursing home, 7 times a day for 37 months		Covert sampling. Research done under the guise of incontinence research. Aides did not give consent to being observed. Most observations occurred in the hallways. LPNs were observed to be engaged in more direct care activities than aides (in the hallways).
Burgio, Fisher, Fairchild, Scilley, & Hardin 2004 USA	Between groups quasi-experimental comparison design	4 nursing homes in Alabama	Observations plus multiple tools to examine permanent versus rotating assignment	Two facilities permanent assignment versus two facilities rotating assignment: residents received higher hygiene rating in permanent assign. But residents received more meds, more psychotropic meds in permanent assign. No differences in disruptive behaviours, no differences in turnover rates, more absenteeism in permanent assignment
Burgio, Tice-Jones, Butler, & Engel 1988 USA	Quantitative	32 geriatric assistants in one nursing home	survey	22% of residents are verbally abusive, 20% are physically abusive towards geriatric assistants
Caris-Verhallen, Kerstra, & Bensing 1997 Netherlands	Literature review of research about communication with residents			Interaction with residents is low, speakers modify speech (baby talk), interaction styles are largely superficial, monotonous or routinized. Time pressure results in brief, task related interactions.
Carpiac-Claver & Levy-Storms 2007 USA	Qualitative	Video analysis of 23 aides interactions with residents	Grounded theory	Video recording of mealtimes and analysis of interactions. Communication between aides and residents is limited, lacks depth and residents not generally given enough time to respond.
Castle 2007 USA	Quantitative	72 nursing homes in 6 states Nurse aides N=1579	questionnaire	Nurse aides enjoy working with residents and co-workers but are not satisfied with pay
Castle, Engberg, Anderson, & Men 2007 USA	Quantitative	1779 aides in 72 nursing homes in 5 states	survey	Job satisfaction is related to intent to leave and turnover. Training, rewards and workload are important aspects of nurse aide work

Castle, & Myers 2006 USA	Quantitative	17,000 nursing homes	Audit of deficiency citations	RN staffing is associated with lower likelihood of being cited for deficiencies in mental health care. NA staffing associated with greater likelihood of deficiency citation in mental health care.
Caudill & Patrick 1989 USA	Quantitative			Praise by patient and family are important to aides. Belonging to a peer group and praise by charge nurse decreases turnover. Input into decisions decreases turnover
Caudill & Patrick 1991 USA	Quantitative			Nursing assistants who plan to leave their jobs are younger, had less tenure, were paid less, and were better educated. Rotating assignments resulted in more turnover than changing patient assignments weekly or never.
Chappell, & Novak 1992 Canada	Quantitative	25 long term care institutions in Winnipeg Nursing assistants N=245	Aides complete the Zarit Burden inventory, Maslach burden inventory and work stress tool	Aides who experience greater workload are more likely to feel burdened. Social support at work does not relieve the effect of workload. Aides who receive support from family and friends are less likely to burnout. Aides who have family supportive of their work experience less job pressure. Fewer family members at home results in less job pressure.
Chappell, & Novak 1994 Canada	Quantitative	25 LTC homes in Winnipeg Nursing assistants N=245	Face to face interviews	Findings point to the need to measure diagnoses and behaviours separately. Three behaviours were related to stress: being uncooperative, restless and constant crying
Cohen-Mansfield 1995 USA	Examination of literature about stress in nursing homes			Offers a comprehensive model of long term nursing care stress
Cole 1989 British	Qualitative	12 aides in one mental hospital and two elderly care hospitals	Interviews	Aides believe that they do much the same job as the RN but get little acknowledgement
Coleman, Looney, O'Brien, Zeigler, Pastorino, & Turner 2002 USA	Quantitative	Two facilities	One facility = Eden Alternative Control facility = traditional care	No significant differences after one year: no differences in infection rates, functional status, cost of care. Aide workforce at each facility remained unstable. Turnover increased during the period of implementation of Eden Alternative.
Cooper &	Quantitative	Nurse aides N	Aides given facts on	Mean score 59%. In comparison, high school

Cronin 2000 USA		= 177 in 9 nursing homes	aging quiz	graduates mean score 57%. Education and advancement of nurse aides is neglected
Cooper, Kaeser, Montgomery, & Marion 1991 USA	Quasi-experi mental		Before and after intervention	Positive effects of permanent resident assignment, case management, resident centred schedules
Corazzini, McConnell, Rapp, & Anderson 2004 USA	A conceptual framework of the decision-mak ing processes of aides			Aides make choices about caring for demented patients on a continuum from rational to intuitive, in part because of the working environment. Some decisions are not good decisions and may lead to decreased quality of care.
Cotton & Tuttle 1986 USA	Literature Review			Studies of employee turnover: increases in pay reduce turnover. Job satisfaction, satisfaction with co-workers are negatively related to turnover. Age, tenure, number of dependents negatively related to turnover. Women more likely to leave than men.
Dewar, & Macleod-Clar k 1992 England	Review of existing literature			There is a lack of clear definition of roles and there are mixed feelings amongst “qualified staff” to the “new helper role”
Dickson & Cole 1987 British	Opinion			Registered nurses have no clear ideas or expectations of the support workers’ roles.
Dougherty, Preston, Jones, & Payne 1992 USA	Quantitative	Varied staff at one state geriatric long term care hospital N=28	Log of exposure to aggressive behaviour for one month, semi-structured interviews, a detailed accounting of one exposure to aggressive behaviour, and questionnaire	Physical aggression was the most frequently reported form of aggression and occurred mostly in the mornings. Job satisfaction was negatively affected by exposure to aggressive behaviour but positively affected by educational level
Douglas, Meleis, Eribes, & Kim 1996 Mexico	Quantitative	Mexican nursing assistants N=59	questionnaire	Frequent stressors were interpersonal relations, anguish, work overload and work environment

Eaton 2000 USA	Literature review			Low quality of care, low quality work environments. Much of the work is invisible and not documented or measured. Training minimal. Supervision inadequate. Little information is shared. Many aides choose this work despite poor working conditions.
Edwards 1997 British	Opinion			Aides are the backbone of health services and perform the greatest part of basic care. Aides are indispensable. Aides do the work. RNs organize the work.
Evers, Tomic & Brouwers 2002 The Netherlands	Quantitative	“Staff” caring for residents in 33 homes for the elderly n=551	Two questionnaires	Physical aggression of residents was found to have a significant relationship to depersonalization (one of three dimensions of burn-out).
Farrell Miller 1997 USA	Qualitative	All staff of one dementia care unit	Interviews analyzed	Responses to physical aggression and the effects of physical aggression on caregivers and on nursing practice. Showering is the activity most likely to provoke patient aggression.
Feder, Komisar, & Nieflod 2000 USA	Literature review			Medicaid versus Medicare.
Feldt & Ryden 1992 USA	Quantitative	Educational intervention		Following educational intervention, aides report caring for cognitively impaired residents is more rewarding and less frustrating
Fitzwater & Gates 2002 USA	Quantitative	20 aides	Assault log	Educational intervention to reduce resident assaults on aides. 4 hour educational intervention resulted in reduced number of assaults and increased confidence.
Foner 1994 USA	Qualitative	200 bed nursing home in New York City	Ethnography Participant observation, 14 “formal” interviews, 20 “informal interviews	Most nurse aides are kind and helpful to residents most of the time. Many aides established relations with patients that they and the patients found gratifying. Work is physically straining and emotionally wearing. Patients are bitter and hostile. Abuse from patients.
Freyne & Wrigley 1996 Ireland	Quantitative		Review systems of recording aggressive incidents, introduce new system, review all cases	Aggression by patients is common. Staff require support and acknowledgement of their difficulties dealing with aggression. A reporting system may assist staff to highlight factors associated with aggression.
Friedman, Daub, Cresci,	Quantitative	Nurse aides in 5 nursing	Survey	Compares Nurse aides in 5 home care programs to nurse aides in 5 nursing homes. Job satisfaction is

& Keyser 1999 USA		homes and 5 home care programs N=349		higher in nurse aides in home care, probably due to increased ability to use own judgments and make own decisions
Garland, Oyabu, & Gipson 1988 USA	Opinion			Careful screening of attitudes and values of aides will reduce turnover
Gates, Fitzwater, & Meyer 1999 USA	Quantitative			Violence occurs frequently. Caregivers and nursing directors consider assaults against caregivers by residents as violence. Homes do not have enough policies or procedures in place to prevent, monitor or control violence
Gates, Fitzwater and Succop 2003 USA	Quantitative	Nurse aides N=138	Occupational stress inventory and assault log	Mean number of assaults per nurse aide per 80 hours of work was 4.69 Range 0-67 assaults per 80 hours of work
Gilloran, McKinley, McGlew, McKee, & Robertson 1994 Scotland	Quantitative	2080 staff in psychogeriatric wards, 50.1% of these were nurse aides	questionnaire	Staff nurses were more dissatisfied than nurse aides because they did not want to be assigned to a psychogeriatric ward.
Goldman 1998 USA	Quantitative	5 facilities	Survey of staff perceptions of primary versus team nursing	Staff prefer permanent assignments
Graneheim, Isaksson, Ljung, & Jansson 2005 Sweden	Qualitative	Six care providers	Narrative interviews: phenomenological hermeneutic	Interactions with people suffering from dementia and behavioural disturbances = ethical dilemmas, balancing contradictions, feeling powerless versus capable, feeling rejected versus accepted
Grant, Kane, Potthoff, & Ryden 1996 USA	Quantitative	400 nursing units in 124 facilities	Collection of baseline data about dementia specific training programs	22% of facilities had no dementia oriented training for new staff. For nursing assistants, more training increases their knowledge and skills needed to work more effectively with residents with dementia
Grau, Chandler, Burton &	Quantitative	Nurse aides N = 219	questionnaire	Quality of the social environment of the nursing home is as important as attitudes to job benefits in accounting for institutional loyalty

Kolditz 1991 USA				
Grau & Wellin 1992 USA	Qualitative	Two metropolitan nursing homes	Ethnography	Monticello versus Homehaven: Unaddressed significant cultural, sociostructural and sociodemographic characteristics shape the climate of the organization
Grieshaber, Parker, & Deering 1995 USA	Quantitative	Two nursing homes	questionnaire	Aides more likely to be dissatisfied with the working conditions than the job content. Managerial performance is key to job satisfaction. Supervisors should include aides in care planning activities to give aides an ownership stake
Hagen & Sayers 1995 USA	Quantitative			Physical aggression associated with lack of knowledge. 50% reduction in reported physical aggression from residents after a staff education program
Hare & Pratt 1988 USA	Quantitative	LPNs and RNs (n=57) and aides (n=96)	Surveys Burnout Inventory	Aides experience significantly more emotional exhaustion and significantly more depersonalization than professional nurses.
Harrington 2005 USA	Quantitative	State licensing and certification program directors	Collection of data from internet regarding state regulations plus telephone survey	Florida is the state with highest nursing home staffing levels: 3.9 hours per resident per day. A trend across the USA towards higher staffing levels. 33 states have minimum staffing levels for NAs. No federal minimum standards for NA staffing levels.
Harrington, O'Meara, Collier, & Schnelle 2003 USA	Descriptive		Examination of information on public database of 1400 California nursing homes	Aides wages are less than a living wage. 91% of all California nursing homes report nurse aide hours below the recommended 2.8 hours per resident per day. Average facility reported 2.2 hours per resident per day. Average annual turnover rate is 78%. Only 23% of California facilities comply with federal regulations
Harrington & Swan 2003 USA	Quantitative	Nursing staffing data from California cost reports 1999		Total nursing hours per resident per day averages 3.208 hours. Higher proportions of Medicare residents and lower proportions of Medicaid residents = significantly higher staffing hours. For profit facilities had less staffing hours.
Harrison, Loiselle, Duquette, & Semenic 2002 Canada	Quantitative	Aides in Quebec, n = 171	Self report questionnaires	Examine relationships between hardiness, psychological distress and work support in nursing aides compared to RNs. Aides are significantly less hardy than RNs and more vulnerable to occupational stressors and burnout
Canadian	Highlights	Uses data		Resident Assessment Instrument Minimum Data Set

Institute for Health Information: Caring for Residents with Behavioural Symptoms Canada 2008	the use of the RAI MDS 2.0 used to capture aggression and other behavioural symptoms.	submitted by 5 Nova Scotia nursing homes		(RAI MDS). 45% of residents exhibit behavioural symptoms including verbal or physical abuse, social inappropriateness, resistance to care and wandering.
Canadian Institute for Health Information: Health Care in Canada 2007 Canada	Produced with Statistics Canada to provide current information on health system and health of Canadians			Health care costs, profile of the workforce (professionals only, NOT aides), wait times for procedures, mortality statistics (cardiac, infections, mistakes etc.), life expectancy across the provinces
Health Employers Association of British Columbia 2000 Canada	Government document prepared for Health employers association of BC and association of unions.	6 sites in BC	Interviews, focus groups and surveys	Focuses mainly on LPNs. Provides recommendations for new positions, education programs, scholarship programs, and continuing education for aides and LPNs. Plans were to provide these recommendations to the Ministry of Health.
Heliker 2007 USA	Discussion/opinion		Story sharing interventions between nurse aides and residents of one long term care facility	Time allotted for reciprocity through story telling: nurse aides feeling valued (best practice)
Helmer, Olson, & Heim 1993 USA	Quantitative	Nurse aides in 40 nursing homes N=246	Survey	71% dissatisfied with wages 70% of nurse aides felt they received no respect 64% felt ignored by management
Hollinger-Samson, & Pearson 2000	Quantitative	62 cognitively intact residents in 6 nursing homes	Empathy scales, depression scales	Examines resonated / perceived nurse aide empathy (measured by empathy subscale), expressed empathy (supervisors) with self rated depressive symptoms of residents Negative nurse aide behaviour is related to

USA				negative psychological outcomes for residents.
Hsieh & Su 2007 Taiwan	Quantitative	826 aides	Survey via telephone	Major reasons for staying in LTC are personal interest in caring, good financial benefits, supportive supervisors. Reasons for leaving: low wages, heavy workloads, long hours, high levels of stress
Jackson 1997 USA	Qualitative	52 nurse aides, 5 nursing homes	Ethnography, feminist methods	Practical knowledge used to guide decision making. A major barrier to giving care is the organization of care itself. Not enough time to give adequate care. Aides not monitored or supervised. Aides not informed properly. Aides perform “invisible work”.
Janz 1992 USA	Opinion			Aides would benefit from psychological training in their programs.
Jervis 2002a USA	Qualitative	14 residents One trained medication aide, four NAs, 11 nursing department employees (administration, RNs, LPNs)	Ethnography Participant observation, semi-structured interviews, medical record reviews	The study revealed a local work environment characterized by conflict and by nurse aides resistance to nurses’ domination
Jervis 2002b USA	Qualitative	One nursing home for psychiatrically disabled clientele. 14 residents and 16 staff members	Ethnography: Participant observation Semistructured interviews	An exploration of how staff conceptualized and dealt with “problem” behaviours. Staff were cognizant of the ever-present threat of assault. Violent, serious disruptive behaviour is a serious problem. Staff resorted to informal and formal strategies.
Kettlitz, Zbib, & Motwani 1997 USA	Quantitative			To reduce turnover rates, it is important to reduce the number of poor candidates selected for employment by using a weighted application blank
Kim, & Rovner 1995 USA	Opinion			Nursing homes function as long term psychiatric hospitals for the elderly
Kitson 1987 USA	Discussion of case studies Qualitative?			The author offers a set of characteristics similar to both lay-caring and professional caring relationships and offers case studies to illustrate care-giving features.

Kiyak, Namazi, & Kahana 1984 USA	Quantitative	308 employees of 6 nursing homes and 12 community facilities	questionnaire	Intention to leave is predicated by age (younger), length of employment (shorter), job dissatisfaction and community agency.
Kovach & Krejci 1998 USA	Quantitative	Aides = 22	Card sort	50 facility factors deemed important for quality care. Staff working together as a team = #1. Having sufficient time to devote to patient care = #2. Having enough time to spend personal time with residents = #3.
Kristiansen, Hellzen & Asplund. 2006 Sweden	Qualitative: narrative interviews	2 RNs 18 support workers	Thematic content analysis	The organization and resident behaviours were seen as very negative. A positive relationship with colleagues was the primary reason for nurses continuing to work.
Lin, Yin, & Li 2002 Taiwan	Quantitative	Analysis of work stressors of 102 aides	Interview	Patient care tasks most stressful. Type of relationship with supervisor reported as least stressful.
Liu 2007 Taiwan	Quantitative, cross sectional design to explore factors that influence job satisfaction of nurse aides and the influence of job satisfaction on the clients	17 private, public and freestanding nursing homes in 3 main cities in Taiwan. Nurse aides n = 244, residents and families, n = 392.	40 item questionnaire for nurse aides, 10 item questionnaire for residents and families Likert scale, very satisfied to very dissatisfied.	Married, part time and nurse aides with long tenure tended to be less satisfied. Justice and fairness were viewed as the most important factors in work environment. No correlation between job satisfaction of NA and resident satisfaction
MacPherson, Eastley, Richards, & Mian 1994 England	Quantitative	4 long stay wards, 4 homes for elderly mentally infirm, 4 homes for elderly, 4 private nursing homes N=188 workers	All staff in each unit completed 30 item screening questionnaire designed to measure psychological distress. Additional log of assaults over previous week	Very high rates of long term sickness. A relationship between psychological disturbance and assault during the past week. Disturbed staff were likely to perceive lack of support at work and report "shouting back"

Manthey 1989 USA	Opinion			The beginnings of the nurse aide working in partnership with the RNs (as a dyad) resulting in cost savings. Suggestion to pass cost savings on to the RN in a form of salary increase. No salary increase for aides.
Mattiasson & Andersson 1997 Sweden	Quantitative	Chronically ill but cognitively well residents (n=60) in 13 homes	Questionnaires	54% of residents indicated that staff members never sat down and talked with them. Nursing homes do not offer satisfactory opportunities for social contact.
McAiney 1998 Canada	Opinion			Development of a model for nurse aide empowerment
McCarthy, Blow & Kales 2004 USA	Quantitative	9618 residents	Use of administrative data for all residents in VA nursing homes	17.9% of residents are diagnosed with a serious mental illness. Residents with a serious mental illness and without dementia exhibit more verbal disruption than residents with dementia. No differences in physical aggression or socially inappropriate behaviour.
McGillis-Hall & O'Brien-Pallascos 2000 Canada	Quantitative	RNs n = 14 RPNs n = 11 Aides n = 21 Toronto, 2 nursing units		Although health care aides perform most of the direct nursing care activities, they value it the least. Aides value the performance of non-nursing tasks and perceive their job as insignificant
McGilton, O'Brien-Pallascos, Darlington, Evans, Wynn, & Pringle 2003 Canada	Quasi-experimental	50 residents given questionnaires, 40 residents and 34 staff observed	Questionnaires and observations	Pre-post intervention: investigator designed education program (relationship enhancing). Care providers taught how to enhance relational skills without added staff. Residents report significant positive effects: more empathetic and more reliable.
McGrew 1999 USA	Quantitative	15 case studies of residents in long term care who are diagnosed with serious mental illness excluding dementias	Chart audit Resident interviews	Violent, disruptive behaviours, agitation, anxiety, withdrawal, conflict with staff, psychotic episodes, impaired judgement, non-compliance with care and/or facility regulations. Lack of training of staff led to inconsistent responses and "taking the behaviour personally"
Mercer, Heacock & Beck	Quantitative	27 randomly selected aides from 3 nursing	Interview	50% of aides work extra shifts just to cover basic expenses. 77.7% of aides experience discriminatory language and racist behaviours. Slurs hurt, even if

1993 USA		homes		they come from demented residents. 75% report that they need more training...feel inadequately trained for the job. 92% of aides report verbal and physical abuse from residents
Mesirow, Klopp, & Olson 1998 USA	Descriptive		Describes implications of enforcing an attendance policy for nurse aides	35% reduction of sick time as a result of implementing attendance policy
Moen & Nievaard 1997 Dutch	Qualitative	15 case studies of dismissed managers on nursing homes	Open, unstructured interviews	Managers have no early warning systems. Managers create their own reality. Dismissal is based on attitudes and competence, not on business expertise or technical skills. Managers need training in social skills.
Monahan & McCarthy 1992 USA	Qualitative	Views of aides n = 76 in seven rural nursing homes in Oregon	Interviews Content Analysis Phenomenology?	No particular reason for becoming a nurse aide Like helping and working with people. Like feeling needed, wanted, valued. Want to receive recognition. Work is physically demanding, tiring. Continue to work because need the money. Desire for more autonomy.
Moyle, Skinner, Rowe, & Gork 2003 Australian	Qualitative	9 RNs, 5 students, 13 aides	Content analysis of focus group interviews	Job satisfaction related to convenience, interaction with residents, team environment, staying beyond end of shift. Dissatisfaction related to being bullied by others, unskilled staff, tensions within role expectations, overtime, not being listened to.
National Union of Public and General Employees 2007 Canada	Discussion and presentation of funding issues for LTC. Discussion of for profit versus not for profit. Workplace conditions			Long term care not a fully insured health service in any Canadian province or territory. Provides demographics and useful facts. Monthly charges. Guaranteed income supplement (GIS), low income. System failing to provide many Canadians affordable care. Many forced to pay for medical and personal care, forced to spend assets. Poor staffing, poor working conditions
Noelker, Ejaz, Menne, Jones 2006 USA	Quantitative	Nurse aides N = 338 at 22 nursing homes	Survey data	Personal stressors have the greatest impact on satisfaction with supervision (family, financial, health concerns). Personal stressors of NAs require attention from supervisors because they affect worker satisfaction
Novak &	Quantitative	Aides n = 245	Three subscales of	Frequency of disturbed patient behaviours explains

Chappell 1994 Canada			burnout	feelings of reduced personal accomplishment. Age, minutes giving care, appraisal of work tasks, reaction to patient behaviours explains depersonalization
Nursing Workforce: Recruitment and Retention... Growing Concern USA 2001	Government document prepared for Congress Review of current literature			Discussion of shortages, current and projected supply of aides, factors contributing to shortage, government and private efforts to improve recruitment and retention of aides. Demographic, employment, wage and benefit profiles in different employment settings.
Parsons, Simmons, Penn, & Furlough 2003 USA	Quantitative	Aides from 70 nursing homes N = 550	Mail out survey	Most satisfied with closeness to residents, their affect on residents, belief that the job is important, and own competence in providing resident care. Dissatisfied with insufficient input into decision-making, pay, benefits, recognition, appreciation
Patchner & Patchner 1993 USA	Quasi-experimental		Before-after	Compares permanent assignment (primary care) to rotating assignment (teams). Rotating distributes the burden of difficult or care intensive patients. Permanent assignment resulted in decreases in behaviour problems and health outcomes and decreased employee absenteeism. However aides reported boredom and overly demanding residents
Radcliffe 1995 USA	Opinion			Increasing numbers of aides working in acute care settings. Educators need to make an effort to assess, organize, and plan activities for aides in acute care.
Ramirez, Teresi, & Holmes 2006 USA	Quantitative	22 New York State nursing homes, 104 aides	Interviews	27% of nurse assistants reported pejorative name calling by their residents. Pressure to complete task, assignment size contributed to demoralization. Support groups also contributed to demoralization (negative support system)
Reagan 1986 USA	Opinion			Each administrator must regularly review to ensure all aides have necessary training, skills and time to perform their duties effectively and efficiently.
Redfern 1994 British	Opinion			Many RNs feel threatened by increasing demand for aides (support workers). RNs exercise control over aides by delegating tasks to support workers.
Reeve 1994 British	Quantitative	RNs n = 120	Questionnaire survey of RN opinions of aides	RNs poorly informed about the role of the support worker.
Remsburg,	Quantitative			Tracking turnover without tracking stability rates

Armacost, & Bennett 1999 USA				results in an incomplete picture of aide turnover
Riggs, & Rantz 2001 USA	Review of existing literature and opinion		A model of staff support in nursing homes is proposed	An organization must provide structure and leadership to help people work together productively
Salmon, Crews, Reynolds-Scanlon, Jang, Weber, & Oakley 1999 USA	Literature review of research, policy and practice regarding nurse aide turnover		Florida Policy Exchange Centre on Aging: sponsored government document.	Stayers are older, African American women with health and pension benefits. Wages and working environments play a major role in turnover. Should recruit older welfare to work clients and students. Focus screening on questionnaires about skills, motivations and reliability. Relationships are important to job satisfaction and turnover. Aides require clear job descriptions.
Sahyoun, Pratt, Lentzner, Dey, & Robinson 2001 USA	Profile of nursing home residents 1985-1997		Government report: Center for Disease Control and Prevention	Changing characteristics of residents. Older, more racially diverse, more circulatory diseases and cognitive and mental disorders, more mental health issues, more help with ADLs, more incontinence, increased choices of care (home care)
Schnelle, Simmons, Harrington, Cadogan, Garcia, & Bates-Jensen 2004 USA	Quantitative	Two groups of nursing homes N=21 are compared	Chart audit, Staff interviews, direct observation	Highest staffed nursing homes performed significantly better on 13 of 16 care processes implemented by nurse aides
Secrest, Iorio, & Martz 2005 USA	Qualitative	Why aides stay in their jobs Aides n = 11	Indepth interviews	Work is physically demanding, poor pay, work grounded in hostility and disrespect, lack of control and physical assaults by residents. Why aides stay in long term care: a sense of connection with families, residents and co-workers, pride, being recognized for their efforts, being conscientious about details
Schnelle, Simmons, Harrington, Cadogan, Garcia, & Bates-Jensen	Quantitative	21 nursing homes in two phases of the study	Staffing information from data base, on site interviews and observations, plus chart audit	Authors describe quality of care related to 27 different care processes (16 of the care processes typically implemented by aides...feeding, incontinence care, social engagement, repositioning etc.). Highest staffed homes perform better on 13 of the 16 care processes. Aides report lower care loads

USA 2004				and provide better care in homes with highest staffing
Sheriden, White, & Fairchild 1992 USA	Quantitative	530 staff in 25 nursing homes in Florida and Texas	questionnaire	Failed homes have significantly lower scores on human relations climate dimensions and on laissez-faire climate. Management in failed homes inattentive to staff motivation, demonstrating inadequate planning and showing disdain for aides
Shaw 2004 USA	Qualitative	9 aides, 3 RNs, 3 administrators in 6 facilities	Grounded theory Semi-structured interviews	Nursing home staff responses to aggressive residents. Best practices: proactive, vigilance, being intuitive, strategizing
Sherrell, Anderson, & Buckwalter 1998 USA	Quantitative	Retrospective audit of psychological reports of 570 residents in 51 nursing homes in Chicago	Coding and categorizing of narrative data contained in reports	Nursing homes function as long term psychiatric hospitals for the elderly. High prevalence of mental disorders in nursing homes.
Stone 2004 USA	Opinion			Recruitment and retention of aides is a major problem. Policy makers must partner with providers, organizations, and researchers to work towards sustaining this workforce.
Sung, Chang, & Tsai 2005 Taiwan	Qualitative	Nurse aides N=16	Semi-structured interviews	Emotional attachment to residents, cleanliness of the environment, adequate staffing, training and equipment contributed to increased job satisfaction
Task Force on Resident/Staff Ratio in Nursing Homes 2002 Canada	Government document: Canadian Union of Public Employees and Nova Scotia Dept. of Health		Survey of nursing homes in Nova Scotia	Task force review of current nursing home staffing in Nova Scotia and examination of challenges (recruitment, increasing needs of residents, inadequate levels of staffing. No overall plan, no regular reporting of statistics. Results compared to 7 of 9 provinces: Hours of care provided in Nova Scotia generally less other provinces. All provinces identify recruitment and retention in top three issues.
Tellis-Nayak, & Tellis-Nayak 1989 USA	Qualitative	Examines two worlds of nurse aides: world in which they live and world in	ethnography	A self perpetuating negative cycle

		which they work		
Thornley 2000 British	Quantitative and opinion		Author draws from national questionnaire surveys	Aides perceive themselves as substituting for registered nurses. Aides are mature, experienced, competent. RNs should welcome aides as team members
Thorson 1989 USA	Letter to the Editor			The author responds positively to Tellis-Nayak (1989) and concurs that aides are underpaid, overworked and underappreciated. The author reflects on his experiences as an orderly in Chicago.
Wadensten 2005 Swedish	Qualitative	Nurses n = 3 Aides n = 15 Residents n = 20	Observations of interactions and field notes. Content analysis	Most common topic of conversation is sickness, focused on the body. Conversations should not focus on illness and body fixation. Staff hurry conversations due to time constraints
Waxman, Carner, & Berkenstock 1984 USA	Quantitative	335 aides in seven nursing homes	Questionnaire and various scales	Turnover would lessen with changes in management style that allow aides more involvement in the decision-making process
Weech-Malondo, Meret-Hanke, Neff, & Mor 2004 USA	Quantitative	1135 nursing homes in 5 states	Data from minimum data set (MDS) and OSCAR	Relationship between staffing and quality of care outcomes (ulcers, restraints, psychotropic medication, decline) is complex and more than a matter of minimum staffing levels
Williams, Kemper, & Humer 2003 USA	Qualitative	20 aides in 5 nursing homes attend a one hour session	Before-after analysis of tape recordings of speech	Investigation of effectiveness of brief communication program aimed at reducing patronizing speech by aides. After training, aides used fewer diminutives.
Wright 1988 USA	Opinion			Nursing home staff attitudes are inappropriately measured with scales based on negative stereotypes. Negative attitudes are not a credible explanation for poor care
Wright 2006 England	Quantitative and Qualitative	Nurse aides n = 23	Questionnaire supplied to nurse aides post study day	Study day helps nurse aides to understand their role in supporting student nurses in geriatric settings
Workman 1996 Britain	Qualitative	Eight support workers	Semi-structured interviews	RNs regarded support workers as a threat. Support workers perceived themselves as key players who support the work of the RNs
Yeatts &	Mixed	Observe	Pre-test, post-test	5 home have work teams, 5 homes give traditional

Cready 2007 USA	methods (qualitative and quantitative)	meetings n=270 in 5 pairs of nursing homes	design: observations of team meetings and comparison of nursing homes	care. Work teams have modest positive effects: increased empowerment, better aide performance, improved care and choices, improved cooperation and coordination. Possibly reduced turnover.
Yeatts, Cready, Ray, DeWitt, & Queen 2004 USA	Quasi-experi mental	5 nursing homes in Dallas-Fort Worth: comparison of self managed work teams for nurse aides versus no teams		Qualitative analysis shows positive effects of self managed work teams for nurse aides
Zinn 1993 USA	Quantitative			Facilities employ more NAs in markets where RN wages are higher

Table 2. Abstraction and Grouping

Findings	# of Reports
<u>Factors that Compromise the Aides Abilities to provide Quality Care to Residents</u>	
There is not enough time to give sufficient care to residents (Krovach & Krejci, 1998)	4
There is not enough time to have a personal relationship with residents (Krovach & Krejci, 1998)	3
Lack of interaction or communication between aides and RNs or other professionals (Anderson et al. 2005)	7
Nurse aides interacting mainly with other nurse aides resulting in small cliques (Anderson, Bailey, Corazzini, & Piven, 2005)	4
No rewards for performance (Anderson, Bailey, Corazzini, & Piven, 2005)	7
Heavy reliance on rules and enforcement of rules (Grau and Wellin, 1992)	9
Having to cutting corners (Jervis, 2002a)	3
Lack of supervision (Barney, 1983)	3
Having to work alone (Barney, 1983)	2
High turnover rate (Barry, Brannon, & Mor, 2005)	3
Recruitment difficulties (Beck, Ortigara, Mercer, & Shue, 1999)	1
Lack of involvement of aides in the care planning process (Beck, Ortigara, Mercer, & Shue, 1999)	2
Inadequate staffing levels (Beck, Ortigara, Mercer, & Shue, 1999)	3
Components of training programs differ widely (Beck, Ortigara, Mercer, & Shue, 1999)	1
Low wages (Jervis, 2002a)	1
Poor management of chronic pain (Schnell, Simmons, Harrington, Cadogan, Garcia, & Bates-Jensen, 2004)	1
Workers perceive organizational climate as laissez faire (Sheridan, White, & Fairchild, 1992)	1
Administration ignores the social history behind apathy (Tellis-Nayak & Tellis-Nayak, 1989)	2

Administration demonstrates inadequate planning (Sheridan, White, & Fairchild, 1992)	1
Administration provides inadequate resources to enhance the quality of resident care (Sheridan, White, & Fairchild, 1992)	1
Administration show disdain for lower level caregivers (Sheridan, White, & Fairchild, 1992)	4
The first priority of the aide is not high quality care, but survival in a hostile environment (Thorson, 1989)	1
Lack of depth of communication between aides and residents (Carpiac-Claver & Levy-Storms, 2007)	2
Lower levels of RN staffing related to higher mental health deficiency citations (Castle & Myers, 2006)	1
 <u>Factors that Enhance the Aides Abilities to provide Quality Care to Residents</u>	
Permanent assignment to residents (primary nursing) (Patchner & Patchner, 1993)	1
Team work assignment (Foner, 1994)	5
Wisdom gained through the experience of being a mother (Anderson et al. 2005)	1
Aides responding to residents as they would wish someone would respond to them (Anderson et al. 2005)	1
Aides possess 'raw data' that can be interpreted by RNs for the residents' benefit (Anderson et al. 2005)	1
Interactions between administration, staff, and residents have a family or social quality (Barney, 1983)	4
Aides treated fairly (Barney, 1983)	1
Aides receive rewards (Monahan & McCarthy, 1992)	3
Community involvement (the surrounding community's presence palpable in the home) (Barney, 1983)	1
Cultural homogeneity within the home (Grau, & Wellin, 1992)	3
Caring relationships between aides and residents (Bowers, Esmond, & Jacobson, 2000)	1
Management mechanisms (monitoring, measuring) (Schnell, Simmons, Harrington, Cadogan, Garcia, & Bates-Jensen, 2004)	1
Administration that is sensitive to the social needs of the nurse aide (Tellis-Nayak & Tellis-Nayak, 1989)	1
Administration that nurtures idealism (Tellis-Nayak & Tellis-Nayak, 1989)	1
Administration that fosters a family spirit (Tellis-Nayak & Tellis-Nayak, 1989)	1
Administration that boosts the self esteem of the aide (Tellis-Nayak & Tellis-Nayak, 1989)	1
Focusing less on health status in conversation with residents, and more on resident as person (Wadensten, 2005)	1
Higher levels of RN staffing reduce the likelihood of receiving a mental health deficiency citation (Castle & Myers, 2006)	1
 <u>Characteristics of the Role</u>	
Task diversity (Dewar & McCleod-Clark, 1992)	2
Working without a clear job description (Ahmed & Kitson, 1993)	3
Working with only minimal supervision (Eaton, 2000)	3
Doing more than what is on the job description (Dewar & McCleod-Clark, 1992)	2
Feelings of depersonalization or devaluation (Bowers, Esmond, & Jacobson, 2003)	4
Feelings of domination (Dewar & McCleod-Clark, 1992)	1
Dog's body (Dewar & McCleod-Clark, 1992)	1
Multiple simultaneous demands (Eaton, 2000)	3
Equipment and essential supplies frequently unavailable (Eaton, 2000)	1
Minimal information sharing (Eaton, 2000)	1
Multiple components of invisible work (neither measured nor documented) (Eaton, 2000)	2
Inadequate time to complete care (Eaton, 2000)	7
Physically straining work (Foner, 1994)	4
Emotionally wearing (Foner, 1994)	3

Having to cope with physical or psychological abuse (Foner, 1994)	4
Repetitive work (Brannon et al. 1988)	1
Status hierarchies (Brannon et al. 1988)	6

Turnover

Average annual turnover rate for aides 1996 (in US) is 32% (Banaszak-Holl & Hines, 1996)	1
Average annual turnover rate for aides 2001 (in US) is 78% (Harrington, O'Meara, Collier, & Schnelle, 2003)	1
Average annual turnover rate for aides (California) is 78% (Harrington, O'Meara, Collier, & Schnelle, 2003)	1
5% of homes have 75% annual turnover rate for aides (Banaszak-Holl & Hines, 1996)	1

Organizational Factors

62% of homes use primary resident care assignment (Banaszak-Holl & Hines, 1996)	1
No federal standards for minimum levels of nurse aide staffing (in US) (Harrington, 2005)	1
Thirty three states have state minimum levels of nurse aide staffing (in US) (Harrington, 2005)	1
Florida is the state with the highest minimum levels of nurse aide staffing (Harrington, 2005)	1
The labour market for nurse aides is wage sensitive (Harrington & Swan, 2003)	1
44% of California nursing homes fail to meet state minimum standards for nurse aide staffing (Harrington, O'Meara, Collier, & Schnelle, 2003)	1
62% of homes in California 1999 -2002 had serious deficiencies not in compliance with federal regulations (Harrington, O'Meara, Collier, & Schnelle, 2003)	1

Training

Minimal training (Eaton, 2000)	6
Working without any formal training (Dewar & McCleod-Clark, 1992)	2
Orientation to the job: (in US) average less than one week (Banaszak-Holl & Hines, 1996)	1
75% feel inadequately trained for the job (Mercer, Heacock, & Beck, 1993)	1
Federally mandated 75 hour initial training course in US (Castle, Engberg, Anderson, & Men, 2007)	3
160 hours training and examination in California (Harrington, O'Meara, Collier, & Schnelle, 2003)	1
Taiwan: minimum 100 hours of training and certification exam (Sung, Chang, & Tsai, 2005)	1
Taiwan: not all aides receive minimum training and certificates (Sung, Chang, & Tsai, 2005)	1
Some on the job training (Mexico) (Douglas, Meleis, Eribes, & Kim, 1996)	1

Wages

Less than a living wage, not competitive with fast food industry (in US) (Harrington, O'Meara, Collier, & Schnelle, 2003)	3
Having to work extra shifts or having a second job to cover basic expenses (Mercer, Heacock, & Beck, 1993)	1
1991 US hourly wage in New York City \$9.16 (Grau, Chandler, Burton, & Kolditz, 1991)	1
1993 average US net weekly income \$301.00 (Mercer, Heacock, & Beck, 1993)	1
1993 average US hourly wage \$4.29 (Mercer, Heacock, & Beck, 1993)	1
1995 average US hourly wage \$5.60 (Banaszak-Holl & Hines, 1996)	1
1995 average US yearly income < \$10,000 (Banaszak-Holl & Hines, 1996)	1
2001 average US hourly wage \$ 9.57 (California) (Harrington, O'Meara, Collier, & Schnelle, 2003)	1
1994 salary before taxes (Canada) \$1000.00 to \$1249.00 (Chappell & Novak, 1994)	1
1996 average salary per day (Mexico) \$4.50 US dollars just adequate for necessities (Douglas, Meleis, Eribes, & Kim, 1996)	1

Taiwan: foreign workers will work for ½ to 2/3 of the salary paid to Taiwanese workers (Sung, Chang, & Tsai, 2005)	1
Taiwan: foreign workers work for 12 hours per day compared to 8 hours for Taiwanese workers (Sung, Chang, & Tsai, 2005)	1
2002 Taiwan monthly wage \$571 US dollars to \$857 US dollars (less than service industries) (Hsieh & Su, 2007)	1
Twenty five 10 hour days per month with 4-5 days off per month (Taiwan) (Hsieh & Su, 2007)	1

Demographics

93% women (Canada) (Chappell & Novak, 1994)	1
83% women (Taipei) (Hsieh & Su, 2007)	1
Average age 48 years (Taipei) (Hsieh & Su, 2007)	1
80% education less than high school (Taipei) (Hsieh & Su, 2007)	1
35% of aides report health problems (Canada) (Chappell & Novak, 1994)	1
55% of aides report at least one sick day in bed over the past 6 months (Canada) (Chappell & Novak, 1994)	1
47% of aides use analgesics in the past week (Canada) (Chappell & Novak, 1994)	1
In US: largely African-American or Hispanic (Banaszak-Holl & Hines, 1996)	1
In Taiwan: mainly from the Philippines and Indonesia (Sung, Chang, & Tsai, 2005)	1

Aspects of Experience of Assault

Most assaults occur during basic care activities (Gates, Fitzwater, & Succop, 2003)	3
More than half of aides report receiving an injury from a resident at some point in employment (Fitzwater & Gates, 2002)	1
Mean number of assaults per 80 hours work is 4.69 (Gates, Fitzwater, & Succop, 2003)	1
5% of assaults result in an injury (nature not specified) (Gates, Fitzwater, & Succop, 2003)	1
55% of assaults result in bruises, abrasions or scratch marks (Freyne & Wrigley, 1996)	1
In 61% of assaults on aides, no specific action is taken after the incident (Freyne & Wrigley, 1996)	1
Younger aides experience more assaults (Gates, Fitzwater, & Succop, 2003)	1
Aides with negative attitudes experience more assaults (Gates, Fitzwater, & Succop, 2003)	1
Aides with complaints of physical illnesses or poor self care habits experience more assaults (Gates, Fitzwater, & Succop, 2003)	1
Aides with more state anger (angry feelings, perceiving unfair treatment) experience more assaults (Gates, Fitzwater, & Succop, 2003)	1
Residents with mental illnesses (but without dementia) exhibit more verbal disruption than residents with dementia (and without mental illness) (McCarthy, Blow, & Kales, 2004)	1
Training helps aides feel more confident in ability to prevent assaults (Fitzwater & Gates, 2002)	2
Education can decrease the number of assaults against caregivers (Fitzwater & Gates, 2002)	1

Factors Specifically Pertaining to Increased Job Satisfaction

Teamwork (being a member of a team) (Krovach & Krejci, 1998)	3
A network of interpersonal (collegial) relationships (Brannon, Cohn, & Smyer, 1990)	5
Working in a community based program rather than in a facility (Friedman, Daub, Cresci, & Keyser, 1999)	1
Administrative support (Krovach & Krejci, 1998)	1
Relationships with residents (Bowers, Esmond, & Jacobson, 2000)	6
Being able to provide care in a way that is like family (Bowers, Esmond, & Jacobson, 2000)	2
Feeling that one is performing a service (Douglas, Meleis, Eribes, & Kim, 1996)	3

Belief that one is able to affect residents (Parsons, Simmons, Penn, & Furlough, 2003)	1
Belief that one is competent in providing care (Parsons, Simmons, Penn, & Furlough, 2003)	1
Flexible shifts that allow for better family life (Moyle, Skinner, Rowe, & Gork, 2003)	1
Habitually staying beyond the end of the shift (Moyle, Skinner, Rowe, & Gork, 2003)	1
Being formally recognized as supporting students and training students (Wright, 2006)	1
Homes with higher daily aide hours per resident (Anderson, Corazzini, & McDaniel, 2004)	1
Variety in the work (Friedman, Daub, Cresci, & Keyser, 1999)	1
Involvement in care planning activities (Friedman, Daub, Cresci, & Keyser, 1999)	2
Having less formal education (Grau, Chandler, Burton, & Kolditz, 1991)	1
Being older (Grau, Chandler, Burton, & Kolditz, 1991)	2
Lower annual household income (Grau, Chandler, Burton, & Kolditz, 1991)	1
Agreeable working conditions more important than job content (Grieshaber, Parker, & Deering, 1995)	2
 <u>Factors Specifically Pertaining to Reduced Job Satisfaction</u>	
Permanent assignment to residents (primary nursing) results in boredom (Patchner & Patchner, 1993)	2
Families who direct the work of the nurse aides (Grau & Wellin, 1992)	1
Nurse aides perceive that RNs do not recognize their contributions (Ahmed & Kitson, 1993)	3
Low wages (Brannon, Cohn, & Smyer, 1990)	6
Low skill variety (Brannon, Cohn, & Smyer, 1990)	1
Care routines that tend toward mass production (Brannon, Streit, & Smyer, 1992)	1
Being unable to customize care for residents (Brannon, Streit, & Smyer, 1992)	1
Feeling under-recognized or underappreciated (Jervis, 2002a)	3
Feeling over-monitored (Jervis, 2002a)	1
No involvement in decision-making or making changes or improvements (Parsons, Simmons, Penn, & Furlough, 2003)	4
Lack of benefits (Parsons, Simmons, Penn, & Furlough, 2003)	2
Low rewards (Lui, 2007)	2
Lack of control (Monahan & McCarthy, 1992)	1
Lack of autonomy (Monahan & McCarthy, 1992)	1
Being bullied by other staff members (Moyle, Skinner, Rowe, & Gork, 2003)	1
Working with unskilled or inappropriately trained staff (Moyle, Skinner, Rowe, & Gork, 2003)	1
Laborious documentation (Moyle, Skinner, Rowe, & Gork, 2003)	1
Tensions within role expectations (Moyle, Skinner, Rowe, & Gork, 2003)	1
Increased need to be available for overtime (Moyle, Skinner, Rowe, & Gork, 2003)	1
Exposure to physical aggression by residents (Dougherty, Preston, Jones, & Payne, 1992)	3
Exposure to verbal aggression by residents (Dougherty, Preston, Jones, & Payne, 1992)	3
Deficiencies in communication from supervisors (Grieshaber, Parker, & Deering, 1995)	1
 <u>Factors Considered to be Necessary for Care of Demented Persons</u>	
Personal characteristics such as kindness, flexibility, patience, calm manner (Krovach & Krejci, 1998)	1
Increased amount of training (Krovach & Krejci, 1998)	8
Reduced regimentation and routinization (Beck, Ortigara, Mercer, & Shue, 1999)	1
Presence of a support group for workers (Broughton & Golden, 1995)	2
Adequate levels of emotional, psychological and moral support from employer (Kristiansen, Hellzen, & Asplund, 2006)	1

Factors that Increase Job Strain

Permanent assignment to residents (primary nursing) results in residents becoming overly demanding (Patchner & Patchner, 1993)	1
Tense, distrustful relationships between family members and nurse aides (Grau & Wellin, 1992)	1
Presence of conflicting subcultures (religious, ethnic) within the nursing home (Grau & Wellin, 1992)	3
Status hierarchy between nurse aides and family members (aides seen as servants) (Grau & Wellin, 1992)	1
Racist remarks by family directed at nurse aides (Grau & Wellin, 1992)	2
Racist remarks by residents directed at nurse aides (Berdes & Eckert, 2001)	2
Being unable to develop an organizational style that keeps the nurse aide out of trouble (Bowers & Becker, 1992)	1
Cutting corners but not preplanning the cuts (Bowers & Becker, 1992)	1
Breaking rules inadvertently or out of desperation (Bowers & Becker, 1992)	1
Being concerned about the quality of care provided to the residents (Bowers & Becker, 1992)	1
Bundling tasks to accomplish several tasks at once but feeling guilty about it (Bowers, Esmond, & Jacobson, 2000)	1
Greater workload result in aides more likely to feel burdened (Chappell & Novak, 1992)	1

Factors that Reduce Job Strain

Uniform culture (religious, ethnic) within the nursing home (Grau & Wellin, 1992)	2
Family members have cultural connections with nurse aides (Grau & Wellin, 1992)	2
Organizational style of the nurse aide that works for them (keeps them out of trouble) (Bowers & Becker, 1992)	1
Cutting corners deliberately (pre-planning cuts) (Bowers & Becker, 1992)	1
Being selective about which rules are broken (Bowers & Becker, 1992)	1
Bundling tasks in order to accomplish several tasks at once (Bowers, Esmond, & Jacobson, 2000)	1
Cutting corners in a way that is invisible to supervisors (Bowers, Esmond, & Jacobson, 2000)	1
Not reporting unacceptable care to supervisors (Bowers, Esmond, & Jacobson, 2000)	1
Giving the appearance of following orders while doing otherwise (Jervis, 2002a)	1
Refusal to attend meetings or events (Jervis, 2002a)	1
Aides who have greater numbers of family members supportive of their work (Chappell & Novak, 1992)	1
Aides who had fewer individuals living with them in the same household (Chappell & Novak, 1992)	1

Most Desirable Aspects of the Job

Being around/helping elderly people (Berdes & Eckert, 2001)	3
Being able to care for/help somebody (Berdes & Eckert, 2001)	1
Being a part of a team, with co-workers (Berdes & Eckert, 2001)	1
Relationship with residents (Parsons, Simmons, Penn, & Furlough, 2003)	2
Feeling valued and needed by residents (Kristiansen, Hellzen, & Asplund, 2006)	2

Least Desirable Aspects of the Job

Low pay (Berdes & Eckert, 2001)	1
Emotional distress of being in proximity to people who are in pain or dying (Berdes & Eckert, 2001)	1
Emotionally demanding job (Monahan & McCarthy, 1992)	1
Physically demanding job (heavy lifting) (Berdes & Eckert, 2001)	3
Distasteful tasks (Lin, Yin, & Li, 2002)	1
Inappropriate sexual or elimination behaviour (Burgio, Jones, Butler, & Engel, 1988)	3
Residents who have activity/sleep disturbances (Burgio, Jones, Butler, & Engel, 1988)	2

Residents who self injure (Burgio, Jones, Butler, & Engel, 1988)	1
Residents who are agitated (Burgio, Jones, Butler, & Engel, 1988)	3
Residents who exhibit excess disability (medical condition alone cannot account for the degree of disability observed in the resident)(Burgio, Jones, Butler, & Engel, 1988)	1
Family members as a source of hostility towards aides (Secrest, Iorio, & Martz, 2005)	1
Physical assault by resident (Kristiansen, Hellzen, & Asplund, 2006)	3
Verbal assault by resident (Kristiansen, Hellzen, & Asplund, 2006)	3
Residents destroying property (Burgio, Jones, Butler, & Engel, 1988)	2
Residents spitting on caregivers (Burgio, Jones, Butler, & Engel, 1988)	2
Lack of control related to time and decision-making (Secrest, Iorio, & Martz, 2005)	1
Inability to attend to details they feel are important (Secrest, Iorio, & Martz, 2005)	1
Overwhelmed by noise (Kristiansen, Hellzen, & Asplund, 2006)	1
Fatigue (Kristiansen, Hellzen, & Asplund, 2006)	2
Feeling insignificant (Kristiansen, Hellzen, & Asplund, 2006)	2
Feeling humiliated (Kristiansen, Hellzen, & Asplund, 2006)	1
Feeling dissatisfied (Kristiansen, Hellzen, & Asplund, 2006)	1
Feeling guilty (Kristiansen, Hellzen, & Asplund, 2006)	1

Factors Specifically Pertaining to Increased Job Stress

Distasteful tasks (Lin, Yin, & Li, 2002)	1
Being a foreigner (Lin, Yin, & Li, 2002)	1
Too many residents assigned to one nurse aide (Lin, Yin, & Li, 2002)	1
Centralized decision making (Grau & Wellin, 1992)	1
Sharp divisions of labour across all departments (Grau & Wellin, 1992)	1
Frequent, wide ranging complaints from residents and/or their families (Grau & Wellin, 1992)	1
Insufficient explanations given to nurse aides by RNs (Ahmed & Kitson, 1993)	1
Limited training that does not equip the nurse aide for the responsibilities (Ahmed & Kitson, 1993)	2
Performing work that they are not qualified to perform (Ahmed & Kitson, 1993)	2
Role ambiguity (Ahmed & Kitson, 1993)	3
Status hierarchies between RNs and aides (Ahmed & Kitson, 1993)	4
RNs spending much of their time on administrative duties (Ahmed & Kitson, 1993)	2
LPNs spending much of their time on medication administration (Anderson, Bailey, Corazzini, & Piven, 2005)	1
Workload (Ahmed & Kitson, 1993)	2
Nurse aides perceive lack of support from supervisors (Ahmed & Kitson, 1993)	2
Threat of assault by resident (Jervis, 2002b)	2
Conflicts with residents who have mental illnesses (McGrew, 1999)	4
Verbal or physical assault by resident (MacPherson, Eastley, Richards, & Mian, 1994)	1
Cigarettes as a source of irritation between staff and residents (Jervis, 2002b)	1
Lack of help during a behavioural crisis (Jervis, 2002b)	1
Residents who are mentally ill in addition to other co-morbidities (Jervis, 2002b)	3
Feeling uncertain about whether or not the residents could actually control themselves in certain situations (Kristiansen, Hellzen, & Asplund, 2006)	1
Not attending care conferences or reading care plans (McGrew, 1999)	2
Conflicts with residents who are addicted to cigarettes (McGrew, 1999)	1
Aides who perceive lack of rewards at work are more likely to experience burnout (Chappell & Novak, 1992)	1

Aides less hardy, more vulnerable to occupational stressors and burnout than RNs (Harrison, Loiselle, Duquette, & Semenic, 2000)	1
Chronic minor assaults (Freyne & Wrigley, 1996)	1

Factors Specifically Pertaining to Reduced Job Stress

Feeling confident in and supported by colleagues (Lin, Yin, & Yi, 2002)	4
On the job training (Lin, Yin, & Yi, 2002)	2
Shared decision making (Grau & Wellin, 1992)	1
Tasks and responsibilities overlap within and across departments (Grau & Wellin, 1992)	1
Aides who receive dementia training less likely to experience burnout (Chappell & Novak, 1992)	1
Aides who receive support for their work from family and friends less likely to experience burnout (Chappell & Novak, 1992)	1

Factors Found to Increase Aide Turnover

Failure of management to recognize social and cultural differences between the aides and the residents and their families (Grau & Wellin, 1992)	3
Role ambiguity (Baldwin, Roberts, Fitzpatrick, While, & Cowan, 2003)	3
Lack of a defined career pathway (Baldwin, Roberts, Fitzpatrick, While, & Cowan, 2003)	2
Aides not present at care planning meetings (Banaszak-Holl & Hines, 1996)	1
Being able to provide care in a way that is like family (Bowers, Esmond, & Jacobson, 2000)	1
Feeling of being disrespected by supervisors (Bowers, Esmond, & Jacobson, 2000)	1
Unpredictable absence policies (Bowers, Esmond, & Jacobson, 2000)	2
Low pay (Bowers, Esmond, & Jacobson, 2000)	5
Low morale (Bowers, Esmond, & Jacobson, 2000)	2
High RN turnover (Brannon, Zinn, Mor, & Davis, 2002)	1
Facility is a training site (Brannon, Zinn, Mor, & Davis, 2002)	1
Facility is for profit (investor owned) (Brannon, Zinn, Mor, & Davis, 2002)	2
Evening shift workers (Burgio, Fisher, Fairchild, Scilley, & Hardin, 2004)	1
Conflicts in relationships between RNs and aides (Jervis, 2002a)	1
Unrewarding role of nurse aide (Jervis, 2002a)	1
Traditional bureaucratic organizational structure (Riggs & Rantz, 2001)	3
Lack of multi-channelled open-communication (Riggs & Rantz, 2001)	2
Supervisors symbolically distinguishing themselves from subordinates (Jervis, 2002a)	1
Supervisors responding to all rule infractions with strict discipline (Jervis, 2002a)	2
Lack of problem-solving skills needed to cope with demands (Riggs & Rantz, 2001)	1
Excessive work load (Riggs & Rantz, 2001)	4
Perception that other employment opportunities are available (Riggs & Rantz, 2001)	2
Sheer effort and determination to seek a way out of an oppressive lifestyle (Tellis-Nayak & Tellis-Nayak, 1989)	1
Written competency examinations (Thorson, 1989)	1
Feeling dismissed, invisible or insignificant (Bowers, Esmond, & Jacobson, 2003)	2
Supervisors demeaning or humiliating aides (Bowers, Esmond, & Jacobson, 2003)	1
Implementation of a new program (Eden Philosophy) lead to increased turnover (Coleman et al. 2002)	1
Female gender (Cotton & Tuttle, 1986)	1
Managerial style authoritarian (Waxman, Erwin, Carner, & Berkenstock, 1984)	1

Factors Found to Reduce Aide turnover

Permanent assignment (primary nursing) (Patchner & Patchner, 1993)	1
Uniform culture (religious, ethnic) between nurse aides and residents and their families (Grau & Wellin, 1992)	3
Involve aides in care planning meetings (Banaszak-Holl & Hines, 1996)	2
Discuss care plans with aides and ask for advice and suggestions (Banaszak-Holl & Hines, 1996)	2
Untrained supervisors (Brannon, Zinn, Mor, & Davis, 2002)	1
Low RN turnover (Brannon, Zinn, Mor, & Davis, 2002)	1
Flatter management structure (less middle management) (Brannon, Zinn, Mor, & Davis, 2002)	1
Presence of a union contract governing managerial relations (Brannon, Zinn, Mor, & Davis, 2002)	2
Acknowledgement of contributions of nurse aides (Broughton & Golden, 1995)	2
Formation of support groups for nurse aides (Broughton & Golden, 1995)	1
Relationship with residents (Parsons, Simmons, Penn, & Furlough, 2003)	4
Focus on the personal needs of the aides (Riggs & Rantz, 2001)	1
Administration and supervisors model effective interactions and respectful communication (Riggs & Rantz, 2001)	1
Benefits that will decrease personal stressors (flexible scheduling, child care etc.) (Riggs & Rantz, 2001)	3
Personalized incentives and rewards (Riggs & Rantz, 2001)	1
A sense of connection with co-workers (Secrest, Iorio, & Martz, 2005)	1
A sense of connection with families (Secrest, Iorio, & Martz, 2005)	1
Taking pride in their work (Secrest, Iorio, & Martz, 2005)	2
Practicing charity and accumulating virtue (Hsieh & Su, 2007)	2
Feeling in control by being conscientious about details (Secrest, Iorio, & Martz, 2005)	1
Mutual decision making for policies and practices that directly affect the aides (Secrest, Iorio, & Martz, 2005)	1
Pay for coverage of the unit for conference time (Secrest, Iorio, & Martz, 2005)	2
Psychological nourishment obtained through solidarity, fellowship, collegial support (Kristiansen, Hellzen, & Asplund, 2006)	1
Monetary rewards including scholarships, tuition fee reimbursement (Sung, Chang, & Tsai, 2005)	4
Compassion for residents/personal interest in residents (Sung, Chang, & Tsai, 2005)	2
Cleanliness of the facility (Sung, Chang, & Tsai, 2005)	1
Adequate staffing (Sung, Chang, & Tsai, 2005)	1
Good equipment (Sung, Chang, & Tsai, 2005)	1
Initial training program for new aides (Sung, Chang, & Tsai, 2005)	1
The work is personally rewarding and fulfilling (Sung, Chang, & Tsai, 2005)	1
Callous detachment...a passionless game (Tellis-Nayak & Tellis-Nayak, 1989)	1
Cynicism (Tellis-Nayak & Tellis-Nayak, 1989)	1
Nursing homes with reward based administration climate (Anderson, Corazzini, & McDaniel, 2004)	1
Nursing homes with higher levels of communication openness (Anderson, Corazzini, & McDaniel, 2004)	1
Administration that emphasizes relationship and concern for employees (Anderson, Corazzini, & McDaniel, 2004)	1
Administration that fosters self organization (people mutually adjust behaviours to cope with changing external environmental demands (Anderson, Corazzini, & McDaniel, 2004)	1
Homes with higher daily aide hours per resident have lower annual turnover (Anderson, Corazzini, & McDaniel, 2004)	1
Overall job satisfaction (Cotton & Tuttle, 1986)	1
Increasing age of employee (Cotton & Tuttle, 1986)	2
Tenure of employee decreases turnover (Cotton & Tuttle, 1986)	1
Increasing number of dependents (Cotton & Tuttle, 1986)	1

Expectations are met (Cotton & Tuttle, 1986)	1
Increased diversity of training methods (workshops, seminars, videos etc.) (Grant, Kan, Potthoff, & Ryden, 1996)	1

Findings Related to Burnout

Aides are at the higher risk for burnout when compared to LPNs or RNs (Astrom, Nilsson, Norberg, & Winblad, 1990)	1
Higher rates of burnout for morning shift workers (Burgio, Fisher, Fairchild, Scilley, & Hardin, 2004)	1
Exposure to physical and psychological aggressive behaviour by residents (Evers, Tomic, & Brouwers, 2002)	1
Aides experience more burnout than RNs (Hare & Pratt, 1988)	1

Findings Related to Empathy

Aides caring for demented patients have lower mean empathy scores than RNs caring for demented patients (Astrom, Nilsson, Norberg, & Winblad, 1990)	1
Cognitively intact residents who perceive empathy from nurse aides have reduced rates of depression (Hollinger-Samson & Pearson, 2000)	1
Difficulty being empathetic when it is believed that an assault is purposeful and resident knows what he or she is doing (Jervis, 2002b)	1
Reliance on inaccurate or stigmatizing folk conceptions of mental illness (Jervis, 2002b)	1

Factors Found to Increase Absenteeism

Primary nursing (permanent assignment) results in significantly more absenteeism (Burgio, Fisher, Fairchild, Scilley, & Hardin, 2004)	1
Morning shift workers (Burgio, Fisher, Fairchild, Scilley, & Hardin, 2004)	1
Working full time (Chappell & Novak, 1994)	1
Aides caring for multiple residents with gross mental impairments (Chappell & Novak, 1994)	1
Aides caring for constantly restless residents (Chappell & Novak, 1994)	1
Aides caring for multiple residents with mental illnesses (Chappell & Novak, 1994)	1

Factors Found to Reduce Absenteeism

Permanent assignment to residents (primary nursing) (Patchner & Patchner, 1993)	1
Team nursing would lead to more discussions about absenteeism and lateness (Yeatts, Cready, Ray, DeWitt, & Queen, 2004)	1

Discussions Regarding Primary nursing versus Team nursing

Primary nurses may become over-involved or over-identified with a patient (Bowers, 1989)	1
Primary nursing may lead to disagreements about care strategies (Bowers, 1989)	1
Primary nursing may lead to divisions within the nursing team (Bowers, 1989)	1
Primary nurses may be unsure of the boundaries of their work (Bowers, 1989)	1
Primary nursing may lead to decreased communication within the nursing team (Bowers, 1989)	1
Primary nursing (permanent assignment) residents prescribed more medications (Burgio, Fisher, Fairchild, Scilley, & Hardin, 2004)	1
Primary nursing residents prescribed more psychotropic medications (Burgio, Fisher, Fairchild, Scilley, & Hardin, 2004)	1
Primary nursing residents received higher ratings for personal appearance and hygiene (Burgio, Fisher, Fairchild, Scilley, & Hardin, 2004)	1

Same residents day after day magnify tensions (Foner, 1994)	2
Team nursing leads to improved interpersonal relationships between nurse aides (Yeatts, Cready, Ray, DeWitt, & Queen, 2004)	1
Team nursing leads to better coordination of resident care (Yeatts, Cready, Ray, DeWitt, & Queen, 2004)	1
Team nursing leads to increased information sharing (Yeatts, Cready, Ray, DeWitt, & Queen, 2004)	1

Factors Negatively Affecting Morale

Nurse aides are not defined as nurses (Advisory Committee on Health Human Resources, 2000)	1
Low occupational status (Berdes & Eckert, 2001)	3
Low wages (Berdes & Eckert, 2001)	5
Low opportunities for advancement (Berdes & Eckert, 2001)	2
Job instability (Berdes & Eckert, 2001)	2
Physical difficulties of short staffing (Bowers, Esmond, & Jacobson, 2000)	1
Supervisors disrespectful of aides (Jervis, 2002a)	1
Supervisors not committed to keeping aides on staff (Jervis, 2002a)	1
Constant reprimands (Jervis, 2002a)	1
Offensive or disturbing language from residents (Ramirez, Teresi, & Holmes, 2006)	2
Racial abuse from residents (Mercer, Heacock, & Beck, 1993)	1
Administrators and supervisors perceived as racially biased (Mercer, Heacock, & Beck, 1993)	1
Being required to attend support groups (Ramirez, Teresi, & Holmes, 2006)	1
Not feeling valued by employer (Kristiansen, Hellzen, & Asplund, 2006)	1
Feeling that the job is insignificant (McGillis-Hall & O'Brien-Pallas, 2000)	1
Elaborate extended family networks necessary to assist with finances and childcare (Mercer, Heacock, & Beck, 1993)	1
Having to work extra shifts or take a second job to cover basic finances (Mercer, Heacock, & Beck, 1993)	1
Feeling inadequately trained for the job (Mercer, Heacock, & Beck, 1993)	1
Absenteeism of other workers (Mesirow, Klopp, & Olson, 1998)	1
Lack of teamwork (Monahan & McCarthy, 1992)	1
The experience of psychological aggressive behaviour (Evers, Tomic, & Brouwers, 2002)	1
Aide positions have less motivating potential than LPN positions (Brannon et al. 1988)	1

Factors affecting basic policy questions about regulation, supply, deployment and movement of nurse aides

Absence of a national (Canadian) data bank (Advisory Committee on Health Human Resources, 2000)	2
Nurse aides (in Canada) are non-regulated (Advisory Committee on Health Human Resources, 2000)	1

Note: To conserve space, only the first author is listed

Table 3. Formatting and Calculating Frequency Effect Sizes (ES) of Findings (total articles 138)

ES%

Aides collectively feel dissatisfied with organizational factors that inhibit them from providing excellent care	20.1%
The supervisory style is generally hierarchical, demeaning and dismissive	37.3%
Aides collectively feel undervalued and unappreciated	17.2%
Lack of financial compensation and rewards shape general job dissatisfaction	38.0%
Work loads are perceived as excessive	21.6%
Aides lack the training and problem-solving skills necessary to cope with demands	26.8%
Lack of communication results in aides who are inadequately informed about their residents' conditions	14.9%
Aides collectively prefer to be involved in care planning and decision-making	14.9%
Caring relationships and/or connectedness between aides and residents or aides and families, and collegial connections are very important motivational factors that reduce turnover rates and increase quality of care	44.8%
Violence and aggression in the workplace poses serious threats to the personal safety of the aide	36.6%



Object Therapy: A Student-selected Component Exploring the Potential of Museum Object Handling as an Enrichment Activity for Patients in Hospital

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Abstract

This study involved innovative research in a novel field, namely ‘object therapy’, within the framework of a student-selected component (SSC) undertaken by second year, Phase 1 Medicine students at University College London. The project had a series of intrinsic aims: to provide medical students with communication skills, methods of assessing wellbeing and research techniques and to evaluate the potential of museum object handling as an enrichment activity in hospitals. Five medical students undertook museum object handling activities at 24 patient’s bedsides in order to assess the psychological impact of ‘object therapy’ using standard Quality of Life (QoL) measures. Quantitative analyses indicated an increase in overall well being and patient’s perception of their health status at the end of the session. Qualitative analyses revealed patients felt positive about the role of object handling sessions as a distraction from everyday ward life. The study showed that this is a novel enrichment activity which has the potential to enhance patient’s lives whilst in hospital. The SSC provided valuable communication and research skills to students in their pre-clinical year, affording an opportunity to interact with patients, gain ward experience and an appreciation of the importance of considering the whole person when treating a patient.

Keywords: Object therapy, Wellbeing, Quality of life, Museums, Enrichment

1. Introduction

Student-selected components (SSCs) are defined by the UK’s General Medical Council (GMC) as that part of the undergraduate medical curriculum which goes beyond the limits of the core and allows students to study in depth in areas of particular interest to them, providing them with insights into scientific methods and the discipline of research that engenders an approach to medicine that is questioning and self-critical (GMC, 2003). At University College London (UCL) SSCs are a compulsory component for Phase 1 first and second year undergraduate Medicine students who are free to select a research project of their choosing. SSC co-ordinators at UCL encourage students to take advantage of the fact that the Medical School is part of a multi-faculty University and this is reflected in the wide range of SSCs offered, including non-biomedical science topics such as arts and humanities, fine art and languages.

Previous research has highlighted the importance of introducing innovation and originality into SSCs and suggested that SSCs provide opportunities for students to develop lifelong and transferable skills (Macnaughton, 1997; Yates et al., 2002). In this study we offered a Phase 1 2nd year SSC entitled ‘The role of museum loan boxes and object handling as an enrichment activity at University College Hospital’. As part of the module, students delivered one-to-one handling

sessions at patients' bedsides using museum objects from UCL Museums & Collections. The key goal of this research was to assess the value and potential of a closer engagement between heritage and hospitals based around museum object handling as an enrichment activity and in so doing "engender an approach to medicine that is questioning and self-critical" (GMC 2003, p. 40). The SSC fulfilled the necessary criteria for research innovation and originality through focusing on a topic not previously explored in a scholarly context. Some museums and libraries do offer services, such as loan boxes (a collection of museum objects which are available as an outreach resource) which are accessible by hospitals, but to date there has been no critical assessment of the impact of such sessions. The module required the students to enhance and develop a range of skills including critical and creative thinking, data analysis and collection (involving quantitative and qualitative techniques), scientific writing and multi-modal forms of communication. Finally, the involvement of museum collections in the research afforded new skills in object handling and raised student's awareness of how the Arts and the environment can impact upon patient wellbeing.

The project had a series of overarching aims including:

- To provide medical students with communication skills, methods of assessing wellbeing and research techniques
- To undertake an innovative project to demonstrate the unique, interdisciplinary, role museum collections can play in university teaching and research
- To evaluate the potential of museum object handling as an enrichment activity in hospitals
- To widen access to UCL Museums & Collections to a new audience
- To widen the understanding of the role that the Arts and environment can play in patient care

The project thus constituted a multidimensional research study exploring the outcomes for both students (pedagogical) and patients (enrichment).

1.1 Background

The clinical basis for this research lies in the fundamental idea that improving the quality of the hospital environment and enriching patient's lives whilst in hospital can have a positive effect for patients and staff. This was perhaps first recorded by Florence Nightingale in 1859 who noted that:

"The effect in sickness of beautiful objects, and especially of brilliancy of colour is hardly at all appreciated [by the authorities]...[The] variety of form and brilliance of colour in the objects presented to patients are actual means of recovery." (Nightingale, 1859).

Some of the first quantitative clinical evidence came from Professor Roger Ulrich whose 1984 paper demonstrated that patients with a view of nature (trees) from their beds had a reduced length of stay and a slightly reduced need for analgesics in hospital compared to those with a view of a brick wall (Ulrich, 1984). Since then further clinical evidence has shown that arts in health interventions have several positive therapeutic and medical outcomes for patients including: reduction of stress, reduction of depression and anxiety, reduced blood pressure, reduced pain intensity, reduced need for medication, improved mental health and reduced length of stay (Staricoff, 2006). These studies have also shown that there are positive effects for staff and benefits in the education and training of medical practitioners including: improved morale and job satisfaction and consequently job retention, increased communication and awareness between patients and staff, reduced stress levels and increased observational skills (Staricoff, 2006; Dolev, et al., 2001). Furthermore, Macnaughton has recently argued that art in hospitals may have a wider role than purely providing a therapeutic environment and that hospitals may be being used as a cultural resource (Macnaughton, 2007).

This research has arisen from the proliferation of arts and health activity across all sections of health care. One such project, the partner to UCL in this research, is UCLH Arts, based at University College Hospitals NHS Foundation Trust. UCLH Arts is committed to providing a welcoming, uplifting environment for all patients, visitors and staff through the use of a varied and stimulating arts programme and in so doing aims to improve patient well being, boost staff morale and widen access to the Arts.

UCLH Arts achieves this in a number of ways including curating exhibitions, hosting music and drama events and partnering with museums and galleries to bring their collections to patient's and staff within the hospital. Often this takes the form of enrichment activity which in this case is defined as an activity which improves and or increases wellbeing. UCLH Arts aim to increase patient well-being and essentially enrich patients' lives using heritage and the Arts. Examples of this include the project presently discussed as well as providing live music by patients' bedsides and commissioning artists to work collaboratively with patients.

To date there is nothing that the authors could identify in the research literature directly relating to the role of, and potential, of museum object handling as an enrichment activity in healthcare. There are however several examples of museums extending their outreach education programmes to hospitals, care homes and other social welfare organisations (Arigho, 2008; Chatterjee, 2008; O'Sullivan, 2008; Noble and Chatterjee, 2008; Jacques, 2007). To this

end we coin the term 'object therapy' to mean the inclusion of museum collections in enrichment and intervention activities in hospitals and other healthcare settings.

2. Methods

2.1 Project plan

The SSC was supervised by the authors (HC and GN) and prior to student recruitment permission was obtained to undertake the research from the UCLH Research Ethics Committee (REC) (MREC No 06/Q0505/78). The project ran from November 2006 to March 2007 and was timetabled as eight sessions each lasting up to three hours, with students encouraged to undertake reading and other preparation in their own private study time. The SSC was assessed via written work and general performance. The allocation of the work was broken down accordingly:

- 10% for the development of enrichment resources (including patient information leaflets and promotional flyers used to recruit patients)
- 10% for the development of suitable data collection methods (including patient evaluation forms and questionnaire design)
- An interim progress report (which carried no marks, but was compulsory)
- 10% for conceptual hypotheses, outreach and other skills (including patient communication skills)
- 70% for a final written report of between 3,000 and 5,000 words (including a comprehensive literature review, materials, methods, data analysis, interpretation and future recommendations)

2.2 Student training

In 2006 five Year 2 Phase 1 medical students from UCL opted to undertake research into the role of heritage in hospitals. The project began with a series of training sessions which covered the following areas:

- An introduction to the role of arts in health
- Methods of assessing wellbeing and quality of life
- Museum object handling and museum outreach session delivery
- Patient communication skills, privacy and dignity in care, and patient confidentiality
- Infection Control
- Research skills

The students were also supplied with a reading list which included literature from the arts in health sector, museum object handling and museum education. In addition the students were given information about UCL Museums & Collections (UCL Museums & Collections, 2006), the history of UCL and object-specific information about the objects in their loan boxes. With training complete the students were inducted into University College Hospital's (UCH) volunteer programme which included training in infection control, patient confidentiality and ward logistics.

2.3 Materials

Each student was supplied with a 'loan box' which contained between 6 and 8 objects from UCL Museums & Collections (www.museums.ucl.ac.uk). These boxes were lightweight metal photographic camera cases approximately 46cm x 32cm x 15cm in size, which ensured the objects could be transported safely and easily. The boxes were lined with specialist museum packaging materials and each object was carefully wrapped in acid free tissue paper. Each box contained a range of objects including natural history specimens, archaeological artefacts and artworks. In addition each box contained a laying-out mat (a piece of object-friendly plastezote) which was used to protect the objects during the object handling session. Each student was also supplied with a digital audio recorder for the collection of qualitative information during object handling sessions, alcohol hand gel and an I.D badge.

An outline research protocol was developed as part of the REC application by the project supervisors; this was later refined in a group session with the students as part of their initial training. In his capacity as UCLH Arts Curator, GN approached staff from a variety of wards at UCH and recruited three wards to participate in the project. Following guidelines from the REC, and with input from the supervisors, the students developed a patient information leaflet (PIF) and consent form (CF).

2.4 Research Protocol

Students delivered one to one object handling sessions at patients' bedsides using the museum loan boxes. As defined in the PIF, participation on the part of the patients was entirely voluntary. Patients were recruited by the students with assistance from the ward staff who often directed students towards those patients who were fit enough to participate (many patients on the participating wards were too unwell to be involved). Following patient recruitment the students fully explained the aims of the research, their role in delivering the object handling session and the research protocol

which included the use of a digital voice recorder. At the start of each session the patient signed the CF and the students laid out all of the objects from the loan box on the patient's table, the audio recorder was switched on and the session could begin.

2.5 Object handling sessions

The research protocol comprised a series of introductory quantitative quality of life questions including two visual analogue scales (Figure 1), one of which assessed patient's perception of their overall health status and the other described patient's perceptions of their general well being; this was based on the EQ VAS design (EuroQol Group, 1990). These questionnaires also included space for the students to list basic patient information such as age and gender, and assign a research number. In addition patients were asked to complete a mood adjective checklist (Table 1) the latter was loosely based on Watson, Clark and Tellegen's (1988) Positive Affect Negative Affect Scale (PANAS).

Once the quality of life questionnaires and mood checklist were completed the students asked each patient to choose an object and then a series of questions were posed, such as:

- Why have you chosen that object?
- What do you think this object is?
- What does the object feel like?
- Can you think of any experience that might relate to this object?
- Where do you think it comes from?
- What material do you think it is made out of?

Each session lasted between 10 to 20 minutes during which the patients were encouraged to handle and explore all of the objects. At the end of the object handling session the quantitative quality of life questionnaires and mood checklist were again completed by patients, the audio recorder was switched off and both parties either washed their hands or used alcohol gel.

3. Results

3.1 Formative assessment with students

As part of the introduction to the SSC and prior to the formal training, the authors led a group formative assessment with the students to explore their existing knowledge of arts in health, their feelings towards enrichment and intervention in healthcare and their reason for selecting the SSC. The students revealed that they had relatively limited knowledge of arts programming in hospitals but stated that their reason for choosing the SSC was to gain a better understanding of hospital enrichment activities and its benefits, to conduct interdisciplinary research and gain new skills (two students specifically cited a desire to increase patient communication skills), to learn more about museums and to work with colleagues across UCL and UCH.

3.2 Data analysis

The students made a combined total of 35 visits to UCH and interviewed 24 patients; patients suffered from a variety of illnesses, almost most were suffering from respiratory disorders, and were over 60 years of age. The length of hospital stays varied from 1 week to over 4 weeks. Post-data collection the students transcribed the audio-recordings and used basic mind-mapping methods to ascertain themes and trends in the qualitative information retrieved from these recordings. This technique involves the selection of key phrases and themes from interview transcripts, and mapping their frequency in a given data set. Quantitative quality of life data extracted from the visual analogue scales (VAS) were analysed using simple statistical techniques (i.e. Students' t-test) to understand frequency distribution.

Due to limited time and difficulties in recruiting patients the students decided to pool their interview transcripts, visual analogue and mood adjective data.

3.3 Research outcomes

Despite the fact that the students pooled their transcripts and data each student analysed these data independently. Table 2 highlights the key themes extracted using mind mapping by one student (PL) from patient interview transcripts. These results indicate that the most frequent theme expressed was a general interest and/or enjoyment of the object handling session. More patients expressed boredom or a lack of interest in the session compared to those who commented that the session suppressed boredom and an appreciation of enrichment activities. Few patients (only 8 out of 24) commented on their illness or made reference to pain during sessions. Other students described difficulties in mapping the frequency of themes using this technique citing vast differences in the range of topics explored in sessions. All of the students commented that most patients appeared to feel positive about the concept of handling objects but agreed that several patients stated that the objects presented were not of interest to them. The students all made reference to

comments made by several patients relating to the sessions being a positive distraction from the stress and bustle of ward life and one patient who actually cited the session as a cause of decrease in their pain intensity.

Natural history objects (fossils, minerals and shells) were the most commonly selected objects with the brass etching plates, plus accompanying prints, and the archaeological pot shards, being the least favoured objects.

Two of the students (CA and DH) employed t-tests to analyse the VAS data. These tests showed that there was an overall improvement in patient's perception of their general wellbeing and health status when the VASs from the start of the handling sessions ('before') were compared to those from the end of the sessions ('after'). These results were significant at the 95% confidence level. Other quantitative analyses undertaken by the students indicated 57% of patients revealed a difference 'before' compared to 'after' the handling session with regard to general wellbeing, with 43% showing no difference 'before' compared to 'after'; 38% of patients revealed a difference 'before' and 'after' the handling session in health status perception, compared to 62% who showed no difference. None of the VAS data showed a decrease in either score after the session.

3.4 Student outcomes: Summative assessment with students

A summative assessment was carried out by the authors at the end of the project when the students submitted their write-ups. These discussions revealed mixed responses from the students with regard to the role of museum object handling as an enrichment activity in hospitals. Most of the students still felt positive about the role of arts in health and were generally enthusiastic about the use of museum collections in enrichment, aside from one student who expressed concerns that such activities may distract from clinical treatments. During the summative discussions the students also revealed certain challenges, notably difficulties in recruiting patients. Partly this difficulty related to the fact that wards are very busy and patients were often receiving treatment or visitors, but the students also cited cautiousness in approaching and communicating with certain patients, particularly those who were very ill.

4. Discussion

The research outcomes from the SSC indicate this is a novel enrichment activity which has the potential to enhance patient's lives whilst in hospital. Quantitative analyses indicated an increase in overall well being and patient's perception of their health status at the end of the session. Qualitative analyses revealed patients felt positive about the role of object handling sessions as a distraction from everyday ward life and had a positive impact on relationships amongst staff and patients. As well as providing evidence of object handling as a means of distraction, some patients also appeared to use the sessions as a tool for providing meaning to their illness and current health status. Such discussions could have valuable health benefits and a means for patients to find positive meaning in their illness, which Romanoff and Thompson (2006) state can lead to less depression and better quality of life and emotional wellbeing.

Crucially more research is needed to fully characterise this new engagement between heritage and hospitals and to thoroughly explore the therapeutic potential of object therapy for patients, their family and friends, carers, medical staff and students. This type of engagement with patients may be more appropriate for longer stay patients, such as those in chronic care facilities, hospices and rehabilitation units, where it could be used to stimulate patients, relieve boredom and facilitate communication between caregivers and patients. Furthermore, in line with Macnaughton's (2007) recent study, the wider impact of arts programmes in hospitals and the role of hospitals as cultural resources warrants further investigation.

One concern which was repeatedly raised by the students throughout the project was the need to adequately control any negative emotions which may emerge during object handling sessions. The possibility of patients revealing negative memories, and showing distress and depression during sessions was discussed throughout the training period and the students were given guidance on how to handle these situations should they arise, including on site consultation with ward staff if the students felt sufficiently concerned (although this was never needed).

Student communication skills turned out to be an important factor which impacted both the length of the sessions and the students' effectiveness in engaging patients in the project. The summative assessment revealed that the students felt hindered by their lack of general communication skills and this was evident when we listened to the audio recordings which were often stilted and sometimes not overly enthusiastic on the part of the students. During training we impressed upon the students the need to employ a sense of excitement and wonder whilst trying to engage patients, but the students' general lack of experience and perhaps confidence in talking openly with older people did seem to have impacted their delivery of sessions. One student in particular highlighted concerns over "not knowing how to talk to older people, especially when they are very ill". Notwithstanding this all of the students felt that the SSC had enhanced their patient communication skills and importantly given them first hand experience of everyday ward life in their pre-clinical year. In addition the experience encouraged them to think creatively about patient care and the importance of considering the whole person when treating a patient. It also emphasised the need for regular non-clinical communication training for medical students taking them out of their comfort zone and challenging them to work with patients in new ways.

Reassuringly one of the key concerns expressed by the medical students was the lack of a control group with which to compare the results against. During the project we discussed the possibility of control groups and what form these should take. One idea was the inclusion of sessions which did not allow direct object handling but only visual inspection of the objects, but the main issue was what would constitute an effective control (i.e. the use of quantitative quality of life questionnaires in the absence of handling sessions? One-one interviews in the absence of any museum object-related activity?); a collective decision could not be reached on this point and hence the lack of any controls in the research.

4.1 Future research and Conclusions

This study has demonstrated that offering a novel SSC can have a range of positive benefits for students, staff and patients. Research at UCH using loan boxes from UCL Museums & Collections is continuing to explore the potential of object handling as a therapeutic, enrichment and/or intervention activity (Chatterjee, 2008). This research has involved a variety of different session leaders including other students (MA Museums Studies students from UCL's Institute of Archaeology and the University of Toronto) and research nurses (UCL Institute for Women's Health). These studies continue to provide support for the positive benefits of providing access to museum collections in arts programming within hospitals and its valuable role in student and staff professional development, particularly with regard to the acquisition of communication and research skills. Future research, funded by the Arts and Humanities Research Council (Award no: AH/G000506/1), will explore the psychological impact of 'object therapy' in a longitudinal, multidisciplinary, study involving a range of researchers from UCL, ULH, several others hospitals and numerous partner museums.

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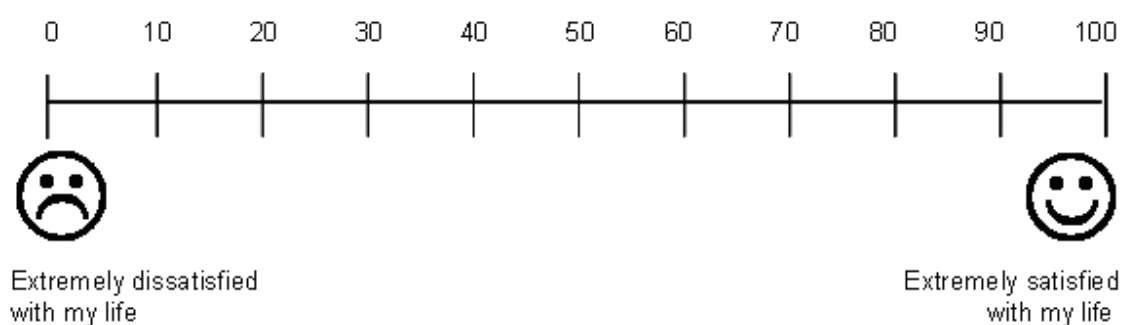
Table 1. Mood adjective checklist

Below are a number of words which describe moods. Please put a cross to indicate how much you have felt the way described, in the last 24 hours.

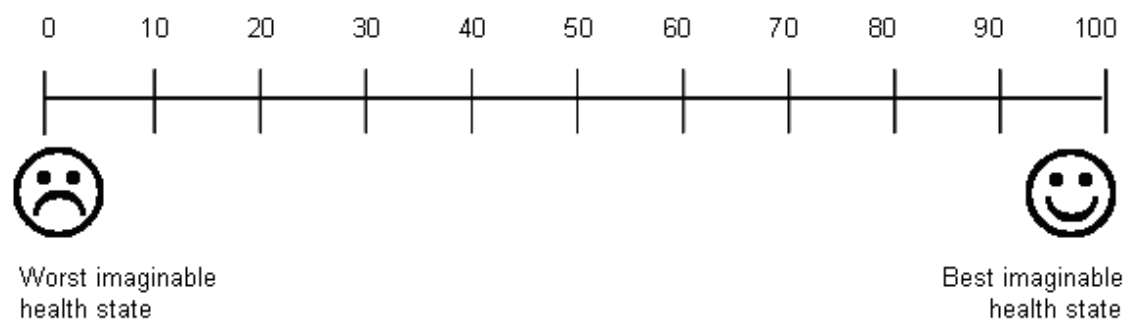
	Not at all	A little	Quite a bit	Extremely
Shaky				
Sluggish				
Resentful				
Nervous				
Wearry				
Vigorous				
Hopeless				
Lively				
Guilty				
Tired				
Unhappy				
Tense				
Full of energy				
Active				
Worthless				
Miserable				
Worn out				
Discouraged				
Spiteful				
Depressed				
On edge				
Angry				
Furious				
Helpless				

Table 2. Key themes expressed by patients during object handling sessions, including frequencies.

Theme	Frequency
Enjoyment / Interest	24
Boredom that was <u>suppressed</u> by session / Appreciation of enrichment activities	11
Boredom <u>caused</u> by session / Lack of interest in the session	18
Pain	3
Positive descriptive terms (e.g. beautiful, pretty)	8



Please indicate how satisfied you feel overall with your life at the moment by putting a cross on the line between 0 and 100.



Please indicate how you feel about your health status at the moment by putting a cross on the line between 0 and 100.

Figure 1. Generic visual analogue scales



Determinants of Consumer Satisfaction of Health Care in Ghana: Does Choice of Health Care Provider Matter?

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Abstract

A modern health system which provides high quality care has trickle-down effect on the quality of life of the individual citizens and the overall economic development of the country. One method which is applicable to the measurement of quality of health care is consumers' ratings of the services provided. This paper investigated the overall level of satisfaction associated with the choice of a health care provider. Parents whose children (aged-under five) fell sick four weeks prior to the survey and had sought intervention within 2 days were asked their overall level of satisfaction with health care providers. Using the ordered logit model the study confirms the notion in Ghana and elsewhere that private health care is associated with higher levels of satisfaction or quality. Control variables that were found to be statistically significant were gender of the child, maternal age and education, distance and waiting time among other. To the best of our knowledge, no study has examined the effect of provider choice on overall satisfaction of health care in Ghana.

Keywords: Consumer satisfaction, Health care provider, Ordered logit, Ghana

1. Introduction

This paper focuses on the overall satisfaction that consumers gain from consuming health services from a given provider. Quality of health services is gaining momentum in the health care literature. Increasingly, health care stakeholders such as governments, health authorities and consumers are attaching importance to health care quality (Lapsley, 2000; Smith et al. 2006). More and more, patients' satisfaction is recognized as essential component in the evaluation of health care quality (Derose et al. 2001; Donabedian, 1992). The quality of health care is not confined to clinical effectiveness or economic efficiency but also incorporate social acceptability as an important quality objective (Calnan, 1997; Donabedian, 1992; Maxwell, 1984).

Monitoring and evaluating consumer satisfaction with health care is a crucial input to improving the quality of health system and changes in the system as well as providing feedback for health care professionals and policy makers (Bara et al. 2002). Measures of consumer satisfaction with health care can provide important assessment of quality of health care not adequately captured by other health service statistics such as patient throughput, waiting times, consultation times and proximity (Sitzia and Wood, 1997; Williams and Calnan, 1991). In fact, it has been suggested that patient satisfaction is a major quality outcome in itself (Derose et al. 2001). The extent to which health care users are satisfied with their local providers may be a key factor underpinning their health behaviour and health care utilization (Rakin et al. 2002; Hadorn, 1991). It is envisaged that timely, accessible, appropriate health interventions, continuous and effective health services are important components of health care quality (Cambell et al. 2000).

In Ghana, the Institutional Care Division (ICD) of Ghana Health Service (GHS) has direct responsibility of ensuring health care quality. The need to improve health care quality was given prominence in the Health Sector 5-year Programme of Work (1997-2001) and the second 5-year Programme of Work (2002-2006) (Note 1). A qualitative

analysis of satisfaction with medical services was conducted in 1997 and 2003 as part of the Core Welfare Indicator Questionnaire. It was found that satisfaction had increased from 57% in 1997 to 78.6% in 2003 indicating a 21 percentage point increase. However, the level of satisfaction was not scaled but simply defined for persons who consulted health practitioners and cited no problem with the health system (Ghana Statistical Service, 1997 and 2003).

Previous studies on parental satisfaction of health care for children aged under-five regarding the services of a given health provider is virtually non-existent in Ghana and elsewhere. Although the kids are the patients in question, they cannot make their own satisfaction evaluation, and thus the mothers or caregivers make such judgments. Previous studies have investigated patient's socio-economic and demographic characteristics in relation with satisfaction partly because of the ease with which this data can be collected. The literature shows that characteristics such as age, educational level, health status and amount of information conveyed by the health provider are significant predictors of health care satisfaction (Chahal et al. 2004; Cohen, 1996; Hall and Dornan, 1988).

The principal objective of this paper is to examine the extent to which the choice of a given provider influences health care satisfaction. Consequently, we model the overall level of satisfaction associated with the consumption of a particular providers' health services using a 5 point Likert scale from (1) very dissatisfied to (5) very satisfied. The satisfaction levels were elicited by asking the respondents, in this case the mother or care-giver to score their overall satisfaction from 1-5. Thus we test the hypothesis that there is no difference in the level of satisfaction associated with the choice of a given health care provider.

2. Profile and Overview of the Health Sector in Ghana

The economy is dominated by agriculture, which contributes about 39.3% of the Gross Domestic Product (GDP), followed by the services sector (32.9%) and lastly the industrial sector, 27.8% (ISSER, 2006). The Ghanaian economy averaged a real GDP growth of 5.3% over the period 2000-2008. Approximately 50% of the population rely on agriculture for their livelihood. Ghana is the second largest producer of cocoa in the world, only next to Cote d' Ivoire. It is also the second largest producer of gold and third largest producer of timber in Africa. In recent times, the economy exports non-traditional commodities such as pineapple, banana, yam and cashew nuts. Besides, tourism is gaining importance as a foreign exchange earner.

Since Ghana's independence from British colonial administration in 1957, several policy interventions have been sought to primarily achieve economic growth and the subsequent trickle-down effect on the other sectors of the economy including the social sector of which health is prominent. In the area of health care, the public and private sectors are important stakeholders with the public sector organized according to national (2 teaching hospitals), regional (10 regional hospitals), district (281 district public and other hospitals), sub-district (622 public health centres) and community about 1 658 Community Health Planning Service and maternity homes at the community level (Ghana Health Service, 2005). Modern health care is complemented by traditional medicine which is quite popular among rural dwellers.

Out of the 281 district and other hospitals, over 50% are private or mission hospitals. However, the private and mission health facilities are greatly supported by government through staff salary and other facilities. They provide both outpatient and inpatient services. At the sub district level where health centres are the highest health facilities and first line of referral to formal health from the community clinic and maternity homes, over 98% of them are public or belong to the government. In order words, mission or private sector participation in the operation of health centres is very low (Akazali et al. 2008).

The Ministry of Health (MOH) is the central government institution in charge of sector-wide policy development, financing, regulation, monitoring and evaluation using its agencies including Ghana Health Service (GHS) which is an executing agency responsible for health service delivery. However, despite the strategically dispersed location of health centres in Ghana, the teaching, regional and district hospitals still have to contend with outpatient and other primary health related cases which could be handled at the district level creating congestions and long queues. Ghana faces acute shortage of health personnel.

For instance, in the year 2006, 1 180 Ghanaians shared one hospital bed while one medical doctor attended to

14 908 patients (see Figure 2) as compared to the World Health Organizations' (WHO) norm for sub-Saharan Africa of 1 medical doctor to 7 500 patients. The problem of inadequate health personnel is further compounded by frequent industrial action precipitated by poor working conditions and low remuneration.

The health sector is also characterized by persistent exodus of health workers and over the period 1993-2002, 3 157 health workers, representing 31% left Ghana for greener pastures (ISSER, 2003). This is against the backdrop that Ghana receives medical aid in the form of medical doctors from Cuba, who are usually posted to the remotest part of the country. Anecdotal evidence has it that there are more Ghanaian medical doctors in the State of New York of the United States of America alone than the resident doctors of Ghana.

In the area of health care financing, health spending lags behind other equally important sectors such as education and interest payment. Public spending on health care remains one of the less controversial roles of government partly due to its spillover effect on GDP. Although, per capita public health spending has been increasing steadily over the period, 2000-2006 (see Table 1), it is still below the levels achieved by sub-Saharan African countries such as Mauritius, Botswana and South Africa. In 2003, the WHO reported that Ghana's per capita public health expenditure was US\$31 while Mauritius had US\$105 (Note 2). It is worth mentioning that the boost in public health spending in Ghana has been fuelled by donor support. For instance, donor support as a proportion of public health spending amounted to 11.1%, 16.2% and 14% in 2003, 2005 and 2006 respectively (GHS, 2007). The donor support excludes projects directly initiated and implemented by the donor agencies such as Danish International Development Agency (DANIDA), European Union (EU) and United States Agency for International Development (USAID).

3. Methodology

3.1 Study Design and Data Collection

The study uses primary data collected in three Districts in Ghana (Lawra, Dangme West and Ejisu-Juaben) between October 2007 and January 2008. A cross-sectional survey of 531 women aged 15-49 who had at least one life birth between October 2002 and October 2007 were randomly interviewed using validated structured and pre-tested questionnaires based on the mortality rates of the Districts. The choice of the three Districts was informed by the poverty, morbidity and mortality trends as well as the need to capture the ecological zones of Ghana. In the 2003 Ghana Demographic Health Survey (GDHS), the Upper West Region had the highest mortality rate (Lawra District), the Ashanti region (Ejisu-Juaben), moderate and the Greater Accra Region (Dangme West), the least mortality rate. Due to the absence of a complete list of households in each District and due to the specificity of the subjects under study; women and children, a three stage stratified random sampling technique was employed where the first stage was the District, the second locality/village and the household being the third stage.

When we have heterogeneous population and the heterogeneity has an impact on the important features being studied such as health seeking behaviour, then simple random sampling and systematic sampling methods may be less appropriate (Anaman, 2003). One method which is applicable under such situations is the stratified random sampling technique. Since this study focuses on women and child health issues, the differential impact of demographic, household, community and environmental characteristics can be adequately captured by dividing the population into sub-population or strata and apply random sampling to the sub-populations/strata based on the different sizes of the populations. The use of this technique allows the researcher to get members of the different sub-population adequately represented in the sample.

To ensure data accuracy, quality and reliability, enumerators who were largely graduate students with experience in field surveys were recruited. The sample size was calculated with recourse to the estimated proportion approach (Cochran, 1977) since the total population of women who had given birth over the past five years in the three districts is unknown. However, we are guided by the 2003 GDHS, and thus employing the sample size for estimated proportion approach;

$$n = \frac{t^2 p(1-p)}{e}, \quad \Pr(|p - P| \geq d) = \alpha$$

Where;

n = the sample size

t = the number relating to the degree of confidence anticipated in the result; in this case a 95% confidence interval ($t=1.96$ which is the abscissa of the normal curve).

p = an estimate of the proportion of people falling into the group in which we are interested, i.e. child mortality. α = probability of type I error, or level of significance. e = proportion of error we are prepared to accept (sampling error; 5% anticipated error).

Using the above formula, 255, 163 and 113 women aged 15-49 were interviewed in the Lawra, Dangme West and Ejisu-Juaben Districts respectively. Data for the study were obtained in face-to-face household interviews in the respondents' residence. In households where there were two or more women within the category (15-49 years), the first willing woman was interviewed. An over sampling of 20 additional women across the Districts was undertaken in order to eventually arrive at the 531 women. In all, the response rate was 94% indicating a higher willingness to participate in the survey. The 531 women had between them 773 children of which 317 representing 41% had fallen sick four weeks prior to the survey. This paper is based on the 317 children who had fallen sick four weeks prior to the survey. We investigated how the choice of health care provider (private medical care, public medical care,

pharmacy/over-the-counter drug, traditional/faith healing and self treatment) influences consumers' (in this case the mother or the caregiver) level of satisfaction.

3.2 Ethical consideration

As part of the requirements for conducting surveys on human subjects in Ghana and elsewhere, the study was approved by the Ethical Review Committee of the Ghana Health Service (Ministry of Health). In addition, all study participants gave informed consent before participation and all information was collected confidentially.

4. Empirical Estimation

Econometric analysis has been applied extensively to consumer or customer satisfaction related to health care delivery (Chu-Weininger and Balkrishnan, 2006; Margolis, et al. 2003; Bara et al. 2002; Derosé, 2001; Hoerger et al. 2001; Fredrik, 2000; Qatari and Haran, 1999). Due to the ordinal nature of the dependent variable; the level of satisfaction associated with the use of an alternative health care which takes on the values 1-5, with 1 being the least and 5 the best, the appropriate model is the ordered logit model (Bara et al. 2002; Derosé, 2001; Fredrik, 2000). The selected link function is logit over probit because of the computational advantages of the ordered logit model (Van Beek, 1997). This model takes into consideration the ordinal nature of the satisfaction variable and estimates the probability that a consumer will choose each satisfaction rating based on personal and provider characteristics (which in our model are a series of dichotomous variables). In order to compute the marginal effects after the estimation, we omitted one of the categories (very dissatisfied) since none of the parents (mothers) who utilized private health care chose the option "very dissatisfied".

We posit that the level of satisfaction is suggestive of the quality of health care. There are other quality indicators, such as nurse and physician satisfaction, mortality and morbidity outcomes and other factors such as ratings of inappropriate health system use. However, due to data limitation, the analysis is restricted to the overall level of satisfaction. In the empirical estimation, we test the hypothesis that there is no significant difference between the levels of satisfaction associated with the choice of a health care provider such as private versus public health providers.

The assumption of the ordered logit model is that there is a continuous latent variable 'Satisfaction' or 'Utility' (y^*), which is unobserved and y which is observed. The variable y is an ordinal version of U which has threshold points. The value on the observed variable y depends on whether it crosses a particular threshold or not. Let y_1, y_2, y_3, y_4, y_5 denote the categories of the variable. Hence, the ordered logit model is based on the following specification:

$$y_i^* = \alpha' x_i + \varepsilon_i$$

$$y_i = 1 \text{ if } y_i \leq U_1$$

$$2 \text{ if } U_1 < y \leq U_2$$

$$3 \text{ if } U_2 < y \leq U_3$$

$$4 \text{ if } U_3 < y \leq U_4$$

$$5 \text{ if } y > U_4$$

The U 's merely provide the rankings. The model is estimated using maximum likelihood. In ordered logistic regression, an underlying outcome measurement is modelled as a linear function of the independent variables and a set of cut points. Thus the probability of observing outcome i corresponds to the probability that the estimated linear function, in addition to the random error, is within the range of the cut points estimated for the outcome.

$$\text{Prob}(\text{outcome}_j = i) = \text{Prob}(\kappa_{i-1} < \beta_1 x_{1j} + \beta_2 x_{2j} + \dots + \beta_k x_{kj} + \varepsilon_j \leq \kappa_i)$$

ε_j is assumed to be logistically distributed. The coefficients $\beta_1, \beta_2, \dots, \beta_k$ are estimated together with the

threshold points K_1, K_2, \dots, K_k , where k is the number of possible outcomes. K_0 is taken as $-\infty$ and K_k is

taken as $+\infty$. The model was estimated using Stata Statistical Software, Release 10.0 (StataCorp, 2007).

The control variables in the empirical estimation which encompass socio-demographic and economic characteristics have been chosen with recourse to general empirical literature. A negative sign on the coefficient means that a higher value of the variable increases the odds of a lower value of the outcome (*very dissatisfied*). For example, a negative coefficient on the variable “sex of child” means that parents of girls (sex=1) have higher odds of dissatisfaction of health services as compared to boys. For continuous variables, a positive sign of the linear predictor ensures that higher values of the coefficients lead to increased probability for the higher categories (say *very satisfied*).

4.1 Results and Discussion

In terms of childhood morbidity prior to health seeking, malaria remained the most endemic (see Figure 1). It accounted for 60% of the diseases suffered by the children, followed by diarrhoea (18%) and cough (15%). Generally, malaria remains the major cause of morbidity and mortality in sub-Saharan Africa, claiming more than one million lives each year, the vast majority of whom are children aged under-five, normally residing in remote rural areas with poor access to health services (Connor *et al.*, 2007). In Ghana, malaria is the leading cause of morbidity and mortality in both children and adults. In 2007, malaria accounted for 38.6% of outpatient attendance and was responsible for over 18% of deaths reported at health facilities (Ghana Health Service 2007).

From the descriptive statistics in Table 2, satisfaction with the health care system in general was 63.4% of those surveyed, while 11.1% were dissatisfied. The satisfaction level is generally high, though not as high as reported in other international literature (Bara *et al.* 2002; Fitzpatrick, 1991) given that the health system in Ghana is fraught with inadequate medical personnel and logistics. One might argue that where there are limited or no alternatives, health care users tend to be content with the status quo. In terms of specific providers, the table indicates that overall, subscribers of private health care are more satisfied than those who demanded other provider's services. This is buttressed by the fact that none of the parents indicated that they were “very dissatisfied” with private health care. The highest level of dissatisfaction is associated with parents who utilized the services of pharmacy services/over-the-counter drugs. It is also evident from Table 3 that mothers with higher education are less likely to be very satisfied with health services.

<INSERT TABLE 2 and 3 here>

Tables 4 and 5 provide the empirical results for the consumer satisfaction model (ordered logit), reporting coefficients and marginal effects respectively. According to our econometric estimation, after controlling for a range of variables reflecting socio-economic and demographic factors, subscribers of private health care are more satisfied as compared to public, pharmacy services and traditional or faith healing (self-treatment is the reference group). This finding is inferred from the magnitude of the coefficients and the associated marginal effects. This might imply that the quality of private health care is relatively higher than public, pharmacy services and faith healing. The high quality of private health care relative to public is consistent with other studies such as Agha and Do (2009) who concluded that private facilities were superior to public sector facilities regarding physical infrastructure and availability of services. However, the difference between the two sectors is unnoticed in terms of technical quality of care provided (*see also* Jofre-Bonet, 2001). Boller *et al.* (2003) corroborates that private providers of antenatal care in Tanzania were significantly better than public ones with regard to all attributes of quality they investigated. Our finding is in line with other studies which have demonstrated that private health providers can deliver adequate health services than the public sector (Walker *et al.* 2001; Aljunid, 1995). Yet there are other studies that contend that within the private health care delivery, industrial or urban dwellers are more satisfied than those living in a more distant and marginalized settlement (Bazant and Koenig, 2009).

Control variables that were found to be significant were sex of the child, maternal age and education (Chahal, *et al.* 2004), marital status and previous knowledge of health issues (proxied by access to television). Higher educated mothers are found to be less satisfied with their children's health care services. This might be attributable to the fact that they are more critical about health services provided in general coupled with the fact that they are more knowledgeable about social health issues and their “rights” (Agha and Do, 2009; Chahal, *et al.* 2004; Bara, *et al.* 2002).

Provider characteristics particularly distance (Baltussen *et al.* 2002) and waiting time (Chu-Weininger and Balkrishnan, 2006) were found to be inversely and significantly related to consumer satisfaction. The longer the distance to the nearest health facility, the lower the level of satisfaction associated with the choice of a given provider's services. Stated differently, proximity to health facilities increases satisfaction while longer distances reduce health care satisfaction. Similarly, longer waiting times are associated with lower levels of satisfaction.

<INSERT TABLE 4 and 5 here>

Table 5 provides information on the estimated marginal effects of each of the satisfaction scales. The demand for private health care increases the level of satisfaction (very satisfied) by 31 percentage points while that of public health increases same by 19 percentage points. Thus parents who demand private health for their children are 12 percentage points more likely to be very satisfied than their counterparts who subscribe to public health care. Therefore, we reject the null hypothesis that private and public health care confer the same level of satisfaction.

The relatively low level of consumer satisfaction of public health care vis-à-vis private health care might be attributable to the general job dissatisfaction and lack of motivation among public sector health care providers. Agyepong *et al.* (2004) highlighted the workplace obstacles that caused dissatisfaction and de-motivated staff in Ghana's public health sector. Among the obstacles the authors mentioned in order of importance were low remuneration; lack of essential equipment, tools and supply to work with; delayed promotion; difficulties and inconveniences with transportation to work; staff shortages and housing among others. The authors concluded that given the workplace obstacles that de-motivate staff and negatively influence their performance, the public sector can hardly provide high quality care.

Parents who utilize pharmacy services are more likely to increase their satisfaction level with health care by 12 percentage points while faith/traditional healing was statistically insignificant, thus conferring the least level of satisfaction. Prior knowledge of health care and marital status is also associated with higher levels of satisfaction while mothers with at least secondary education are more likely to be dissatisfied. It is apparent that younger women (20-24 years) and older women (40+ years) are less likely to be very satisfied with health care. It is also evident that rural dwellers are 8 percentage points less likely to be very satisfied with health providers.

4.2 Limitation of the Study

The survey relied upon respondents' self-assessment of morbidity prior to health seeking. The reliance on self-recall of morbidity is somewhat problematic. Hence, the data for the study did not capture bio-medical variables such as the perceived severity of the illnesses reported which might influence significantly the demand for a particular choice of health provider. These variables are thus captured by the stochastic error term. Even, when such outcomes are captured, their reliability is questionable since severity may depend on the mother's familiarity with that illness, symptoms and its early detection. Thus in the absence of professional diagnosis, variables capturing severity of illness could be misleading.

It must be noted however that, measuring satisfaction can be problematic, partly due to the multifaceted nature of the concept including the very act of defining satisfaction (Collins and O'Cathain, 2003; Verbeek *et al.* 2001). Normally, satisfaction levels do not always equate solely to quality care. Other factors influencing satisfaction include consumer perception, attitudes, expectations and experiences; their physical and psychological health; personal and societal values; and consumer knowledge of and exposure to health services (Hordacre *et al.* 2005; Carr-Hill, 1992). In order to appreciate consumer satisfaction with various aspects of health delivery, it is recommended that future research in the areas of childhood health seeking in Ghana examine specific attributes such as the friendliness of medical personnel, waiting time and professionalism *inter alia*.

5. Conclusion

The paper has investigated the empirical relationship between health care providers and satisfaction with health care. We found that users of private and public health facilities are more likely to be very satisfied with health services than their counterparts who seek health care from traditional healers, pharmacies/over the counter-drugs. However, Consumers of private health services are approximately 12 percentage points more likely to be satisfied than subscribers of public health care. This confirms the notion in Ghana and elsewhere that private health delivery is synonymous with quality care (Boller *et al.* 2003; Jofre-Bonet, 2001; Walker *et al.* 2001; Aljunid, 1995). This implies that the public health system needs some quality adjustments to bring it at par with private health care. In addition, as the quality of modern health care (be it private or public) improves, the demand for unorthodox health care such as traditional medicine and self treatment will reduce in favour of modern health care. Furthermore, we found that distance, waiting time, maternal education and gender of child *inter alia* are significant predictors of health care satisfaction.

Finally, while parents have the right to choose the type of treatment option for their children, the children also have a fundamental right to appropriate health care. In many instances, parents who subscribe to self treatment and other unorthodox treatment options, refer their children to appropriate health care only when their conditions have already deteriorated. It will be imperative if public health policy could address such anomaly by making appropriate health care an inalienable right of children.

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Endnotes

1. Strategies adopted to improve quality of care included: provision of more resources for health care; improved and expanded human resource development; strengthening of health care management and introduction of quality assurance (QA) programmes (GHS, 2007).
2. This is in international prices (Purchasing Power Parity). <http://afro.who.int/ome/countryprofiles.html>
3. Using the GDHS (2003), $p = 0.21$ (in the Upper West Region: Lawra/Nandom), $p = 0.12$ (in the Ashanti Region: Ejisu-Juaben) and $p = 0.08$ (in the Greater Accra Region: Dodowa District). Given that there has been a significant improvement in health care between 2003 and 2007, the mortality cases are expected to be lower than the proportions experienced in 2003.

Table 1. Public Health Spending

year	Exchange Rate (₹/\$)	Population	Per capita Public Health Exp(US\$)
2000	5,455.06	19.87	5.85
2001	7,170.76	20.31	6.22
2002	7,932.70	20.76	8.20
2003	8,677.37	21.21	10.50
2004	9,004.63	21.66	13.82
2005	9,072.54	22.11	17.40
2006	9,174.38	22.57	22.78

Source: Computed from Ministry of Health data (2007). Population and Exchange rate data were collated from IMF's International Financial Statistics (2007)

Table 2. Level of satisfaction by Provider Choice

Health Facility	Very Satisfied	Satisfied	Somewhat Satisfied	Somewhat Dissatisfied	Very Dissatisfied
Private	12(33.4%)	13(37.1%)	9(25.7%)	1(2.9%)	0(0.0%)
Public	29(21.2%)	68 (49.6%)	29(21.2%)	7(5.1%)	4(2.9%)
Faith Healing	8(34.8%)	6(26.1%)	6(26.1%)	2(8.7%)	1(4.3%)
Pharmacy	16(25.85%)	24(38.7%)	15(24.2%)	3(4.8%)	4(6.5%)
Self Treatment	7(11.7%)	18(30.0%)	22(36.7%)	2(20.0%)	1(1.7%)
Total	72 (22.7%)	129 (40.7%)	81 (25.6%)	25(7.9%)	10 (3.2%)

Table 3. Maternal Education by overall Satisfaction level

Education	Very Satisfied	Satisfied	Somewhat Satisfied	Somewhat Dissatisfied	Very Dissatisfied
None	16(22.2%)	46(35.6%)	30(37.1%)	5(20.0%)	6(60%)
Primary	11(15.3%)	18 (14.0%)	9(11.1%)	7(28.0%)	0(0%)
Junior High/Mid.	35(48.6%)	44(34.1%)	24(29.6%)	8(32.0%)	4(40%)
Secondary+	10(13.9%)	21 (16.3%)	18(22.2)	5(20.0%)	0(0%)
Total	72	129	81	25	10

Table 4. Results of Provider Choice and Satisfaction Level Based on Ordered Logit

Variable	Coefficient	Robust St. Err	Confidence Interval	
Self Treatment (ref.cat.)	-	-		
Private Healthcare	1.5545***	0.4729	0.63	2.48
Public Healthcare	1.1978***	0.3737	0.47	1.93
Pharmacy	0.7011*	0.3742	-0.03	1.43
Traditional/Faith Healing	1.0201	0.6458	-0.25	2.29
Residence (Rural=1)	-0.4865*	0.2738	-1.02	0.05
Age of Child >1 (Ref. Cat.)	-	-		
Age of Child (1-2)	0.4461	0.3027	-0.15	1.04
Age of Child (2+)	-0.3620	0.2788	-0.91	0.18
Sex of Child (Girl=1)	-0.4518**	0.2263	-0.90	-0.01
Birth order	-0.1427	0.0944	-0.33	0.04
Price of Treatment	0.0159	0.0206	-0.02	0.06
Price of treatment Squared	-0.0001	0.0001	-0.0002	0.00007
Log of household income	0.2655	0.2311	-0.19	0.72
Marital Status (1=Married)	0.6789**	0.2960	0.10	1.26
Mother's Age ≥19 (ref. Cat)	-	-		
Mother's Age (20-24)	0.7813**	0.3457	-1.46	-0.10
Mother's Age (25-29)	-0.0293	0.3675	-0.74	0.69
Mother's Age 30-34)	0.4816	0.4250	-1.31	0.35
Mother's Age (35-39)	-0.9755	0.7664	-2.48	0.53
Mother's Age (40+)	-1.0941	0.8251	-2.71	0.52
No education (ref. Cat.)	-	-		
Primary Education	-0.2928	0.3950	-1.10	0.48
Junior High/Middle	-0.094	0.3095	-0.70	0.51
Secondary+	-0.6362*	0.3570	-1.34	0.06
Watches TV (1=Yes)	0.7407***	0.2840	0.18	1.30
Read Newspaper (1=Yes)	0.0806	0.5303	-0.96	1.11
Listens to Radio (1=Yes)	-0.2579	0.2928	-0.83	0.32
Distance	-0.0351*	0.0197	-0.07	0.004
Waiting Time	-0.0035**	0.0014	-0.006	-0.0001
Malaria (1=Yes)	-0.2224	0.3146	-0.84	0.39
Diarrhoea (1=Yes)	-0.4142	0.4069	-1.21	0.38
Threshold 1	-2.8430*	1.6270	-6.03	0.35
Threshold 2	-1.3977	1.6006	-4.53	1.74
Threshold 3	0.4105	1.6131	-2.75	3.57
Threshold 4	2.6027*	1.6246	-0.58	5.79
Number of Observations = 317				
Pseudo R-square = 0.11				
Log Pseudolikelihood = - 385.40				
Wald chi-square (28) = 120.42				
Prob > chi-square = 0.0000				

*** = (sig. at 1%), **=(sig. at 5%) and *(sig. at 10%).

Table 5. Results of Provider Choice and Satisfaction Level Based on Ordered Logit (Reporting Marginal Effects)

Variable	Very Satisfied	Satisfied	Somewhat Satisfied.	Somewhat Dissatisfied
	<i>dy/dx</i>	<i>dy/dx</i>	<i>dy/dx</i>	<i>dy/dx</i>
Self Treatment (ref.cat.)	-	-	-	-
Private Healthcare	0.31326 (0.110)***	-0.05293(0.062)	-0.19211(0.044)***	-0.05071(0.013)***
Public Healthcare	0.18911(0.060)***	0.06457(0.026)***	-0.17299(0.051)***	-0.05909(0.021)***
Pharmacy	0.11927(0.071)*	0.02342(0.014)	-0.10150(0.051)**	-0.03044(0.014)**
Traditional/Faith Healing	0.19389 (0.146)	-0.00695(0.060)	-0.13690(0.070)**	-0.03716(0.017)**
Residence (Rural=1)	-0.07642 (0.045)*	-0.02835(0.015)*	0.07279 (0.040) *	0.02353(0.013)*
Age of Child >1 (Ref. Cat.)	-	-	-	-
Age of Child (1-2)	0.07153(0.051)	0.02336(0.013)*	-0.06645(0.043)	-0.02096(0.013)
Age of Child (2+)	-0.05371 (0.041)	-0.02685(0.022)	0.05492(0.042)	0.01882(0.015)
Sex of Child (Girl=1)	-0.06846 (0.034)**	-0.03087(0.017)*	0.06816(0.033)**	0.02289(0.012)*
Birth order	-0.02136 (0.014)	-0.01028(0.007)	0.02170(0.014)	0.00731(0.004)
Price of Treatment	0.00238(0.003)	0.00115(0.001)	-0.00243(0.003)	-0.00082(0.000)
Price of treatment Squared	-0.00001(0.000)	-0.00005(0.000)	0.00001(0.000)	-0.00004(0.000)
Log of household income	0.09136 (0.034)	0.01914(0.017)	-0.04039(0.035)	-0.01359(0.011)
Marital Status (1=Married)	0.09136 (0.034)***	0.65782(0.039)*	-0.10212(0.043)**	-0.04002(0.021)*
Mother's Age ≥19 (ref. Cat)	-	-	-	-
Mother's Age (20-24)	-0.10520 (0.042)***	-0.07521(0.04)*	0.11687(0.050)**	0.04618(0.024)**
Mother's Age (25-29)	-0.00436 (0.054)	-0.00214(0.027)	0.00445(0.055)	0.00151(0.019)
Mother's Age 30-34)	-0.06497 (0.051)	-0.04674(0.051)	0.07307(0.063)	0.02815(0.028)
Mother's Age (35-39)	-0.11091(0.063)*	-0.12383(0.126)	0.13764(0.085)*	0.06936(0.072)
Mother's Age (40+)	-0.11907 (0.061)**	-0.14494(0.410)	0.14924(0.078)**	0.08144(0.082)
No education (ref. Cat.)	-	-	-	-
Primary Education	-0.04098 (0.051)	-0.02603(0.042)	0.04468(0.060)	0.01633(0.024)
Junior High/Middle	-0.01397 (0.045)	-0.00698(0.023)	0.01432(0.047)	0.00487(0.016)
Secondary+	-0.08296 (0.040)**	-0.06606(0.047)	0.09558(0.052)*	0.03879(0.026)
Watches TV (1=Yes)	0.11300 (0.046)***	0.04861(0.020)***	-0.11047(0.042)***	-0.03752(0.015)***
Read Newspaper (1=Yes)	0.12328 (0.082)	0.00533(0.031)	-0.01220(0.079)	-0.00401(0.025)
Listens to Radio (1=Yes)	-0.04035 (0.048)	-0.01545(0.014)	0.03883(0.043)	0.012550(0.013)
Distance	-0.00526 (0.003)*	-0.00253(0.001)	0.00534(0.003)*	0.00179(0.001)*
Waiting Time	-0.00053 (0.000)***	-0.00025(0.001) **	0.00054(0.000)***	0.00018(0.000)**
Malaria (1=Yes)	-0.03376(0.048)	-0.01519(0.020)	0.03371(0.047)	0.01121(0.015)
Diarrhoea (1=Yes)	-0.05655 (0.050)	-0.03914(0.046)	0.06301(0.061)	0.02383(0.026)

*** = (sig. at 1%), **=(sig. at 5%) and *(sig. at 10%). *Standard errors in parenthesis*

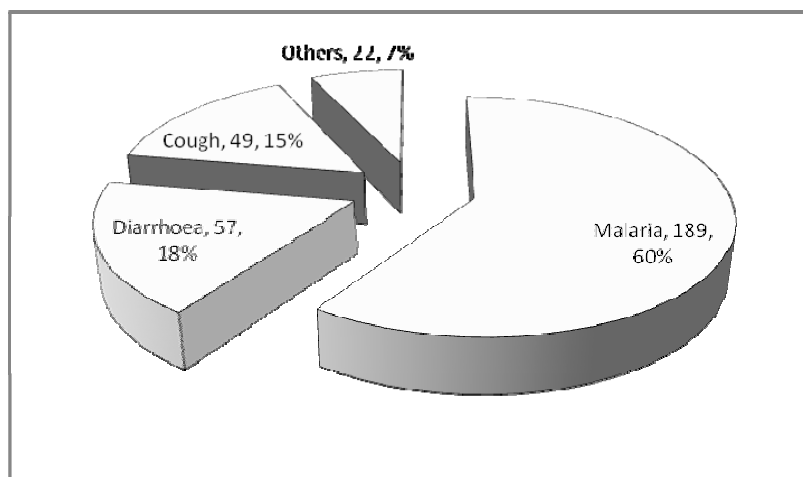


Figure 1. Which Illness did Child Suffer?

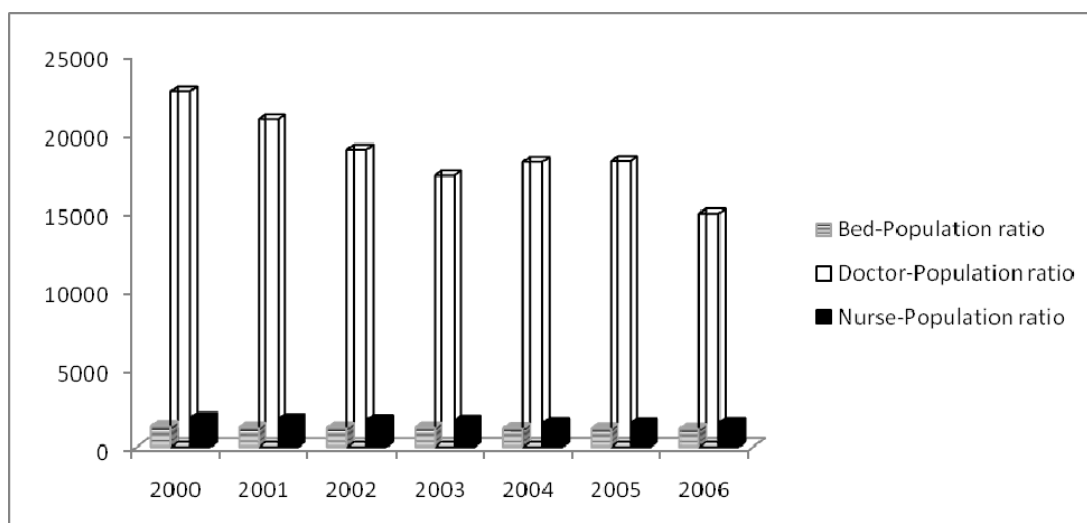


Figure 2. Bed, Doctor and Nurse state statistics
Source: Ghana Health Service- Ministry of Health, 2007



Issues and Challenges of HIV/AIDS Prevention and Treatment Programme in Nepal

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Abstract

This paper explores some of the key issues and challenges of government HIV/AIDS prevention and treatment programme in Nepal. Providing HIV/AIDS prevention and treatment services in Nepal is associated with a number of issues and challenges which are shaped mostly on cultural and managerial issues from grass root to policy level.

Numerous efforts have been done and going on by Nepal government and non-government organization but still HIV prevention and treatment service is not able to reach all the most at risk populations because cultural issues and managerial issues are obstructing the services. The existing socio-cultural frameworks of Nepal do not provide an environment for any safe disclosure for person who is HIV infected. Thus, there is an urgent need to address those issues and challenges and strengthen the whole spectrums of health systems through collaborative approach to achieve the millennium development goals. It will be the purpose of this paper to contribute to the policy makers by exploring the pertinent issues and challenges in the HIV/AIDS programme.

Keywords: HIV/AIDS, Prevention, Treatment, Cultural issue, Nepal

1. Background of the study

For more than two decades, the Acquired Immune Deficiency Syndrome (AIDS) and its aetiological agent, the Human Immunodeficiency Virus (HIV) has been a growing challenge worldwide. HIV/AIDS is recognized as a global emergency demanding the attention on the international health agenda and one of the most important public health issues (WHO 2006). The spread of HIV/AIDS has reached a pandemic form within a short span of time. A total of 33

million people are estimated to be living with HIV across the globe, 2.7 million people became infected with the virus and 2 million people have lost their life due to AIDS (UNAIDS 2008). Every day, more than 6800 people become infected with HIV and more than 5700 die, mostly because they have no access to HIV prevention, treatment and care services (UNAIDS 2008). The United Nations included HIV in its sixth millennium development goals which stated in combating and reversing the spread of HIV/AIDS by 2015 as well as to achieve universal access by 2010 (WHO 2008a). This paper discusses the government's efforts on HIV/AIDS programme management and explores some of the key issues and challenges of HIV/AIDS prevention and treatment programme in Nepal. Its impact is necessarily wider than just medical and includes the cultural and managerial considerations which govern success in medical interventions.

2. Literature search strategy

Electronic journals and reports were accessed by using Medline, Science Direct, Google and Google Scholar. The search strategy was limited to published year from 1990 to 2009. Other "grey literature" (especially policy documents) published by national and international, governmental and non governmental organizations (UNAIDS, WHO, UNGASS, Ministry of Health and Population, NCASC) was also searched.

3. HIV /AIDS programme

3.1 HIV/AIDS epidemiology in Nepal

HIV/AIDS is a major public health concern in Nepal (MoPH 2005), since its first case was reported in 1988. Currently, Nepal is depicted from a "low prevalence" to a "concentrated epidemic" (UN 2008). According to the National Centre for AIDS and STD (Sexually Transmitted Disease) Control (NCASC), there were 12933 HIV positive people, 2151 people living with AIDS and 509 AIDS cases were reported to have died by the end of 2008 (NCASC 2008a). The HIV/AIDS cases in Nepal from 1988 to 2008 years wise male and female cases are shown below figure 1.

<Figure 1>

Poor surveillance systems and the lack of access to quality voluntary counselling and testing services, means prevalence figures are likely to be a gross under estimate. However, the United Nations estimates that the current prevalence is about 0.49% in the adult population, and the estimates number of people living with HIV/AIDS at 75,000. The prevalence in the general population may still be low but it is increasing prevalence in several risk groups. The difference between these two data demonstrates the seriousness of the problem.

The highest burden of people living with HIV is estimated seasonal labour migrants (41%) followed by the, injecting drugs users (34.7%), clients of sex workers (16%) and 21% partners of HIV positive men (WHO/UNAIDS 2008, WHO/UNAIDS 2006, NCASC 2007a). Majority (74.5%) of HIV infection in Nepal is through sexual transmission and followed by injecting drug use and perinatal were found to be the third main route of HIV transmission (table 1).

< Table 1>

However, the distribution of HIV prevalence across the country is uneven. It shows that almost 50 percent of all HIV infection lies in the terrain highway epidemic region which constitutes from the east to the west of the country, followed by the hill region 19 percent, far western and Kathmandu valley 16 percent each respectively (NCASC 2007b).

3.2 HIV/AIDS prevention

The aim of the HIV prevention programme is to change individual behaviour of those at risk of infection to change to less risky behaviour by adopting consistent condom use, or stop sharing of injection equipment and providing antiretroviral drugs to pregnant women to child transmission. In addition, preventing subsequent HIV transmission by those new and identified as infected is an important goal (WHO 2008b). The HIV/AIDS prevention programmes in Nepal have included by media, poster/pamphlets campaign. Similarly, other programmes also have included such as information education communication, behaviour change interventions, safer sex behaviour, condom promotion, identifying and treating STIs, harm reduction, voluntary counselling and testing services, sexual health and HIV/AIDS to youth, preventing mother to child transmission and treatment of adults through antiretroviral drugs (FHI 2004). However, the absence of above prevention interventions even a "low to concentrated growth of HIV" would make AIDS the leading cause of death in Nepal.

3.3 Government efforts

The main government agency responsible for HIV/AIDS and STD is under the Ministry of Health and Population. The Government of Nepal launched the first National AIDS prevention and control programme in 1988 with the implementation of a short-term plan (Subedi 2003). At the beginning, the country provided priority in prevention approaches. A number of local and International Non Governmental Organizations (INGOs), the Government of Nepal and donors have developed well targeted model prevention programmes reaching difficult to access populations with different prevention programmes (DoHS 2004). Similarly, in 1995 the Government of Nepal formulated a national policy with the consultation of different stakeholders for the control of HIV/AIDS. Provisions were made for reducing

stigma and discriminatory practices against people living with HIV/AIDS, confidentiality of blood testing and safe blood transfusion in this policy (MoHP 2007).

There have been diverse efforts to mitigate the increasingly devastating impact of HIV/AIDS in Nepal. The country has proceeded through many phases of AIDS and STD prevention and treatment efforts (table 2).

< Table 2>

In 2001 Nepal initiated a special programme named as “Nepal Initiative” which was developed on assessing the increasing incidence of HIV among high risk behaviour groups (Subedi 2003). Documentation of a rapidly increasing HIV prevalence among drug users and clients of sex workers over the past several years led the country to question the effectiveness of prevention approaches. In this regard, NCASC developed a national strategy on HIV/AIDS in 2002 which was a milestone in national efforts to combat the epidemic in the country. It was developed for five years (2002 – 2006) which has subsequently been translated into a five year HIV/AIDS operational work plan for 2003 – 2007 (World Bank 2006). This strategy had been formulated different activities such as prevention of STI and HIV among most at risk groups, prevention of new infections among young people, ensuring care and support services, expansion of monitoring and evaluation frame, establishment of an effective and efficient management and implementation mechanism. Although the strategy address a wide range of programme issues and its implementation also need to be effective (Sharma 2004, NCASC 2003).

A number of multilateral and bilateral organizations support HIV/AIDS prevention and treatment programmes in Nepal, including interventions for vulnerable groups, condom promotion, STI testing, behaviour change communication, volunteer counselling and testing services and providing antiretroviral drugs. But what is being done on the field of HIV/AIDS by these organizations are not enough to address the pertinent cultural issues in grass-root level and management issues in service provider level. These should be clearly identified otherwise the problems will continue unless the root causes of these issues and challenges are identified.

4. Major issues and challenges for HIV prevention and treatment

Despite the progress that has been made still many issues and challenges are unidentified either programme management level or services seeking level. The facts that the number of new HIV infections continues to increase that have impacted the current efforts on the evaluation of the HIV epidemic. Thus, the ultimate goal of this paper is to identify those issues and challenges for the effective response.

4.1 Limited coverage of prevention programme

Two decades has taken place in HIV/AIDS prevention. To date the health service has had limited success in addressing the need of the commercial/female sex workers such as poor knowledge about safe sex and poor negotiation of condom use (World Bank 2008, Limbu 2007). Sexual transmission is a key driver of HIV transmission in Nepal. Sex workers are both at high risk because of multiple sexual partners and highly vulnerable because of environmental and structural barriers that prevent them from accessing prevention services and having control over their activities (Vuylsteke *et al* 2007). For example, Nepalese young women with their traditionally lower social status, they have knowledge about HIV/AIDS and STD but they have no access to means of protection which is more pertinent to cultural issue. Similarly, still many village women do not consider themselves at risk of HIV/AIDS/STIs from their migrant husbands because they do not believe their husbands are having sex with other partners or sex workers (Bondurant *et al* 2001). But the evidence shows that 27% of Nepali migrants who work in India were engaged in high risk sexual behaviours and frequently visited sex workers. One of the high migration districts reported nearly 50% of suspected PLWHAs (34 out of 71 cases) were migrants (CARE 2004).

The size of the IDUs population also varied by location and they are found to be highly mobile. Nepal was the first developing country to establish a harm reduction programme with needle exchange but the programme's coverage is found very limited (Vuylsteke *et al.* 2009). Similarly, men having sex with men in Nepal is still a taboo subject (Pokhrel *et al.* 2008).

Young people are vulnerable to HIV/AIDS due to their poor knowledge about sexual health; poor translate of safe sex practice and limited condom use because adults do not talk to children about sexual matters (Pokhrel *et al.* 2008). On the other hand there are strong cultural taboos against premarital and extramarital sexual relations but young people are practicing risky sexual behaviour such as having multiple partners and non-use of condoms. Various studies showed that electronic media (radio, TV, internet) are the primary source of information to the young people and a significant proportion of young people use these media in their leisure time (UNGASS 2006). Similarly, teachers, peer, health workers, poster/pamphlets were other prime sources of information. Sex and HIV education is included in school and college curricula but there is a question about how can dropout student will take this information. Moreover, the methods of teaching remain didactic (Shimkhada & Karki 2002). Similarly, sexual health is a sensitive issue in Nepalese culture as a result; only 27.6% of female and 43.67% of male young people can currently identify ways of preventing the sexual transmission of HIV (NDHS 2007). Moreover, despite the cultural and social norms, girls are

traditionally lower status; they have knowledge about HIV/AIDS and STD but no access to means of protection (<http://www.indiana.edu/~kinsey/ccies/np.php>, Pigg 200). Thus, Nepal lack of educational programmes based on behavioural science and access to youth friendly information. In this regards, still many Nepalese youth are at risk of acquiring HIV which is a big challenge to the government to tackle these socio-cultural taboos.

4.2 Limited condoms use

The condoms are considered best weapons to fight against HIV/AIDS transmission. Availability shall be ensured and correct ways of use shall be promoted (Karkee & Shrestha 2006). The spread of AIDS would be slowed if more people used condoms (NCASC 2007). In Nepal, very few drug users are using condom ranging from 34% to 51% with regular and non-regular sex partners among them adolescent condom use in their first sexual contact was found to be only 14% (Limbu 2007). Still, it is a taboo to talk about sexuality in Nepalese society and people might feel embarrassed about it buying condoms from pharmacies (Poudel et al 2008). A study in Nepal revealed that, only 14% of married men and 4% of married women had reported using condoms for the prevention of HIV/AIDS & STI (CREHPA/NDI 2006). Similarly, a study revealed that HIV positive men in Kathmandu who had sex did not always use condom (Poudel et al. 2008).

On the other hand, government supply of condoms is irregular and no accessibility of free condom in remote areas which in turn discourages target groups for adopting safer sex practices (UNAIDS/FHI 2007). Studies overwhelmingly demonstrate that condoms are highly effective in preventing HIV transmission (Wegbreita et al 2006) but availability and regular use is found a big issue.

Thus, government should need to access the success history of other countries such as Thailand, Uganda and so on (Bertozzi 2008). In 1989 Thailand was initiated “100% condom programme” targeted sex workers. **No Condom No Sex** was propagated through mass media and workplace which was credited for reducing new HIV infections by 80% and STDs by 90% within three years (Rojanpithayakorn 2006, Chen 2007). Thus, we need to identify whether similar intervention in Nepal would be possible and equally effective.

4.3 Inadequate surveillance system

The surveillance data is scarce in Nepal however the existing medical and public health infrastructure in Nepal and the lack of continuity in National HIV/AIDS reporting mechanisms, it is very likely that the actual number of cases is many times higher. The discrepancy in reported versus estimated HIV/AIDS cases is a reflection of this gap. Without this information, it is very difficult to determine which interventions are more likely to mitigate the impact of HIV/AIDS. Similarly, the use of surveillance to understand trends and patterns in HIV epidemic is important in Nepal that characterized by heterogeneity in terms of the sub-populations affected, geographical distribution and their evolution over time (NCASC 2007c) but the service is still limited which is big challenge to the NCASC to produce high quality and complete information for designing interventions programme to the high risk populations which make government intervention difficult to take contact with vulnerable groups in a diffused population.

4.4 Limited coverage of HIV testing and counselling

Counselling services have a pivotal role in HIV/AIDS care (Gilks 2001). HIV counselling and testing is a major starting point for accessing and being informed on HIV/AIDS related services which provide psychological support (Lamptey 2006). Basic assumption that widespread uptake of Voluntary Testing and Counselling (VCT) within communities can help “to normalise HIV/AIDS to reduce AIDS related stigma and to raise awareness of the epidemic” (UNAIDS 2001) and represents a mechanism for referral into care and treatment in health centres. The knowledge of sero-status may lead individuals to avoid engaging in risky behaviours and increases abstinence (Birdsal et al. 2004, Wegbreita et al. 2006). So the government intervention needs to focus on these particular groups.

Due to the limited access of testing facilities, 90% of HIV positive people in Nepal are unaware of their status and even though there is available of treatment services, so many people living with HIV are dying without knowing their status (Kshetry 2008). On the other hand, this very limited VCT services are mostly concentrated in urban centres. Weak pre and post test counselling, difficulties to confirm result and maintaining confidentiality are other issues testing and counselling service in Nepal (UNAIDS/NCASC 2006). Few public health facilities were equipped with laboratory services (CD4 count) and most hospitals with laboratories do not have essential equipment and trained technicians. Technicians in government laboratories have not received recent training on appropriate STI diagnostic procedures (NCASC, WHO & UNAIDS 2006).

Similarly, coverage of VCT service was very low amongst most at risk groups such as migrants’ workers, drug users, sex workers and men who have sex with men (www.aidsdatahub.org) who are potential carriers of HIV. Effective VCT is vital for identifying individuals who can benefit from early treatment, for promoting treatment adherence and bolstering prevention. Unfortunately, there are still challenges on this front. VCT services are available 112 hospitals and clinic across the country in the public and private sector (UN 2008). However, several key issues were seen for make available of VCT services in terms of access, infrastructure, trained manpower, quality of services, service

provision hours (for employed people, students etc), and maintaining private and confidential working spaces. To make available of complete package of counselling and testing services for those daily increasing HIV infected people is really challenges to NCASC. It is a well known fact that without preventing HIV among most at risk people, it is not possible to halt and reverse the HIV epidemic (World Bank 2008).

4.5 Health systems constraints

HIV/AIDS poses a challenge for health and social systems. Although positive steps have now been taken by the Nepalese government in combating HIV/AIDS, still numerous challenges remain. One issue is the structural inadequacy of Nepal's current health care system that was geographically revealed. The basic health services and other social service systems are poorly functioning and a trained health worker are leaving for better opportunities in urban areas leaving understaffed in the rural health institutions (UNGASS 2006). However, NCASC is responsible largely for development of policy and designing of planning for HIV/AIDS prevention and treatment programmes and little progress has been made in the scale up but still arrays of essential support services remain largely inadequate as well as application of a multi-sectoral approach in practice remains a challenges (Shrestah 2005). The epidemic can not be tackled only through medical intervention but it requires multi level interventions that seek to involve a variety of partners in coordinated action that have been shown to be more successful than those that work in isolation but it has found real challenges for Nepal government to work with all stakeholders in a mutual approaches (UNAIDS 2000).

On the other hand, HIV infected people are not receiving effective health care services. Over 1400 people living with HIV/AIDS and 36 HIV positive pregnant women were receiving antiretroviral treatment through 23 ARV sites (NCASC 2008b). These sites not adequately cover to all, as many cannot access this service because it is not practical for them to travel long distance each morning which is high financial and physical cost for them (UNFPA 2008). It seems to be a big management issue for adequately expanding HIV treatment sites for targeting vulnerable groups which is not easy access to the disperse populations. Thus, the policy level people need to address these pertinent issues and overcome the diminish access to both preventive and medical care services to the high risk populations.

4.6 Financial constraints

HIV/AIDS programme is well-funded areas in any country but this epidemic burdens the economy of any country. "Prevention makes treatment affordable and treatment can make prevention more effective" (Salomon *et al.* 2005). Adequate financial resource for HIV/AIDS prevention and treatment programme scale up is a great challenge because poverty is a key factor in propagation of the HIV epidemic. Many of the high risk behaviours that expose people to HIV are related to poverty (UN 2005). There has been debate regarding the relative allocation of HIV/AIDS funding, how much should go towards prevention and how much towards treatment, with an emerging consensus at policy level that prevention and treatment are best viewed as complementary rather than in competition with one another. Increased access to treatment improves opportunities for HIV prevention through increased HIV testing and increased testing can reduce stigma and act as an entry point to prevention services. A financial issue for a developing country Nepal has great challenges for medical care because HIV is chronic in nature. HIV treatment requires a lifetime commitment and consequently there is a need to find sustainable funding. This is the main management problems for finding and allocating the adequate financial resources for medical care to people living HIV and AIDS.

4.7 Social and cultural challenges

Nepal is a multicultural and multiethnic society with over one hundred ethnic and caste groups (Dahal 2003). Socio-cultural norms provide a formidable challenge to efforts to mitigate the impact of HIV/AIDS. AIDS is a social and cultural issue, dealing the sex issues regarding in Nepalese society, it is disrespectful. Sexual behaviour is not openly discussed in Nepal and talking sex is considered impolite. Parents and elders usually do not talk openly about sex with adolescents (<http://www.indiana.edu/~kinsey/ccies/np.php>, Pigg 2001) and this cultural constraint is one that this paper will examine in more detail.

On the other hand, most of the Nepalese PLWHAs do not know their status and so many may continue to be engaging in unsafe sexual practices. They do not go to test and seek treatment because Nepalese people perceive HIV/AIDS negatively (UNAIDS/NCASC 2004). They are not ready to discuss in the society and hide their status due to the fear of the society but not due to the fear of the transmitting the disease. Mass media reinforces this negative attitude towards HIV/AIDS as the bad person's disease. It shows the great displeased about the awareness programme from mass media for generating negative attitude towards HIV/AIDS. Similarly, commercial sex workers, drugs users, men sex with men are socially and culturally perceived as being of bad character which directly hinders the utilization of HIV prevention and treatment services (Beine 2003). Thus, these socio-cultural challenges are responsible to fuel the spread of HIV/AIDS and diminish access to both preventive and medical care services So, it is time for policy makers to think seriously address the way the media message.

4.8 Leadership and coordination

Strong leadership at all levels of society is crucial for an effective response to the HIV/AIDS prevention and treatment programme. Leadership involves personal commitment and concrete actions unfortunately NCASC is functioning with instability at the top level of management which is hindering the HIV prevention and treatment programme effectiveness in the long term. According to UNGASS, NCASC is a poorly functioning in national coordination mechanism which results in poor policy support (UNGASS 2006). Currently, more than 100 NGOs are working in the HIV/AIDS field in Nepal and many have several specific programmes but these programmes are scattered and there is a lack of a common forum and coordinating mechanism to play a significant role in strengthening the programmes with better output. It is also necessary to examine the impact of intervention on a regular basis (UN 2008). There is lacking of coordination and collaboration that are always part of good programme management which develop synergies, maximize resources utilization and reduce duplication of programmes. The National Strategic Plan embodies a multisectoral response, it has been particularly challenging to maintain interest and engaging non health sectors in the planning and implementation because HIV/AIDS is not their more interest field. It has largely to be in the area of strengthening the institutional mechanism both within and outside of NCASC. Inspiring and empowering leadership at the policy levels to functional levels is needed to transform the national response to HIV and AIDS from a plan into action. This is a particular challenge to the Nepal government because of frequent turnover of senior manager in NCASC.

4.9 Stigma and discrimination

Stigma and discrimination are still the much talked issues (Subedi 2007). HIV related stigma significantly impacts on uptake of HIV testing, negative attitude of services providers, and adherence to HIV treatment and follow up (O'Brien 2009). This reinforces the social constraints of cultural acceptance of medical initiatives.

Due to stigma and discrimination people are less likely to undergo HIV test and seek treatment (O'Brien 2009). PLWHA hide their disease due to the fear of the separation as well as stigma sculptured by the mass media. It is important to address and take steps to eliminate stigmatization of most at risk populations when developing HIV/AIDS prevention interventions programmes. However, Nepal Demographic and Health Survey (2006) have shown that the awareness among men has gone to a level of 91.7% compared to 72.6% in women; however the level varies with age group and literacy level (NDHS 2007).

This situation, directly challenges to success of HIV prevention and treatment services. If this situation continues, government's efforts will be lost. In this regard, government needs to develop befriending support intervention programme that should to be culturally appropriate to overcome the stigmatization and discriminations toward people living with HIV/AIDS by the health personnel in health institutions and also in the community.

4.10 Geographical challenges

Nepal is geographically skewed with mountain, hilly and terrain (plan land) regions where the majority of the populations (80%) live in rural areas. Due to the geographical complexity, it is also a serious challenge to carry out mass Information Education and Communication (IEC) services, condom promotion, peer education programme, harm reduction (needles exchange programme) activities to prevent and treat the high risk groups that is a big difficulties of management of health interventions. So, no single media to single hospital is effective to carry out the preventive and treatment intervention in the country, especially in remote areas. Similarly, VCT is provided on an extremely limited scale and what little is offered is concentrated mostly in urban centres where around 80% populations live in rural areas (UNAIDS/NCASC 2004). On the other hand, unavailability of health personnel in rural areas most of the time doctors are away from their work place, so absenteeism issues is also a great challenge in mountain and hilly areas.

4.11 Limited coverage of HIV treatment

Life-saving anti-retroviral drugs (ARVs) help people living with HIV to have longer and healthier longer. The use of ARV has lead to a marked reduction in AIDS related morbidity and mortality, in countries where ARVs are widely available are experiencing clear declines in AIDS related death (Castro 2003), this has led to a 70% decline in deaths due to HIV/AIDS (WHO/UNAIDS 2006). However, less development has existed in the area of HIV treatment in Nepal despite the fact that the estimated number of people living with HIV is very high. Over 1400 people living with HIV/AIDS and 36 HIV positive pregnant women were receiving ARV treatment through 23 health institutions across the country (NCASC 2008b) but UNAIDS/WHO currently estimated that almost 20,000 adult people and 1500 of pregnant women living with HIV require ARV right now, in Nepal (WHO/UNAIDS 2008). These sites not adequately cover to all PLWHAs as many cannot access the services. This is because; we have issues about the availability of HIV treatment and other side inadequate response of the government. The access to treatment is uneven across and within countries.

Available evidence from numerous studies indicates that provision of antiretroviral drugs (nevirapine, lamivudine and zidovudine) to infected mothers significantly reduces vertical transmission, with values ranging from 33–63% reduction

in transmission (Wegbreita *et al.* 2006). Thus, PMTCT programme will be one of the entry points for ARV but numerous issue and challenge (limited testing, counselling, poor referral mechanisms, stigma etc) are hindering to reach the HIV treatment services in Nepal. These are management issues which could be addressed directly by the policy level.

4.12 Paediatric HIV/AIDS prevention and treatment

Most children infected with HIV acquire infection from their mothers during pregnancy, labour and delivery or by breastfeeding (WHO 2004). Infant and children are immensely vulnerable to HIV/AIDS in Nepal which are new born or unborn. Due to various dynamics affecting their lives, they are identified as immediate risk people. NCASC (2008) reported that 763 children age less than 15 years aged were reported on HIV positive in Nepal. However, UNICEF (2007a) estimates that 13,000 children were orphaned and 111,000 children were affected by their parents' HIV infection. HIV prevention activities are also an issue such as limited use of condom use in rural areas teenagers, still high stigma and discrimination, do not want to socialize with infected people and exclude or ignore infected people and their families at social gathering. Similarly, in health institutions was the most frequent place of discrimination followed by the family and community (UNICEF 2007b)

The survival prospects of both parents and children are dramatically improved if they are diagnosed and receive ARV treatment. Correctly used, ARV is very effective, transforming AIDS into a chronic illness for adults and giving infected children a future. The number of babies who are infected by their HIV positive mothers at birth drops from around a third to 10 percent or less with appropriate medical intervention. But the overwhelming majority of people living with HIV do not know their sero-status and consequently their lives and their children's futures are at risk (UNICEF 2007b). These are widespread issues and challenges to uptake ARV treatment to the children in Nepal. According to WHO (2008), only 51 children (under aged 15) were receiving ARV treatment in Nepal, which numbers of children in need of ARV are much higher than receiving treatment. This is because of the limited number of ARV site for children in public health system.

5. Conclusion

Limited resources and administrative capacity tied with strong underlying needs for health services (HIV/AIDS prevention and treatment) create serious challenges to the Government of Nepal. HIV prevention programmes build individual skills needed to use prevention commodities properly and run preventive and medical services in parallel. Programmes to prevent HIV transmission often compete with programmes to treat people suffering from AIDS for limited resources with numerous challenges such as management issues and deep- rooted cultural constraints.

Nepal faces numerous challenges in effectively addressing the HIV prevention and treatment to the epidemic. Critically the use of condoms, adequately testing and counselling and behavioural change through a social-cultural change will remain among the most important prevention measures. These can be mobilized by strategic management interventions. Despite, numerous efforts by Nepal Government, HIV prevention and treatment services are not able to reach the at-risk populations because there is a gap between top levels to grass root level. Thus, the policy makers seriously need planning to anticipate and translate the plan into action to prevent and treat the increasing numbers of people living with HIV/AIDS. There is urgent need to address those issues and challenges and strengthen the whole spectrums of health systems through collaborative approach to achieve the millennium development goals. We have also identified the need to address the cultural constraints which may obstruct the use of services offered due to antipathy within or between groups of sufferers and the general population and without preventing those most at risk people, it is not possible to halt and reverse the HIV epidemic.

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Table 1. Route of HIV transmission in Nepal

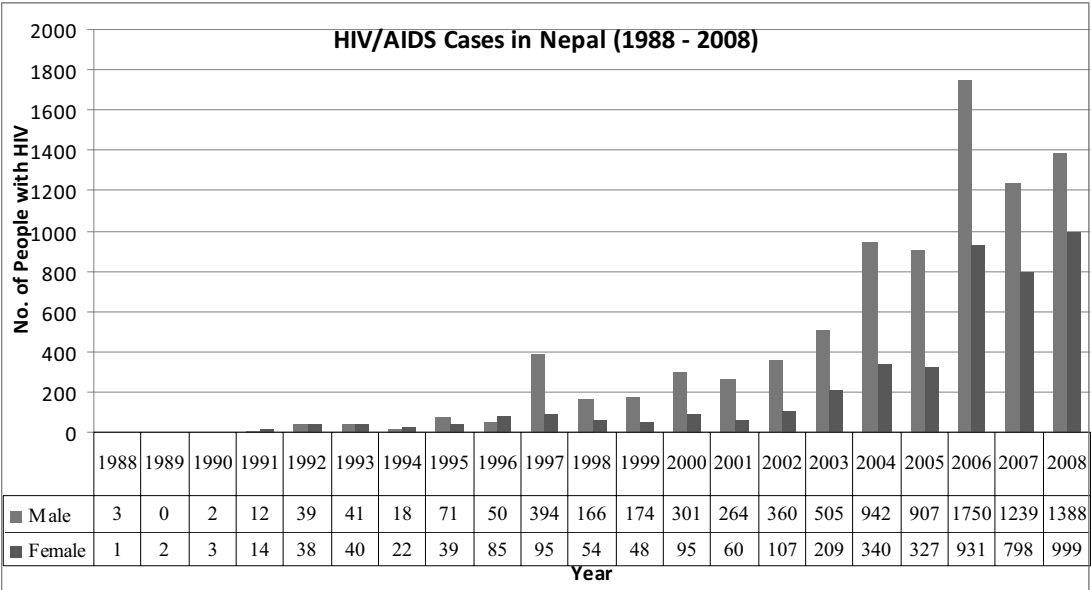
Route of Transmission	Total No. of Infection	Percent
Sexual intercourse	9712	74.5
Blood or Organ Recipients	38	0.5
Injecting Drug Use	2358	18.2
Perinatal	748	6.0
Unidentified	77	0.6
Total	12933	100.00

Source: NCASC, December, 2008

Table 2. Milestones in HIV /AIDS prevention and treatment efforts in Nepal

Year	Activities
1986	Organization of STD/AIDS control committee
1987/88	Lunched the first National short term AIDS prevention and control programme
1990/92	Implementation of medium term plan
1993	Policy adopted for 100% screening of donated blood
1993/97	Implementation of second medium term plan for AIDS/STD control
1995	National policy on AIDS and STD prevention adopted
1997-2001	Strategic plan for HIV/AIDS prevention adopted
1999	Started integrated bio-behavioural survey (IBBS)
2002	National AIDS council formed
2002 – 2006	National strategy for HIV/AIDS prevention adopted
2003- 2007	Operational plan for HIV/AIDS control
2003	National Voluntary Counselling & Testing (VCT) guidelines
2004	Antiretroviral (ARV) treatment started / National ARV guidelines
2004	Standard operating procedures on ARV for Sukraraj Tropical Hospital
2004	STI case management guidelines developed
2006 - 2011	Second National HIV/AIDS strategy
2006 - 2008	National action plan
2008 - 2011	Three year National plan

Source: DHS, 2005-6, NCASC, 2007



Sources: Subedi 2006, NCASC 2008

Figure 1. HIV/AIDS cases in Nepal (1988 – 2008)



The Association between Ergonomic Risk Factors, RULA Score, and Musculoskeletal Pain among School Children: A Preliminary Result

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Abstract

A study was done to investigate the risk factors associated with musculoskeletal disorder (MSD) among school children in Malaysia. Two schools in the Klang Valley and one in Johor Bahru were selected. A cross sectional study was done beginning February 2009 until May 2009. Two hundred and twenty nine pupils among 2nd Grade (age 8 years) and 5th Grade (age 11 years) from three school were selected to participate in this study. Musculoskeletal symptoms were recorded using Modified Nordin Body Map Questionnaires; Tanita weight measurement was used to measure school bag weight and students' weight. Modified Rapid Upper Limb Assessment (RULA) was used to assess the awkward posture of the students' torso namely bending forward movement, leaning, sitting and twisting. A high prevalence of MSD among school children aged 11 years old (5th grade) was found (68.0%) compared to 8 years old (2nd grade) with 36.4%. Result also showed that 31.8% of 2nd grade and 62.2% of 5th grade students experience upper MSD. Lower MSD complains showed 5th grade students are at higher percentage than 2nd grade with 45.5% and 20.9% respectively. Logistic regression analysis controlling for body mass index, sport injuries and history of major accidents revealed that the following factors were related to MSD: home activities (involving television (TV) watching and personal computer (PC) used) [1.889, 95% CI 1.081 – 3.301] and bag perception complain among school children [2.148, 95% CI 1.086 – 4.247]. For specific MSD symptoms it was found that the duration of home activities using PC or TV exceeding 2 hours was the main the risk factor of upper MSD among school children [4.923, 95% CI 1.188-20.389]. In conclusion, combination of risks leads to high increase of MSD among school children in Malaysia.

Keywords: Musculoskeletal Disorder (MSD), Rapid Upper Limb Assessment (RULA), School children, Home activities

1. Introduction

Ergonomics is a science that seeks to comfort the workstation and all of its physiological aspects to the human (David, 2008). In Malaysia ergonomics issues among school children are not documented widely compare to other issues such as air pollution, water pollution and other hazards in school. School furniture is among several factors that may contribute to musculoskeletal pain (MP) among school children. In the classroom, children often sit in poor postures with trunk, back and neck flexed or rotated even for longer periods of time. Generally in normal school environments, many factor can influence students' sitting posture, this include the anthropometric dimensions of school children, the measurement and design features of school the furniture (Murphy et al. 2004, Yeats, 1997). Sitting posture perform by students in school can contribute to the development of MP among them. When posture of the students were compromise with awkward body position when sitting adding with the heavy lifting of school bag can introduce harm and danger to the student musculoskeletal system (Murphy et al. 2004). School children lugging bags packed with books have been a perennial problem in Malaysia. Nowadays, Ministry of Education has introduced periodic table and serial textbooks to reduce the weight of school backpacks. The changes were done when many teachers and parents voiced their concern about the load in school bags especially in early 2002. However, heavy school bags remain a yearly problem as some subject that requires five or six exercise books, excluding the textbooks (Furjuoh et al. 2003).

The bags could weight up to 10 kg each which is about 50% of student body weight. The rolling backpacks have been recommended by United Kingdom health professionals, but lead to other challenges, such as difficult manipulation on stairs, storage within school and passage through crowded hallways and buses (Furjuoh et al. 2003). Ergonomics awareness in school environment have not being implemented seriously in Malaysia, and as the result most of the children poses greater risk to ergonomics hazard due to the heavy lifting of school bag and incorrect sitting posture in classrooms. This can lead to development of MP at any body part in the future. In promoting safety and health among school children pertaining to ergonomic issues, the teachers play major role enhancing healthy behaviors. Intention to adopt healthy behaviors, like any other type of behaviors, is motivated or 'trigger' by stimuli in an individual's environment (Egger et al. 2004).

Many factors can increase the risk on developing of low back pain (LBP) after exposure to the ergonomic hazard. For the school children, structurally they are small and need special chair design for them to sit for a long period of time without experiencing any back injury (Yanto et al. 2008). In Yanto et al. (2008) study, mismatch occurs among the school children where their furniture in class does not match with their body dimension and thus complained on back of body due to their buttock and back pain. The second factor of ergonomic stressor in the school environment among school children are the bad horizontal and vertical movement on their school furniture in class session. In Indonesia, Riyadina (2001) studied the effect of mismatch between school furniture dimensions with painful at neck (61.3%), shoulder (57.0%), waist (49.2%), posterior (54.5%) and arm (72.3%).

Many researchers have concluded that the awkward posture status, bag weight and lack of ergonomics awareness were the major factors that contribute to the development of musculoskeletal disorder (MSD) among school children. Therefore, this national cross sectional study among the school children was carried out to determine the prevalence of MSD, risk factor associated with MSD and posture score. This preliminary study is a part of cohort study with the aim to determine the effectiveness of ergonomically designed furniture for Malaysian schools.

2. Methods and materials

2.1 Subject recruiting and selection

A cross sectional study was conducted involving 229 school children in 3 locations from February to May 2009 in two state in Peninsular Malaysia, namely Selangor State in the Central region (2 schools), and Johor State in the Southern region). Two classes were randomly selected from each school, where one class from second grade (2nd Grade) which aged 8 years old, and fifth grade (5th Grade) which aged 11 years old. Systematic random sample was used in selecting the student in each class when Rapid Upper Limb Assessment (RULA) was performed on selected students'. The student selection was based on the specific criteria which exclude the student with major accidental injury and mental illness. The sampling frame was a list of government primary schools in Selangor and Johor, which was obtained through the Ministry of Education, Malaysia. The list of students studying in primary two and five from the selected schools obtained. The schools were selected based on its medium of teaching, which is Malay Language, and multiracial and coeducational characteristics. Student name was obtained from the school management based of their respective class.

2.2 Questionnaires

Two sets of questionnaires were used in this study. The first set was used to determine the children's background such as ethnic, transportation to school, type of school bag and home activities. To obtain information on the MSD, a set of self-administered questionnaire translated into Malay language from the Standardized Nordic questionnaire (SNQ) (Kourinka et al., 1987), was used. The questionnaire contained a diagram of 9 body parts divided into neck, shoulder,

upper back, lower back, elbow, arm, hand, thigh, knee and leg so to assist the students in identifying the correct body parts when answering the questions. The questions consist of simple phrase such as “For the past 1 month ago, do you experience problem on muscle or bone (aching, pain and discomfort) in these areas? 1) neck” (No=0, Yes=1).

2.3 Rapid Upper Limb Assessment (RULA)

The posture analysis among student was performed using Rapid Upper Limb Assessment (RULA). RULA was developed by McAtamney and Corlett of the University of Nottingham's Institute of Occupational Ergonomics (McAtamney et al, 1993). Rapid upper limb assessment was used to evaluate the awkward posture of students in their class activities when in sitting position. Posture of the student in this study was assessed and good inter reliability result were obtained (α Cronbach = 0.8120, 0.7951, 0.7851, 0.8141, 0.8310, 0.7931 for arm analysis, wrist, neck, trunk, leg and muscle, respectively). Modified RULA checklist forms translated into Malay language were used and observations were recorded as numerical scores. The score was then translated using specific RULA matrix of scoring whereby a high grand score indicate a severe awkward posture (Figure 1).

2.4 Bag weight

The bag weight measurement was performed to evaluate the schoolbag load status among the respondents. The weight of each respondent's schoolbag load (including everything that the was brought to school on the day of measurement such as water bottle, books, stationeries and food) was measured using an electronic weighting scale (Tanita Model) with an accuracy of ± 0.1 kg. The schoolbags were placed at the centre of the weighing scale with the loads evenly distributed over the surface. The measurement was then, recorded to the nearest 0.1 kg. Time, date and place on which the measurements were conducted were recorded. Three measurements were made daily (early morning, morning and evening) to obtain representative weight of the schoolbag load.

2.5 Statistical Analysis

For univariate analysis, distribution and frequency of socio-demographic factors under study was determined. Logistic regression analysis was performed by adjusting the Body Mass Index (BMI), sport injuries and accident injury when determining the risk factors of MSD. Statistical Package for Social Science (SPSS[®]) version 13.0 was used in data analysis with the significant value ($p < 0.05$).

2.6 Quality control

Pre-test questionnaires was performed on 10% of sample size before the start of the study on school children aged 8 and 11 years old to ensure the understanding of the questions (face validity). In order to control the selection bias, matching procedure was conducted controlling for; i) the mode of transportation of the school children to school, ii) the distance of the school, iii) the school bag and the method of carrying school bag daily. To ensure that analysis was done correctly, a video camera was used to capture the motion of the students for the morning session only. The video were then analyzed for one minute using a RULA cycle.

2.7 Ethical issues

Approval from Medical Researcher Ethic Committee, UPM was obtained. Written consent from the parents/ guardians of the school children were obtained before data collection. Reference item of Ethical Approval was (UPM/FPSK/PADS/T7-MJKEtikaPer/F01_(JKK_APR (09) 01).

3. Results

3.1 Socio-demographic information

Demographic information of respondents is shown in Table 1. All anthropometric measurements were significant different between 2nd grade and 5th grade group (Table 2). Modified RULA assessment for school children showed there were significant different in RULA score between two groups with the higher scores among 2nd grade than 5th grade students (Table 2).

3.2 Comparison of MSD prevalence among school children

The study showed that from the 9 body parts, the lifetime prevalence of MSD showed that the highest complain was shoulder pain (16.4%) among the 2nd grade children and neck pain (38.0%) was the highest complained among the 5th grade. The overall MSD pained shows that the 5th grade reported the higher complaint (67.0%) than the 2nd grade (36.0%) (Table 3). The study also showed that the 5th grade school children recorded higher sports injury (47.1%) compared to the 2nd grade school children (16.4%). The injury were mainly due to sport injury was leg pain among the 2nd grade (33.3%) and 5th grade school children (64.3%) (Figure 2.0).

3.3 The association between MSD with risk variables

Risk determination was carried out, controlling for sport injury, history of previous accident or major injury and body mass index (BMI). Results showed that home activities and perception of bag weight had significant association with

the MSD prevalence among study group (Table 4). The study showed that those who used personal computer or watch television (TV) had higher risk (OR=1.889) of developing MSD compared to those without these activities. Study also showed that the students with heavy bag weight had higher risk (OR=2.148) in developing MSD compared to those with light bag weight. Others risk factors showed no significant association between MSD and risk factors either for the 2nd grade students (Table 5) or 5th grade (Table 6).

Form the risk determine in this study, further analysis was conducted and risk variables data were grouped into 3 main factors namely time consume for home activities (more or less than 2 hours), bag weight (more or less than 10% of each students body weight) and RULA score (more or less than awkward position score =5). Results for overall analysis of risk factors and MSD showed that, time spent (more than 2 hours) for home activities influence MSD occurrence among school children after adjusting for sport injury, history of accident and BMI. This study suggested that the students who use PC or watch TV more than 2 hours had higher risk (OR=4.923) of developing MSD on the Upper Back (OR=2.259) compared to those without these activities.

4. Discussion

4.1 Prevalence of MSD

This study was to determine the rate of musculoskeletal disorders amongst schoolchildren and the role of physical and psychological factors in which evaluation and association with subsequent symptomology were made. The primary aim of the study was to estimate the prevalence of students having musculoskeletal pain, and to calculate risk associated with the pain including bag weight, home activities, and awkward position and posture. Higher prevalence of MSD reported pain occur more frequent among female then the male students. Simialr findings by Troussier et al. (1999) who found that MSD for back pain common among female than in male (25.4% versus 15.2%; $p < 0.001$).

This study showed a high prevalence of MSD among Malaysian schools children from 9 body parts. This findings by Gary A. et al. (2006), reported the highest prevalence of MSD associated with demographic and behaviour factors in which the prevalence of MSD pain was much higher (55.9%) than the present study (36.6%). Higher MSD pain reported in lifetime for 5th grade (67.2%) compared to 2nd grade (36.4%) for this study. Dominant pain location for lifetime prevalence recorded for 5th grade was the neck (37.8%) followed by the shoulder (31.9%) and thigh (19.3%). Total reported MSD pain in one week was also recorded higher at the neck area (22.7%) for the 5th grade as compared to the 2nd grade (8.2%). However outcome from this study as comaped to that observed by Yanto et al. (2008) who reported most of the 2nd grade (11 – 12 years) school children in Indonesia reported as having higher thigh pain (>30%). For the 2nd grade students, the highest reported musculoskeletal pain was the shoulder area (16.4%) followed by the neck (14.5%) and leg (12.7%).

The strongest complaints in this cross-sectional study were observed in the neck, upper back and low back pain. Jones et al. (2003) concluded that the musculoskeletal pain complaints may relate to childhood somatic symptoms. Mikkelsen et al. (1997) showed that 30.5% of children in their study reported headache at least once a week compared with 54% of children who also reported musculoskeletal pain, while Wickman (1992) and Brattberg (1992) found students with any body part of muscle pain especially at lower back and headache reported higher stomach ache than those who had no symptoms. There are other factors that may influence the reporting of pain symptoms among the children and need to be thoroughly understood when interpreting the findings from musculoskeletal pain studies.

4.2 Bag weight

From this study, the mean of school bag weight of the 5th grade students showed significantly higher mean than the (mean = 4.89kg \pm SD = 1.43kg) 2nd grade students (mean = 4.63 kg \pm SD 1.03kg). Whittfield et al (2005) reported the mean of school bag weight was 6.6kg (SD 2.2kg) for all groups. Several authors reported a significant relationship between musculoskeletal pain and school bag weight (Viry et al., 1999; Whittfield et al., 2005), however, the findings in this study were inconclusive because of the timetable issues and lack of storage area in school. These lead to the habit of children to bring excess books in their bag to school daily.

Despite from the findings there were no significant association between the method of carrying bag and MSD but Troussier et al. (1994) reported a significant correlation between presence of pain at the back and the position in which the bag was carried (i.e. in hand or on one shoulder). No significant association between the school bag weights amongst the 2nd grade as compared to 5th grade. This may be due to the weight of subject being studied. In Malaysia, the second level students (aged 10 to 12 years old) were required to take extra subject for language and science. As a result, more books might cause the bag weight to be above allowable weight of 10% above the body weight.

The small body measurement of the 5th grade may also influence the MSD reported symptoms. From the result, there were significant different between 2nd grade and 5th grade students for all anthropometric measurements which might influence the bag weight carrying habits among the 5th graders. Similar findings by Yanto et al. (2008) there were significant difference in anthropometric measurements amongst 10 – 12 years old school children when compared to younger age group.

4.3 Rapid Upper Limb Assessment (RULA) score

Rapid upper limb assessment is an observational method of assessing postural health among human workers (McAtamney et al. 1993). This technique was used in this study as the student may possess greater risk of prolonged sitting and performing awkward posture in the class environment. From this study, both groups showed no significant association between MSD and the increment of RULA score (above 5). Previously, studies have demonstrated that there was a mismatch between the dimensions of school furniture (chair/desk) and the anthropometric measurements of school students (Parcells et al. 1999; Legg et al. 2003). Several studies also have found an association between musculoskeletal pain of lower back with sitting position (Balagué et al. 1988; Salminen, 1984; Viry et al. 1999). Nissinen et al. (1994) studied a cohort of fourth-grade school children and found those with low back pain in the last month sitting (55.6%) was cited as the most common provoking factor, as reported by 30.2% of subjects.

Troussier et al. (1994) found that of 1178 subjects included in their study, 41.6% of the respondents (490 children) experienced pain while sitting in the classroom. They also noted that 69.5% of the back pain occurred after 1 h of sitting and that MSD pain on back increases with the duration of the sitting position in school. In another study by Balagué et al. (1988) found that, out of the students suffering MSD included in their study (i.e. 27% of 1715 school children), 42% experienced pain when sitting and 28% when bending forwards. In a study of 370 children aged 11–17 years, Salminen (1984) observed that 59.9% of those reporting current neck and/or back symptoms (20% of sample) complained of pain while sitting.

4.4 Ergonomics and home activities

Previous study showed that the postural behaviour of school children may affect MSD prevalence (S. Hakimi et al. 2008). Hakimi et al. (2008) had showed that the majority of school children (62%) had poor sitting posture while writing and reading. Previous findings also indicated that 50% of respondents from the study subject did not have enough information about proper sitting in class (S. Hakimi et al. 2008). Studies found an increased risk of MSD as a result of watching television or using PC at home (Balagué et al. 1988, 1994; Troussier et al. 1994).

This study result showed strong significant association between watching television and MSD among all study groups. Balagué et al. (1988) reported prevalence rates of over 50% among those who spent more than 2 h per day watching television. This study suggested that the main risk factor associated with the MSD was the using PC or watching TV at home for 2nd grade and 5th grade [OR=4.923, 95% CI 1.188-20.389]. However Troussier et al. (1994) suggested that the risk of musculoskeletal pain (R.R= 1.71) increases when watching TV for more than 1 h per day, proposing that the effect of TV on the musculoskeletal health is secondary to prolonged postural pain. Result from this study, recorded the time consumed by the student using PC at home more than 2 h or not. It showed that the highest risk of developing MSD symptoms were the using of PC for prolonged sitting habits. Although many studies showed significant association between TV watching habit and MSD rather than PC, but another study showed null association as reported the same (Gunzburg et al. 1999a) between musculoskeletal pain and television watching; although in this study, significantly more musculoskeletal pain was observed in children who reported playing video games for more than 2 h per day. As far as we are aware of, it is not known whether the risk associated with TV viewing is due to sitting or inactivity.

In future research, it is important to recognize the influence of psychological and family factors in children's pain especially the onset of musculoskeletal pain. It would be helpful to better understand these risk factors, and interactions that may exist between them to ascertain their relative importance and predictive ability in terms of back pain among schoolchildren. While it may be possible to influence physical risk factors acting in the school environment, it is important that psychological factors are also included in a preventative strategy aimed at reducing the occurrence of MP amongst schoolchildren.

Physical factors seem to play an important role in the development of children's pain, and prolonged periods of sitting may increase pain reporting. This study also suggests that school furniture may contribute to the onset of pain in schoolchildren. There are also serious implications for the future workforce with many young adults entering the workplace already having neck and back pain already present.

Finally, further research is required to examine the association between sitting posture and pain reported at different spinal locations. Unsuitable school furniture may contribute to the onset of pain and those children with psychological difficulties may go on to develop more long term and serious pain. Children are also more likely to report pain if there is a family history of such pain.

4.5 Study Limitation

The main limitation of the present study was that it was cross sectional design and not all risk factors assumed as being important were predictive and seen as exploratory rather than an examination of pain and causal factors. Posture assessments should have been done for all subjects. The results were also limited to 3 schools in 3 different cities. As the present study was preliminary for our cohort study; risk factors for MSD will be revealed further when the whole study is completed.

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Table 1. Demographic information among 229 school children

Variables		Frequency	Percentage (%)
Grade	2 nd Grade	110	48.0
	5 th Grade	119	52.0
Gender	Male	94	41.0
	Female	135	59.0
Race	Malay	197	86.0
	Indian	22	9.6
	Chinese	2	0.9
	Others	8	3.5
Transportation	Bus/ Car	214	93.4
	Walk	15	6.6
Time for Travel	< 15 minutes	187	81.7
	> 15 minutes	42	18.3
Home activities^a	Yes	154	67.2
	No	75	32.8
Perception of bag	Light	42	18.3
	Medium	150	65.5
	Heavy	37	16.2
Bring Food	Yes	188	82.1
	No	41	17.9
Comfort of Chair	Yes	171	74.7
	No	58	25.3
Comfort of Desk	Yes	184	80.3
	No	45	19.7

^a Use personal computer at home (PC) and watch TV

Table 2. Anthropometric, bag weight and RULA scores between 2 groups

Variables		2 nd Grade [n=110] Mean (SD)	5 th Grade [n=119] Mean (SD)	t value	p value
Anthropometric	Weight	23.61 (6.20)	35.54 (10.30)	-10.524	p<0.001
	Height	122.10 (6.71)	132.14 (12.51)	-7.453	p<0.001
	BMI	15.63 (2.55)	20.52 (6.00)	-7.912	p<0.001
Bag Weight		4.63 (1.03)	4.89 (1.43)	-1.606	0.110
RULA Score^a		[n=56] (SD) 5.35 (0.47)	[n=61] (SD) 4.94 (0.64)	3.901	p < 0.001*

^aThe RULA assessment was performed by selected students only to represent their class using systematic random sampling.

Table 3. Lifetime prevalence and 7 days prevalence of body part complaint among respondents

Body Parts	Life time			7 days		
	2 nd Grade (n=110)	5 th Grade (n=119)	All	2 nd Grade (n=110)	5 th Grade (n=119)	All
Neck	14.5	37.8	61	8.2	22.7	36
Shoulder	16.4	31.9	56	9.1	16.8	30
Elbow	11.8	3.4	17	7.3	2.5	11
Arm	10.9	17.6	33	5.5	5.0	12
Upper Back	8.2	17.6	30	3.6	6.7	12
Lower Back	6.4	18.5	29	1.8	8.4	12
Hip and Thigh	6.4	19.3	30	4.5	10.1	17
Knee	8.2	14.3	26	6.4	5.0	13
Leg	12.7	19.3	37	7.3	8.4	18
MSD Experience in lifetime	36.4	67.2	120	24.7	47.9	84
MSD Prevalence (1 month)						
Yes (%)	41 (37.3)	87 (73.1)	128			
No (%)	69 (62.7)	32 (26.9)	101			
Injured During Physical Education Class						
Yes (%)	18 (16.4)	56 (47.1)	74			
No (%)	92 (83.6)	63 (52.9)	155			

Table 4. Association between risk factor and MSD prevalence

Risk Variables	With MSD n= 128 (%)	Without MSD n=101 (%)	χ^2	Odd Ratio (OR)	95.0% C.I
Grade					
2 nd Grade	41 (32.0)	69 (68.3)	29.778*	4.575	2.614 – 8.010
5 th Grade	87 (68.0)	32 (31.7)			
Sex					
Male	52 (40.6)	42 (41.6)	0.021	1.040	0.612 – 1.768
Female	76 (59.4)	59 (58.4)			
Transportation					
Bus/Car/Bike	121 (94.5)	93 (92.1)	0.555	0.673	0.235 – 1.921
Walking	7 (5.5)	8 (7.9)			
Time Consume					
< 15 minutes	100 (78.1)	87 (86.1)	2.421	1.740	0.862 – 3.514
> 15 minutes	28 (21.9)	14 (13.9)			
Home activities					
Using PC	94 (73.4)	60 (59.4)	5.047*	1.889 ^a	1.081 – 3.301
Not Using PC	34 (26.6)	41 (40.6)			
Perception of bag					
Light	17 (13.3)	25 (24.8)	4.960*	2.148 ^a	1.086 – 4.247
Heavy/Medium	111 (86.7)	76 (75.2)			
Attitude bring					
Bring food/water	108 (84.4)	80 (79.2)	1.025	1.418	0.720 – 2.790
Not bringing	20 (15.6)	21 (20.8)			
Chair Complain					
Comfort	88 (68.8)	83 (82.2)	5.382*	0.477	0.254 – 0.898
Discomfort	40 (31.3)	18 (17.8)			
Desk Complain					
Comfort	98 (76.6)	86 (85.1)	2.636	0.570	0.287 – 1.129
Discomfort	30 (23.4)	15 (14.9)			

* Significant at $p < 0.05$ ^a Significant at OR=1, 95% CI

Table 5. Association between risk variables and MSD prevalence for 2nd grade study group

Risk Variables	Mean (SD)	OR	95.0% CI
Anthropometric			
Weight	23.59 (6.20)	1.032	0.929 – 1.146
Height	122.13 (6.70)	1.007	0.914 – 1.109
BMI	15.62 (2.55)	1.063	0.910 – 1.242
Bag Load Status			
Bag Weight	4.63 (1.03)	1.129	0.768 – 1.661
RULA Assessment			
RULA score	5.35 (0.47)	1.788	0.530 – 6.028

Table 6. Association between risk variables and MSD prevalence for 5th grade study group

Risk Variables	Mean (SD)	OR	95.0% CI
Anthropometric			
Weight	35.51 (10.28)	1.031	0.966 – 1.101
Height	132.13 (12.51)	0.970	0.914 – 1.029
BMI	20.50 (6.00)	1.078	0.991 – 1.174
Bag Load Status			
Bag Weight	4.89 (1.43)	0.950	0.605 – 1.492
RULA Assessment			
RULA Score	4.94 (0.64)	1.132	0.410 – 3.217

Table 7. Association between risk factors and MSD prevalence among all respondents

Body Parts	Home Activities ^a (OR)	Heavy Bag ^b (OR)	Incorrect Posture (RULA) ^c (OR)
Neck	2.356 (0.930-5.968)	0.887 (0.633-1.243)	0.656 (0.324-1.327)
Shoulder	2.000 (0.800-4.998)	0.793 (0.561-1.121)	1.131 (0.561-2.282)
Hand/Arm	2.067 (0.574-7.436)	1.118 (0.711-1.760)	0.512 (0.198-1.325)
Upper back	4.923 (1.188-20.389)	0.850 (0.537-1.347)	1.017 (0.385-2.682)
Low back	1.145 (0.393-3.336)	0.778 (0.512-1.183)	0.709 (0.306-1.641)
Tights	2.011 (0.577-7.012)	1.142 (0.742-1.759)	0.595 (0.239-1.481)
Knee	3.062 (0.727-12.894)	0.766 (0.475-1.233)	0.442 (0.164-1.191)
Leg/ Ankle	1.212 (0.417-3.526)	1.127 (0.748-1.698)	1.593 (0.677-3.752)
Elbow	3.334 (0.629-17.663)	0.994 (0.549-1.622)	2.047 (0.619-17.663)
MSD overall	2.259 (1.161-5.780)	0.886 (0.634-1.81)	0.906 (0.483-1.701)

^aHome activities including time spent for using PC and watching television more or less than 2 hours

^bBag exceed 10% of student body weight categories as heavy bag

^cExceed scoring of 5 indicate awkward posture when sitting and ergonomic risk present

RULA SCHOOL CHILDREN Assessment Worksheet

Complete this worksheet following the step-by-step procedure below. Keep a copy in the employee's personnel folder for future reference.

A. Arm & Wrist Analysis

Step 1: Locate Upper Arm Position

Step 1a: Adjust...
 If shoulder is relaxed: +1;
 If upper arm is abducted: +1;
 If arm is supported or person is leaning: -1;
 If arm out to side of body: +1

Step 2: Locate Lower Arm Position

Step 2a: Adjust...
 If arm is working across midline of the body: +1;
 If arm out to side of body: +1

Step 3: Locate Wrist Position

Step 3a: Adjust...
 If wrist is bent from the midline: +1

Step 4: Wrist Twist
 If wrist is twisted in mid-range = 1;
 If twist at or near end of range = 2

Step 5: Look-up Posture Score in Table A
 Use values from steps 1, 2, 3 & 4 to locate Posture Score in Table A.

Step 6: Add Muscle Use Score
 If posture mainly static (i.e. held for longer than 1 minute) or, if action repeatedly occurs 4 times per minute or more: +1

Step 7: Add Force/load Score
 If load less than 2 kg (intermittent): +0;
 If 2 kg to 10 kg (intermittent): +1;
 If 2 kg to 10 kg (static or repeated): +2;
 If more than 10 kg load or repeated or shocks: +3

Step 8: Find Row in Table C
 The completed scores from the Neck/Trunk & Leg analysis is used to find the row on Table C.

B. Neck, Trunk & Leg Analysis

Step 9: Locate Neck Position

Step 9a: Adjust...
 If neck is twisted: +1; If neck is side-bending: +1

Step 10: Locate Trunk Position

Step 10a: Adjust...
 If trunk is twisted: +1; If trunk is side-bending: +1

Step 11: Legs
 If legs & feet supported and balanced: +1;
 If not: +2

Step 12: Look-up Posture Score in Table B
 Use values from steps 9, 10 & 11 to locate Posture Score in Table B.

Step 13: Add Muscle Use Score
 If posture mainly static or, if action 4/minute or more: +1

Step 14: Add Force/load Score
 If load less than 2 kg (intermittent): +0;
 If 2 kg to 10 kg (intermittent): +1;
 If 2 kg to 10 kg (static or repeated): +2;
 If more than 10 kg load or repeated or shocks: +3

Step 15: Find Column in Table C
 The completed scores from the Neck/Trunk & Leg analysis is used to find the column on Table C.

Final Score	
-------------	--

Subject: _____

Company: _____

Date: ____/____/____

Scorer: _____

FINAL SCORE: 1 or 2 = Acceptable; 3 or 4 investigate further and change soon; 5 or 6 investigate further and change soon; 7 investigate and change immediately

© Professor Alim Hodge, Cornell University, Nov. 2000

Figure 1. Modified RULA Assessment Form

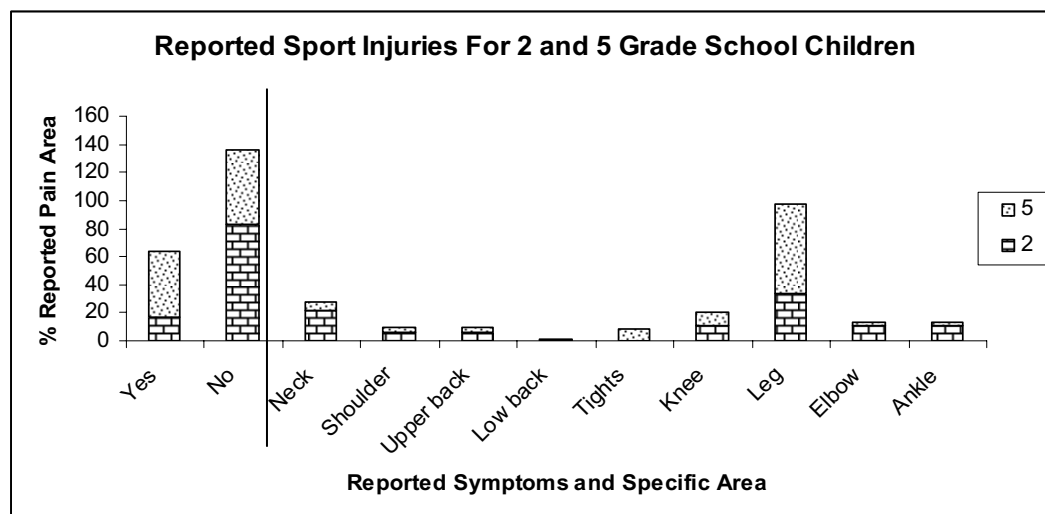


Figure 2. Prevalence of MSD pain due to sports injuries



Review of Barriers to Engaging Black and Minority Ethnic Groups in Physical Activity in the United Kingdom

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Abstract

Introduction and Objective: The lower physical activity levels in Black and Minority Ethnic (BME) groups as compared with general population in the United Kingdom (UK) could relate to barriers to engaging these groups in physical activity. Hence, the aim to conduct a review to examine UK primary studies reporting barriers to engaging BME groups in physical activity. **Method:** This is a narrative review of literature from 1970 to 2008. The search looked for English literature from five bibliographic databases (MEDLINE, Embase, CINAHL, PsycINFO, Ethnicity and Health). Broad search terms 'physical activity and minority' were used and views from BME groups were considered in this review.

Results & Conclusion: The search yielded 391 studies and 18 were finally included in the review. Our review identified 20 barriers clustered among four broad themes of: (a) perceived personal barriers; (b) socio-economic barriers; (c) cultural barriers; and (d) environmental barriers. Overcoming these barriers in these broad areas is important in development of sensitive multicultural health promotion addressing physical inequalities.

Keywords: Systematic review, Health promotion, Black minority ethnic groups, Physical activity, South Asian African

1. Introduction

Emerging evidence suggests that Black and Minority Ethnic (BME) groups have lower physical activity levels than their white counterparts and this may be one potential reason why BME groups are at higher risk of non-communicable diseases (Fischbacher *et al.* 2004; Haase *et al.* 2004; Health Survey for England 2004; Sport England 2006). Primary prevention of non-communicable diseases is paramount in public health in developed countries, and even more so for ethnic minorities. We use the United Kingdom (UK) as an example in this review as little is known about barriers to engaging in physically activity among BME groups in the UK and challenges of overcoming these barriers are critical in planning and implementing culturally sensitive interventions.

Physical inactivity remains a major risk factor for chronic diseases and obesity. It is clear that having inactive lifestyles has contributed to increasing rates of heart disease, stroke, diabetes, depression and cancer, and to poor mental health (Adams *et al.* 2007; Alessio 1997; Cooper & Brill 1988; Commandre *et al.* 2000; Santaularia 1995; Vuori 2001; Thompson 1994; Sproston & Mindell 2006; Warburton *et al.* 2006). Globally, 1.9 million deaths are attributable to physical inactivity (WHO 2002a) and yet the proportion of people meeting recommendations of physical activity is generally low. In public health practice, recommendations are: 30 minutes of moderate-intensity physical activity 5 days per week or 20 minutes of vigorous-intensity physical activity 3 days per week for adults. The World Health Organisation (WHO 2002b) and evidence-based reviews by the American College of Sports Medicine and American Heart Association (Haskell *et al.* 2007), Strong *et al.* (2005) and Department of Health, UK (2004) supported this assertion. Of interest are findings in BME groups not meeting recommended activity levels as compared to general population (Fischbacher *et al.* 2004; Haase *et al.* 2004; Health Survey for England 2004; Health Education Authority 2000). In the same way, research has shown that ethnic minorities stand a higher chance of having non-communicable diseases in UK (NRCEMH 2004; Fischbacher *et al.* 2004; Haase *et al.* 2004; Rudat 1994). For instance, the prevalence rate of diabetes in BME groups is three to four times higher in Scotland's BME population (NRCEMH 2004, NRCEMH/Diabetes UK Scotland 2006) and the risk of heart disease in this group is higher than the general population (Bhopal 2000; Gill *et al.* 2004). Stroke mortality rates in African-Caribbean are up to four times higher than the general population in England and Wales (Chaturvedi & Fuller 1996).

The BME groups are so diverse in terms of migration history, culture, language, religion and disease profiles. Defining 'ethnicity' is hard as the concept is multidimensional and used as a synonym for 'race' and there is no consensus on appropriate terms for use in the scientific study of health by ethnicity and race (Bhopal 2004). The term 'minority' may suggest a sociological group that does not constitute a politically dominant voting majority of the total population of a given society. They may be migrant, indigenous or landless nomadic communities. The term 'Black' is commonly referring to Africans and Afro-Caribbeans, but may also signify all non-white minority populations (Bhopal 2004), such as Indian, Pakistani, Bangladeshi and South Asian populations (Phillips 1998).

As physical activity inequalities may have resulted from barriers of participating in physical activity, commonly mentioned barriers in both BME groups and the general population are related to safety, availability, cost, personal barriers e.g. lack of time, health concerns, and lack of motivation. (Eyler *et al.* 1998) and the social influence of peers (Keresztes *et al.* 2008). For BME groups 'restricting' factors such as culture, knowledge, strength of beliefs in health benefits of activity may be contributing (Haase *et al.* 2004). Increasing primary studies on physical activity issues among BME groups prompted this narrative review in order to give more dimension and insight into likely causes of physical activity inequalities. Overcoming these barriers is critical in developing and implementing interventions in multicultural environments.

2. Objectives

This review aims to undertake a narrative review of relevant literatures relating to barriers and influence involved in physical activity participation among BME groups.

Using a systematic approach will help to provide evidence of what is known about the dimension of barriers and influence to physical activity. This review brings together the findings of both quantitative and qualitative primary studies in the UK.

3. Methods

3.1 Literature Search

Five electronic bibliographic databases were searched from 1950 to April 2008, including MEDLINE, EMBASE, CINAHL, PsycINFO, Ethnicity and Health including government websites; NHS Scotland Library, Health Technology Assessments (HTA), National Institute of Health and Clinical Excellence (NICE). The review used combination of MeSH terms, free text word and truncated terms of 'physical activity', 'ethnic group', and 'barriers' were used in search strategy. The MEDLINE search strategy was adapted for searching other databases. Reference and library source searching plus hand-searches was also performed to identify relevant studies. A total of 391 articles and reports were identified.

3.2 Study Selection

Studies are included if they contained reported and separate BME groups results related to barriers or influence of physical activity in the UK. The sifting of literature performed in stages against inclusion criteria was initially based on 'title', and then 'abstract' that resulted in 71 potentially relevant references. The retrieved full texts of 71 references were similarly assessed to yield a total of 13 papers. Figure 1 summarises the sifting process with inclusion and exclusion criteria. Five papers were identified from hand-searched literature to make total of 18 papers that make up this systematic review.

A data extraction form was developed and piloted for the purpose of this review. Full data extraction was performed by one reviewer and checked by a second reviewer. The qualities of studies were assessed by nine-item checklist

constructed specifically for this review (copy available from first author). The quality criteria were informed by several sources (Higgins 2006; Thomas *et al.* 2003; Spencer *et al.* 2003; NHS Centre for Reviews and Dissemination 1996, NHS Health Scotland 2008; Greenhalgh 1997). Discrepancies between reviewers were resolved through discussion.

4. Findings

4.1 Description of Studies

Findings are reported as narrative summary and in tabular form. The search strategy produced 391 articles. Out of these, 18 met the inclusion criteria of reporting separately the barriers of physical activity among BME Groups in the UK. The study designs of the included studies were of various types: nine studies used solely qualitative method, three were quantitative, and the remaining six studies used mixed method (Table 1). The qualitative studies employed methodologies that range from case studies to semi-structured interviews, and in-depth interviews to focus groups discussions. There were three intervention studies identified (Snape & Binks 2008; Jolly *et al.* 2007; Carroll *et al.* 2002), one evaluated the intervention programmes by way of a RCT (Randomised Controlled Trial) (Jolly *et al.* 2007), while others gave case studies reports of the interventions. Sample sizes ranged from six to 175 in the qualitative studies, and from 25 to 4452 in the quantitative studies. All studies considered perspectives of BME groups although three papers included views from teachers (Khunti *et al.* 2007), programme staff (Snape & Binks 2008), GPs (General Practitioners), Health Authorities and leisure centres (Carroll *et al.* 2002).

It is the aim of this review to consider only UK studies, we found that all papers were conducted in England except one (Lawton *et al.* 2006) which was conducted in Scotland. We also found that five of the studies expressed solely women's views and it is important to note that all these come from South Asian populations. One paper took its perspectives solely among men (Naeem 2001) and the rest included male and female. In the majority of studies the participants are adults above 18 years, only two studies explored the views of schoolchildren under the age of 15 (Khunti *et al.* 2007; Mahoney 1992).

The sample frames for included studies were drawn from variety of ethnic groups, settings and gender. Ethnicity was described by all the studies with 10 out of 18 papers restricted to South Asians mainly Indians, Pakistan, and Bangladesh (McKenna & Ludwig 2008; Sriskantharajah & Kai 2006; Carroll *et al.* 2002; Lawton *et al.* 2006; Khanam & Costarelli 2008; Farooqi *et al.* 2000; Snape & Binks 2008; Burney 2006; Khunti *et al.* 2007). Six studies combined mixed populations of South Asians, Whites and/or Afro-Caribbean (Greenhalgh *et al.* 1998; Mahoney 1992; Jolly 2007; Darr *et al.* 2008; Health Education Authority 1999; Rai & Finch 1997) while one study each focused on Afro-Caribbean (Molokhia & Oakeshott 2000) and West Africans (Elam *et al.* 2001). In methodological quality, the studies had clearly defined purpose and gave adequate descriptions of the sampling and justification for data collection in general, but details for sample validation and assessment of generalisability varied widely. There was limited evidence of triangulation with other sources and limitations of studies made clear by authors. Details of the studies' aims, design, samples and assessment of qualities are summarised in Table I and IV.

4.2 Physical Activity Barriers

Our review identified 20 barriers clustered among three broad themes of perceived personal, socio-cultural and environmental barriers. With no attempt to quantify results in this review, the range of barrier outcomes is appreciated (see Table III). Whilst some barriers are distinct, some are inter-related for example lack of time may be due to work or family commitment. Lack of time was the most reported barrier ($n = 8$) but further probing for reasons was poorly reported (Tables II and III).

Identifying literatures from databases have been difficulty as majority are qualitative studies which tend to use creative titles that provide no information on barriers of physical activity among BME groups. The included studies can be broadly classified into a) those that focus on physical activity alone ($n=8$), and b) physical activity and other lifestyles ($n=10$). The groups included in the studies included patients with diabetes, cardiovascular heart disease (CHD), osteoporosis, and obesity. Studies were generally poorly reported and inconsistent questions asked to identify physical activity barriers. The physical activity preferences of BME groups were poorly explored by included studies.

5. Discussion

This review revealed a limited literature on physical activity among BME groups, and even less investigating the barriers to engaging in physical activities among the same UK population. Most studies explored the views of South Asian population as compared with other UK minorities. All studies conducted in England with exception of only one which was conducted in Scotland (Lawton *et al.* 2006). The information on methodology and results provided by most studies varied widely in terms of how it was presented and the level of details reported. This may be due to strict word-length restriction by some academic journals.

The difference in physical activity levels between BME groups and general population revealed by Fischbacher and colleagues may contribute to increase risks of non-communicable diseases such as diabetes, hypertension (Fischbacher *et al.* 2004). The strength of this review lies in providing better insight on the range of barriers that are consistently identified in several different studies related to BME groups. Knowledge of barriers to engaging in physical activity

among this population may prove useful in the development of physical activity interventions for BME groups. The findings here are consistent with a review that focused on children in the general population (Brunton *et al.* 2003).

We identified inter-related personal, socio-cultural and environmental barriers as classified by several other studies (Andajani-Sutjahjo *et al.* 2004; Booth *et al.* 1997; Browson *et al.* 2001; Cleland *et al.* 2008). For example, personal barriers relate to lack of motivation; socio-cultural barriers are associated with lack of family support, religion, language barriers; and environmental barriers have to do with lack of information, access, safety, cost and time. Of interest is the cultural influence on physical activity in which participants negatively perceive exercise. In this case there were beliefs that exercise connotes 'illness', as informed by lay concept of exercise in Bangladesh's local language 'beyam' (Greenhalgh *et al.* 1998); the belief that women are not allowed to walk alone in the evening (Khanam & Costarelli 2008); and also the perception of exercise as sexual connotation since it makes you look attractive for seduction purpose (Snape & Binks 2008). The attitudes of participants towards physical activity were affected by other cultural factors such as language barriers, religion and cultural dress codes, unavailability of women only sessions at sport facilities.

Ruland and Moore (2001), Wilcox and colleagues (1999) and Burke and colleagues (2006) have all emphasized the influence of ethnic background on physical activity preferences. Our review pointed out lack of evidence as related to activity preferences. Understanding BME groups' preferences is crucial alongside evidence of barriers to physical activity in developing strategies of effective Physical Activity interventions.

This review falls short of assessing effectiveness of interventions used to promote physical activity among BME groups because only one study evaluated intervention promoting physical activity adherence (Jolly *et al.* 2007). The majority of studies were epidemiological and exploratory focusing on beliefs and attitudes towards healthy lifestyles and risks of diseases.

Challenges faced in searching for studies exploring the views of BME in UK may reflect either paucity of literature in this field or failures of search strategy to capture literature since creative titles not including keywords being used mostly. Hence, we cannot exclude the possibility of some studies being missed out in this review. A detailed quality assessment was not conducted in this review due to heterogeneity of study designs and the lack of consensus in the literature on quality criteria in use for mixed methods and qualitative studies (O'Cathain *et al.* 2008; Hannes 2008). As indicators of quality criteria in the field of Ethnicity and Health, we looked into justification for designs and sampling, ethical issues, language interpretation and triangulation of results with other sources. This is as informed by sources (Higgins 2006; NHS Health Scotland 2008; Thomas *et al.* 2003; Spencer I. 2003; University of York NHS Centre for Reviews and Dissemination 1996; Greenhalgh 1997). There is, however, a great need for development of standardised tools for assessing mixed methods.

The results of most of the studies may not be generalisable, this is more so because failure or inadequacy of the studies to include control groups, hence the result might have been over-interpreted.

6. Conclusion

This review has given more insights to potential causes of what is currently known in this field, namely that BME groups do have lower physical activity levels. Evidence of personal barriers, socio economic, cultural and environmental barriers that influence physical activities have been described in this paper. Overcoming these barriers in these broad areas is essential in development of sensitive multicultural health promotion addressing physical inequalities. Future research needs to focus on different contexts of physical activity preferences among BME groups as such evidence alongside the identified barriers to engaging in physical activity could help develop effective physical activity interventions targeted at BME groups. The paucity of literature in this field necessitates future research to take opportunity of including ethnic minorities in all research in UK with separate analysis, thus having foundation for more evidence and external validity of studies.

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Table 1. Characteristics of Studies included in the Systematic Review

Reference	Design	Location	Ethnicity/Perspectives
Mckenna & Ludwig 2008	Qualitative method. 22 Semi-structured- interviews. 43-82 years. Comparative study; Sample source; Osteoporosis Society/support groups. Community setting. Analysis; Theme generation manually.	Bristol England	Female South Asian (Gujarati) & Caucasians. Perspective; Osteoporosis patients. Interviews were mostly in English. Interpreter provided where necessary..
Sriskanharajah & Kai 2006	Qualitative method.15 Semi-structured Interviews, 26-70years. Sample source; GP list. Community setting. Analysis; Theme generation.	Nottingham England.	Female South Asian (Indian, Pakistan, Bangladesh, Sri-Lanka). Perspective; CHD/NIDM patients. Interviews mostly in English except for 3 where Interpreter was used. Interpretation back checked.
Caroll <i>et al.</i> 2002	Mixed method. Self administered Questionnaire, in-depth interviews, focus groups, case studies of Pilot Intervention programs. No evaluation by RCT.Sample; 35 South Asian Muslim women.	Bradford, Leicester, East Lancashire, Birmingham	South Asian Muslim women (Pakistan and Bangladesh). Adults. Perspective; 137 GPs, 5 Health Authority, 32 Leisure centres, 35 South Asian Muslim women.
Greenhalgh <i>et al.</i> 1998	Qualitative method. 50 Semi-structured interviews; 40Bangladesh, 8 Whites, 2 Afro-Caribbeans. Focus group; 6-9 participants (total of 24 subjects). Age 21-80year. Sample source; GP list. Analysis; NUDIST software.	East London	Bangladesh, Whites and Afro-Caribbeans. Interviews in Sylheti. Interpretation and translation simultaneously. .Perspective; DM Patients. Interpretation back checked.
Molokhia & Oakeshoot 2000	Mixed method. Structured interviews with bio chemical risk factors measurements. . 98 respondents out of 107 (92%).34 men, 64 women. Sample source; GP surgery attendance. 10 patients (9%) attended 3 Focus groups. Age 15-79	London England	Afro- Caribbean. Perspective; CHD Patients. Interpreter-NR.
Mahoney 1992	Quantitative method. Cohort study. 103 School children. 53 boys, 50 girls. Age 12 years. School setting.	UK ? Region	Afro-Caribbean, Indians, races. Interpretation- NR

Reference	Design	Location	Ethnicity/Perspectives
Jolly <i>et al.</i> 2007	Mixed method. RCT (263 Home vs. 262 Hosp), 43% response rate, 6 months follow up. 49 semis structured interviews for non-adherers, 5 Focus groups for adhering patients. Outcomes; Exercise capacity. Lack of motivation exists in home based, group exercise is the motivation in hosp based.	Birmingham England	Mixed; white, Pakistan, Indian, Afro-Caribbean. Perspective; Cardiac rehabilitation patients. Interpretation by rehabilitation nurse.
Lawton <i>et al.</i> 2006	Qualitative method. 32 In-depth interviews Age >18years. Sample source; GP list. Analysis; Theme generation/NUDIST software	Edinburgh Scotland	9 Indian, 23 Pakistan. Perspective; Diabetes patients. Bilingual researcher interprets in Urdu, Punjabi.
Khanam & Costarelli 2008	Mixed method. A survey based on interview-guided questionnaires. 25 subjects. Age. 30-60years. Sample source; sport centre/mosque. Results expressed in quotations and percentage.	London England	25 Muslim Bangladesh females. Perspective; Overweight women referred to gym by GP. Bilingual researcher in Sylheti.
Farooqi <i>et al.</i> 2000	Qualitative method. 6 Focus groups. 44 subjects participated. Age >40 years. Sample source; GP list. Analysis; Theme generation.	Leicester England	South Asian female. Perspective; Women thought to be at high risk of CHD. Interpreter in Hindi, Gujarati, Punjabi. Back translation checked.
Darr <i>et al.</i> 2008	Qualitative method. Comparative study. 65 Semi-structure interviews. 65 out of 122 subjects (response rate 83%), Age >30years. Sample source; Cardiac rehabilitation nurses.	West Yorkshire England	20 Pakistan, 25 Indian, 20 White. Perspective; CHD patients diagnosed in last 1 year... Translation in Urdu, Hindi, Punjabi, Sylheti, Gujarati.
Snape & Binks 2008	Qualitative method. Case studies of intervention program in Blackburn North Healthy Living Centre. Semi-structured interviews with program staff focus groups with community members. Facility attracted 4353 subjects over 1 year mostly Asian community; No evaluation by RCT.	Blackburn England	South Asian Muslim; 1887 Indians, 1903 Pakistan and 4 Bangladesh. Perspectives from program staff and community members. Translation/interpretation by program staff.
Naeem 2001	Quantitative method. Questionnaire- Survey, 106 out of 160 men responded. Sample source; Diabetes Clinic list. Analysis by SPSS.	Leeds England	Kashmir Muslim, 106 men. Perspective; Diabetic patients. Bi-lingual researcher

Reference	Design	Location	Ethnicity/Perspectives
Burney 2006 (Unpublished)	Mixed method. Self-administered Questionnaires –survey; 47 out of 345 (13.6% response rate). 6 semi-structured interviews.	Nottingham England	South Asians; 37 Indian, 10 Pakistan. Perspective; NHS staff- Workplace. Researcher is fluent in Hindi, Gujarati, and Punjabi.
HEA 1999	Quantitative method. Questionnaire survey, 4452 subjects. (Response rate 72%). Sample source; Postcode Address File.	England	Pakistan, Indian, Bangladesh, Afro-Caribbean. Interpretation by interviewers.
Khunti <i>et al.</i> 2007	Mixed method. Comparative study called action research project for a year period. No specific intervention but collaborative links established. Questionnaires-4763 pupils in 5 schools, Response rate 3601, 76% at baseline, 8 Focus groups. 5 school settings.	Leicester England	3650 pupils out of 4763 are south Asians 77%, mostly Indians. Age 11-15years, Perspective; Pupils and staff. Interpreter-NR
Rai & Finch 1997	Qualitative method. 22 Focus groups. 175 total respondents. Gender specific groups. Age 18-50years. Analysis; Theme generation	London England	Indians, Bangladesh, Pakistan, African Blacks. Translator in Punjabi, Urdu, Gujarati, Sylheti
Elam <i>et al.</i> 2001	Qualitative method. 48 In-depth interviews. 44 participated in 4 focus groups.	London, Manchester England	African; Ugandans, Somalia, Nigerians

Table 2. Findings of Studies' Barrier outcomes

Reference	Aim of studies	Barriers Outcomes
Mckenna & Ludwig 2008	Comparative study of views and experience between Osteoporotic Caucasian and south Asian women about GPs' support. Results; Asians reliance on GP, family and community for support and resources.	Uncertainty on source of information. No referral by GP.
Sriskanharajah & Kai 2006	To explore influences and attitudes towards physical activity among south Asians CHD and DM patients.	Health concerns, Lack of knowledge
Caroll <i>et al.</i> 2002	To explore attitudes and practices of 'exercise on prescription' among south Asian women, GP, leisure centres and authorities.	Access to facilities, cost, no childcare support, cultural codes of conduct, language.
Greenhalgh <i>et al.</i> 1998	To explore health beliefs and experience of management in Bangladesh DM patients.	Safety, Lack of knowledge. No facilities. Negative perception as lay concept of exercise connotes illness 'beyam' Women only sessions
Molokhia & Oakeshoot 2000	Cardiovascular risk assessment	Lack of time especially in women with children. Lack of risk awareness. Language difficulty
Mahoney 1992	Cardiovascular fitness measurement using 20-MST and PWC170.	Religion, Language and dress code
Jolly <i>et al.</i> 2007	Trial of patient adherence and cost effectiveness when Home based rehabilitation centre compared with hospital based.	Health problem, Lack of motivation, Distance too far to centre.

Reference	Aim of studies	Barriers Outcomes
Lawton <i>et al.</i> 2006	Barriers of physical activity among Pakistan and Indians with Type 2 Diabetes.	Lack of time, Health concerns, weather, Language difficulties, Lack of culturally sensitive facilities
Khanam & Costarelli 2008	Attitudes towards health and exercise of overweight and obese women	Language, lack of time, lack of motivation, cultural reasons-provocative videos, lack of knowledge, women not allowed to walk alone/ in the evening
Farooqi <i>et al.</i> 2000	Attitudes to lifestyle risk factors for coronary disease among South Asians	Lack of women only facilities, lack of time, religion, language
Darr <i>et al.</i> 2008	Causal attributions, illness belief of CHD South Asian patients in UK.	Lack of time, lack of understanding, health problems and fear, weather, no access to open spaces for walking, job
Snape & Binks 2008	Factors identified in developing PA intervention Muslim South Asian community.	Exercise perceived as neglect of family responsibility, religion, concern about negative impact, sexual connotation since it makes you look attractive, dress code, sexual safety.

Naeem 2001	The role of culture and religion in management of Diabetes	Cost, fear of injury or safety, dress code, lack of single sex facilities, lack of privacy in changing areas
Burney 2006	Levels of physical active and barriers among South Asians at workplace	Lack of time, commitment to work, working unusual hours, obligations to family, childcare.
HEA 1999	Black and minority ethnic groups survey in England	Old age, lack of time, lack of motivation, fear of injury/safety, health problem, not sporty, cost, no partner
Khunti <i>et al.</i> 2007	Primary prevention of type 2 diabetes and heart disease. In secondary schools. Evaluating action research project.	Low priority of impact of PA on health. lack of storage for bikes in facilities, religion, limitation by availability of staff in extracurricular activities
Rai & Finch 1997	Views of Physical activity among south Asians and black communities in England.	Lack of motivation, lack of company, fear about safety, single sex facilities, dress code, cost constraints, work, lack of time, religion.
Elam <i>et al.</i> 2001	Feasibility study for health surveys among black African people in England 2003 survey.	Concerns about weight gain, encouragement from friends.

Table 3. Classification of Barriers

	Barriers	Reference	Number of Ref.
1	Uncertainty on source of information	Mckenna 2008	1
2	No referral by GP.	Mckenna 2008, Khanam 2008, Elam 2001	3
3	Health concerns e.g. fear of injury	Sriskanharajah 2006, Lawton 2006, Darr 2008, Naeem 2001, HEA 1999, Elam 2001	6
4	Lack of knowledge	Sriskanharajah 2006, Greenhalgh 1998, Molokhia 2000, Khanam 2008, Darr 2008.	5
5	Access to facilities e.g. far distance or inadequate facilities.	Caroll 2002, Greenhalgh 1998, Lawton 2006, Farooqi 2000, Darr 2008, Naeem 2001, Khunti 2007.	7
6	Cost constraints	Caroll 2002, Naeem 2001, HEA 1999, Rai 1997	4
7	Family obligation e.g. no childcare support	Caroll 2002, Burney 2006,	2
8	Dress code	Caroll 2002, Mahoney 1992, Khanam 2008, Snape 2008, Naeem 2001, Rai 1997	6
9	Language barrier	Caroll 2002, Molokhia 2000, Mahoney 1992, Lawton 2006, Khanam 2008, Farooqi 2000, Darr 2008.	7
10	Safety and fear e.g. avoidance of crime/sexual abuse	Greenhalgh 1998, Snape 2008, Naeem 2001, HEA 1999, Rai 1997	5
11	Negative perception as lay concept of exercise	Greenhalgh 1998, Snape 2008	2
12	Lack of time	Molokhia 2000, Lawton 2006, Khanam 2008, Farooqi 2008, Darr 2008, Burney 2006, HEA 1999, Rai 1997	8
13	Religion	Mahoney 1992, Farooqi 2000, Snape 2008, Rai 1997, Khunti 2007	5
14	Lack of motivation, low priority	Jolly 2007, Khanam 2008, HEA 1999, Rai 1997, Khunti 2007	5
15	Weather condition	Darr 2008	1
16	Culturally sensitive facilities e.g. videos, music	Khanam 2008, Lawton 2006	2
17	Lack of women only sessions	Caroll 2002, Naeem 2001, Farooqi 2008, Khanam 2008, Rai 1997	5
18	Commitment to work e.g. working unusual hours	Burney 2006, Rai 1997	2
19	No accomplice, partner or group exercise	Sriskanharajah 2006, Caroll 2002, Lawton 2006, Jolly 2007, HEA 1999, Rai 1997, Elam 2001.	7
20	Age	HEA 1999,	1

Table 4. Quality Criteria of Studies

Study	Scope/Purpose	Design	Sample	Ethical issues stated	Data Collection	Interpretation/ Translation	Analysis	Validity/ Reliability	Generalisability/ Transferability	Average Score
Mckenna & Ludwig 2008	+	+	~	+	+	~	-	~	~	6.0
Sriskantharajah & Kai 2006	+	~	+	-	+	+	-	~	~	5.5
Caroll et al. 2002	+	+	+	+	+	~	+	~	+	8.0
Greenhalgh et al. 1998	+	+	+	~	+	+	~	~	+	7.5
Molokhia & Oakeshoot 2000	+	+	+	~	-	-	~	-	~	4.5
Mahoney 1992	+	+	~	-	~	-	+	+	~	5.5
Jolly et al. 2007	+	+	~	~	~	+	~	+	+	7.0
Lawton et al. 2006	+	+	+	~	~	~	~	+	~	6.5
Khanam & Costarelli 2008	+	~	+	~	~	~	~	~	~	5.5
Farooqi et al. 2000	+	+	+	-	+	+	~	~	~	6.5
Darr et al. 2008	+	+	+	~	~	~	~	~	+	6.5
Snape & Binks 2008	~	+	~	-	-	~	-	~	~	3.5
Naeem 2001	+	~	+	~	~	~	~	~	-	5.0
Burney 2006	+	~	+	~	~	~	+	~	~	6.0
HEA 1999	+	~	+	~	+	~	+	+	+	7.5
Khunti et al. 2007	+	~	+	+	+	-	+	+	+	7.5
Rai & Finch 1997	+	+	+	+	+	~	+	+	+	8.5
Elam et al. 2001	+	+	~	-	~	-	~	~	~	4.5

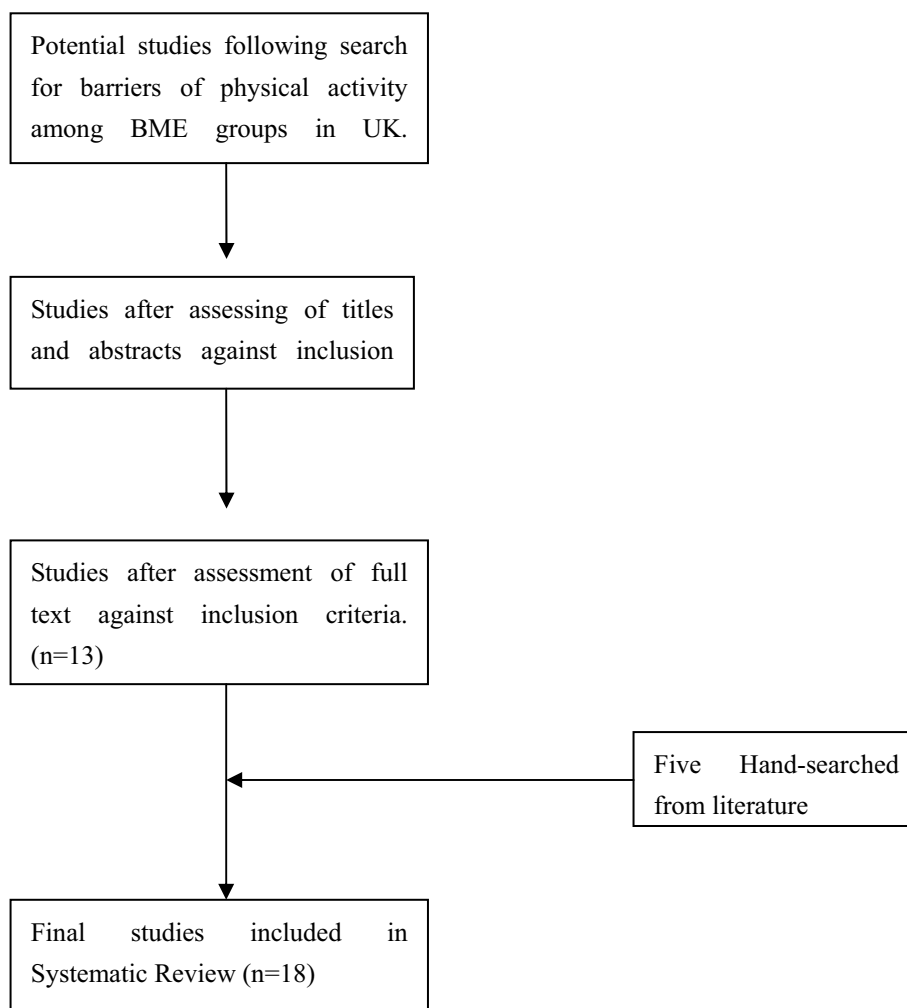


Figure 1. Flow diagram: Searching and sifting process



Breast Cancer: Knowledge and Perceptions of Chinese Women in Hong Kong

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Abstract

This study explored the knowledge of breast cancer risk factors and employed the Health Belief Model (HBM) to examine the perception and barriers of breast cancer screenings of Hong Kong Chinese women using a structured questionnaire. Of the 496 respondents, 70.8% and 77.0% considered a family history of breast cancer and prior history of benign breast problems as risk factors respectively. However, over 40% were unsure of other risk factors including age, early age at menstruation, late age at menopause, childlessness and oral contraceptive use. About 80% regarded breast cancer as a serious illness and 88.7% acknowledged that both mammography and breast self examination (BSE) could help early detection of the disease. Nevertheless about 68% had never had a mammogram, and the most important perceived barriers were not knowing how the test was done (81.3%) and the cost (63.0%). Only 31.9% did not practice BSE, and not knowing how to perform BSE was the primary perceived barrier.

Keywords: Breast cancer, Risk factors, Health belief model, Screenings, Perceived barriers, Hong Kong

1. Introduction

Breast cancer is the most common cancer in women worldwide (World Health Organization, 2005). In Hong Kong, breast cancer, the third leading cause of female cancer deaths after lung and colorectal cancers, accounted for 9.8% of all female cancer deaths in 2006 (Hong Kong Department of Health, 2007). The incidence of breast cancer in Hong Kong has risen since 1994 and the most obvious increase is among the 30-49 age groups (Hong Kong Department of Health, 2004). It is estimated that one in 23 women would develop breast cancer by age 75 (Hong Kong Department of Health, 2006).

Breast self-examination (BSE) and mammography are methods for early breast cancer detection. Although BSE is considered as cost-free, simple, non-invasive intervention (Norman and Brain, 2005), its benefit is controversial (Harvey et al., 1997; Thomas et al., 2002). There is also doubt in the cost-effectiveness of mammography screening. However, both BSE and mammogram are effective preventive measures to detect breast diseases. When detected at the early stage, breast cancer is curable, with a 100% 5-year survival rate for stage 0 and I (American Cancer Society, 2007). It is important for women to be aware of the importance of early screening.

In Taiwan, the Department of Health launched a 3-year breast cancer screening campaign in 1999, and a total of one million women aged 35 or older received physical examinations by nurses and were referred to mammogram screening and/or breast ultrasound if suspicious abnormalities were found. Also BSE was recommended and had been the policy for breast cancer prevention (Huang et al., 2001). In Hong Kong, both BSE and mammography are not recommended for general female population and there is no centrally organized population based breast cancer screening program in Hong Kong. The high risk group (that is those with prior history of breast cancer, family history of breast cancer, or under hormone replacement therapy) is recommended to consult professionals to determine the appropriate surveillance. (Hong Kong department of Health, 2004).

In Hong Kong, most women are unaware of risk factors of breast cancer and preventive practices (Chua et al., 2005). There was a low frequency of mammogram screening (Leung et al., 2008) and BSE even though majority of women perceived health as the most important entity (Fung, 1998). The lack of knowledge on screening was discovered to be a major barrier that prevented many women from carrying out preventive actions (Abdullah et al., 2001; Chua et al., 2005). Improved healthcare provider-patient communication was important for promoting breast health and screening

program (Abdullah et al., 2001). A community-based outreach program that aimed at raising the awareness of BSE practice and breast health in Hong Kong was conducted in May 2002 to March 2003. It was discovered that 93.3% of the 777 participants were willing to practice BSE regularly after intervention (Chan et al., 2007). To develop breast cancer educational programs and prevention campaigns, it is crucial to comprehend Hong Kong women's knowledge, perception and awareness of breast cancer.

Previous research conducted in Hong Kong has focused on knowledge, perception and behavior of only BSE (Fung, 1998), mammography screening (Chua et al., 2005; Chor et al., 2008) or clinical breast examination (CBE) (Chan et al., 2002). Abdullah et al. (2001) studied breast cancer screening behaviors of women who attended a well-women clinic. Little is known about women's knowledge of breast cancer risk factors and source of breast cancer information that is essential in planning breast health awareness programs. The aims of the present study are to explore Hong Kong Chinese women's knowledge of breast cancer risk factors and their perceptions of the benefits and barriers to both BSE and mammography screening. Results of the present study can provide additional imperative information, particularly the knowledge of risk factors, which bridges the gap from previous studies.

2. Theoretical Framework

The theoretical framework employed in the current study was the Health Belief Model (HBM). The HBM model, first proposed by Hochbaum, Leventhal, Kegeles and Rosenstock in the 1950s (Rosenstock, 1966), was designed to apply to various health-related decision making problems. The HBM assumes that an individual's perception of the susceptibility and severity of an illness produces the readiness to take a health action to reduce the health threat. The model includes four dimensions: (a) perceived personal susceptibility to a disease, (b) perceived severity if contracted the disease, (c) perceived benefits of a particular health action and (d) perceived barriers taking a particular health action (Rosenstock, 1974). The concept of health motivation, that is defined as an individual's health concern will result in behaviors to promote health, was later added into the HBM (Becker, 1974).

The HBM has been used in different cultures and health delivery systems to explain preventive health behaviors. Studies have employed the HBM to understand breast cancer screening behaviors of Asian women (e.g. Yi and Prows, 1996; Choudhry et al., 1998; Han et al., 2000) and Chinese American women (e.g. Lu, 1995; Hoeman et al., 1996; Yu and Wu, 2005; Lee et al., 2007). Fung (1998) used the HBM to examine the BSE practice of sample of 124 Chinese women in Hong Kong, and concluded that BSE practitioners had higher perceived susceptibility and fewer perceived barriers to breast cancer. The HBM used in the current study could shed more lights on the relations between the beliefs of HBM variables and breast cancer screening behaviors.

3. Methods

3.1 Sample and setting

The study was a cross-sectional survey using an anonymous structured questionnaire in English. The target subjects were Chinese women aged 20 years or greater. Survey responses were collected through a convenience sample in urban public areas including subway stations and shopping locations (in Hong Kong Island and Kowloon) in winter 2006. In the process of conducting the survey, two trained interviewers arbitrarily handed out the questionnaires to 1000 Chinese females, who were told about the survey's objective, methods and confidentiality. A total of 496 Chinese women (49.6%) agreed to participate in the study and completed the questionnaires via face-to-face interviews in Cantonese.

3.2 Survey instrument

The survey instrument was an anonymous questionnaire designed to ascertain the knowledge and perception of breast cancer. The questionnaire comprised of questions on (1) information about subjects' demographic characteristics, (2) sources of breast cancer and screening information, (3) knowledge of breast cancer risk factors, (4) perceived susceptibility and severity of breast cancer (5) perceived benefits of BSE and mammography and (6) perceived barriers to take screening.

Respondents were requested to answer "yes", "no" or "uncertain" to nine items regarding breast cancer risk factors, that were based on the guidelines of the American Cancer Society (2005) and the questionnaires employed by Paul et al. (1999), Odusanya (2001) and Pöhls et al. (2004). These items were (1) age, (2) family history of breast cancer, (3) previous history of benign breast problems, (4) early age of menstruation (age 12 or before), (5) late age at menopause (age 55 or after), (6) childlessness, (7) no breastfeeding, (8) oral contraceptive use and (9) hormone replacement therapy (HRT) at postmenopause. Respondents were also asked to name other risk factors to assess whether the respondents had good knowledge of breast cancer risk factors.

Statements of the HBM variables (perceived susceptibility, perceived severity, perceived benefits and perceived barriers) were formulated with reference to Champion's (1993) HBM instrument and other resembled statements used in similar studies (Stillman, 1997; Han et al., 2000; Jirojwong and Manderson, 2001). Respondents were requested to rate these statements using a five-point Likert scale, on which 1 indicated strong disagreement and 5 indicated strong agreement.

Three susceptibility items measured respondents' beliefs of the likelihood of getting breast cancer. Seven items related to the seriousness of breast cancer evaluated severity. The benefits of obtaining BSE and mammography were assessed by four items that asked about the perceived usefulness and value of these preventive measures. Respondents who had never had mammography screening and were aged ≥ 40 , and who did not practice BSE in the past month were asked to rate the items on the barriers to performing these actions. These barriers included knowledge of these preventive measures, availability of free time, fear of positive results, embarrassment; and additional barriers of discomfort and cost for obtaining a mammogram.

A pilot study on 20 Chinese women from a convenience sample was conducted at subway stations and the sequence of some questions was rearranged. Internal consistency reliability of the HBM subscales was examined and the alpha coefficient ranged from 0.69 (perceived susceptibility) to 0.75 (perceived barriers).

3.3 Data analysis

Descriptive statistics were employed to describe the demographics of the subjects, knowledge of breast cancer risk factors and HBM variables. Pearson's Chi-square tests were used to examine the association between categorical variables. To determine whether there were differences in scores of the HBM variables among various demographic characteristics, ANOVA was used.

4. Results

4.1 Demographic characteristics of respondents

Table 1 presents the demographic characteristics of the respondents. The majority of the women was aged 30-49 years (56.8%), married (63.1%), employed (65.8%), had attained secondary education (51.6%) and a monthly income \leq HK\$10,000 (48.2%). All the respondents had heard of breast cancer. Most women in the study had heard of mammography (67.9%) and BSE (94.4%).

4.2 Source of health information

Mass media, such as newspaper and television, is the major information source of breast cancer (73.2%) and BSE (60.3%), followed by doctors or health care providers (16.1% for breast cancer information; 25.9% for BSE information). However, women got information of mammography primarily from doctors/health care providers (50.7%) and relatives or friends (24.3%).

The main information sources were further examined for a relationship with respondents' demographic characteristics. In addition to mass media, women who were at the age of 60 and above ($\chi^2=27.47$, $df=6$, $p=0.00$), retired ($\chi^2=23.67$, $df=8$, $p=0.00$) and had primary education ($\chi^2=22.09$, $df=4$, $p=0.00$) tended to obtain breast cancer information from doctors/health care providers. Further, full time housewives ($\chi^2=23.67$, $df=8$, $p=0.00$) and women having monthly income \leq \$10,000 ($\chi^2=13.64$, $df=6$, $p=0.00$) would get the information from relatives and friends. In relation to mammography, women at age 60 and above ($\chi^2=17.74$, $df=6$, $p=0.01$) and those having monthly income over \$30,000 ($\chi^2=12.63$, $df=6$, $p=0.04$) would acquire information from doctors/health care providers. Regarding BSE, women with primary education ($\chi^2=24.82$, $df=4$, $p=0.00$) were more likely to get information from relatives and friends.

4.3 Knowledge of risk factors

Over 70% of the respondents considered a family history of breast cancer (70.8%) and prior history of benign breast problems (77.0%) as risk factors. Full-time housewife ($\chi^2=16.46$, $df=8$, $p=0.03$) and women with college education ($\chi^2=17.33$, $df=4$, $p=0.00$) were more likely to acknowledge family history of breast cancer as a risk factor. The recognition of history of benign breast problems as a risk factor was more associated with housewife ($\chi^2=77.38$, $df=8$, $p=0.00$). Besides, 54% believed hormone replacement therapy (HRT) to influence breast cancer risk; and the retired ($\chi^2=42.12$, $df=8$, $p=0.00$) tended to be more likely to agree with this. Nevertheless, all women were uncertain about age as an important breast cancer risk factor. Further, only 11.3% of the women agreed no breastfeeding as a risk factor. Over 40% of the women were indecisive regarding early age at the first menstrual period, late age at menopause, childlessness and oral contraceptive use as risk factors; and no association between these responses and the demographic parameters was discovered.

Respondents were requested to nominate other breast cancer risk factors in addition to the specific ones asked in the questionnaire. All women were unable to state other risk factors such as high-fat diet, alcohol consumption, lack of exercise and being overweight. Two respondents named emotion or stress to be a factor.

4.4 Attitudes and beliefs about breast cancer

Table 2 presents the frequency distribution of responses to the statements of the HBM variables. Majority of women believed breast cancer was unavoidable and 44.1% were worried about getting the disease. Significant differences were found between HBM belief variables and some demographic data. Women, who were at age < 29 ($F=2.79$, $p=0.17$),

students ($F=0.67$, $p=0.00$), had monthly income $>\$50,000$ ($F=2.91$, $p=0.01$) and higher education ($F=3.80$, $p=0.02$) thought they would have lower vulnerability of getting the illness.

The majority regarded breast cancer as a serious illness and 93.0% knew that the disease was curable if detected early. Perceived severity scores differed significantly among age groups ($F=9.28$, $p=0.00$), education ($F=24.51$, $p=0.00$) and employment ($F=6.26$, $p=0.00$). Women who were younger than age 29, students and had college education, having the lowest scores, tended not to consider breast cancer as a serious disease.

Over 70-80% of the respondents acknowledged that both mammography and BSE could help early detection of breast abnormality and breast cancer. The perceived benefit scores were not significantly different among demographic characteristics.

4.5 Barriers to preventive actions

Out of a total of 266 respondents aged ≥ 40 , 68.05% of them ($n=181$) stated they had never had a mammogram. The most important perceived barriers to having a mammogram were not knowing how the test was done (81.3%) and the cost (63.0%) (Table 3 (a)). Scores of perceived barriers to mammography were significantly different by age ($F=6.19$, $p=0.00$), education ($F=3.65$, $p=0.03$) and income ($F=2.44$, $p=0.04$). Women, who were at the age ≥ 70 , had college education and monthly income $>\$40,000$, had fewer perceived barriers.

Only 31.9% of the respondents reported that they did not practice BSE in the past month. Not knowing how to perform BSE was the primary perceived barrier (Table 3 (b)). The perceived barrier scores were not different among demographic parameters.

5. Discussion

All the women surveyed had heard of breast cancer and their primary source of health information was from the mass media. This finding is consistent with the study conducted by the Family Planning Association of Hong Kong (1996), and reveals the efforts of the promotion campaigns by the Hong Kong Health Department and other organizations such as the Hong Kong Breast Cancer Foundation and Hong Kong Cancer Fund in exposing the public to the disease. Promotion activities reported by the media; and billboards and advertisements placed in subway stations effectively expose the public to breast cancer. Further, the women's lifestyle programs on television and magazines may also account for the increased media exposure of the disease.

Over half of the respondents, who had heard of BSE ($n=468$), acquired BSE information from mass media, whereas of 337 interviewees who had heard of mammography, only 13.4% obtained information of mammography screening from the same source. These results reflect the lack of comprehensive breast health education; and it can infer that breast cancer promotion campaigns fail to convey information of breast cancer screenings (particularly mammography screening) successfully.

Generally, women in the study had poor knowledge of the breast cancer risk factors. Half of the women were doubtful about the early age at menstruation, late age at menopause, childlessness as risk factors that, in fact, they are. Another 42.5% were indecisive about oral contraceptive use as a risk factor. The meta-analysis by Kahlenborn et al. (2006) revealed a small significant risk increase for premenopausal breast cancer among women who used combined oral contraceptives. Nevertheless, the absolute risk was very small. It is crucial for women to understand both the risks and benefits of oral contraceptives.

Over 50% women surveyed believed HRT to be a risk factor. At present, the association of breast cancer risk and HRT is inconclusive. Some studies discovered an increased breast cancer risk in post-menopausal women related to HRT (Beral and Million Women Study Collaborators, 2003; Stahlberg et al., 2004) while other research did not (Espíe, et al., 2007; Cortés-Prieto and Juez-Martel, 2007). Since HRT has become more significant with increasing age, it is important for women to understand the advantages and disadvantages of hormone therapy, so that fears can be cleared (Beckmann et al., 2003).

Age as another major risk factor was poorly understood since all women surveyed were unsure of age as a factor. This finding is in accordance with the study conducted by Paul et al. (1999). This misconception may lead to under-estimation of the importance of regular screening by older women if they mistakenly believe the younger age groups as the groups most at risk. Preventive measures (i.e. mammography screening and BSE) not being recommended by the Hong Kong Health Department may explain women's lack of understanding of age as a risk factor. Instead, women with a family history of breast cancer are recommended to access medical professionals for appropriate regular surveillance (Hong Kong Department of Health, 2004). This further explicates why the majority of the women surveyed (70.8%) agreed family history of breast cancer as a significant risk factor.

Only 11.3% women surveyed realized the benefit of breastfeeding of reducing breast cancer risk although the breastfeeding rate rose from 50% in 1997 to 70% in 2006 and the exclusive breastfeeding rate for 4-6 months increased from 6.0% to 13.5% for the same period (Center for Health Protection, 2007). This poor recognition of no breastfeeding

as a risk factor is plausibly because of the strong emphasis on the long-term health benefits for babies at breastfeeding promotions. In addition, the awareness and acceptance of breastfeeding in Hong Kong are fairly low. There are limited breastfeeding areas in public places; and the Hong Kong government is urged to legislate proper facilities for breastfeeding (The Standard, 2007).

It is presumed that strong beliefs in perceived benefits and/or susceptibility and seriousness tend to take up the preventive actions. However only 31.95% women aged ≥ 40 had ever had a mammogram in this study. This finding of discrepancy between perceived beliefs and actual screening undertaking is similar to the previous study by Fung (1998), and also indicated the inadequate information received by women. Lack of knowledge about screening to be the major barrier supports the findings of other studies (McPhee et al., 1997; Abdullah et al., 2001). To increase the acceptance of mammography screening, it is essential to disseminate the information in an easily understandable way.

Financial cost was another major reason for the reluctance to access mammography screening, particularly to the lower income groups. This finding is compatible with other studies (e.g. Chua et al., 2005; Lee et al., 2007). At present, organized population-based screening program is not established in Hong Kong. A government-subsidized screening program was set up in 1991. However, women who use the government-funded screening services need to pay a charge that is similar to the cost of the private sector (Leung et al., 2008). There are also doubts in the cost-effectiveness of this preventive intervention. The study by Wong et al. (2007) indicated that mammography for Hong Kong women might not be cost effective under the current scarce public health resources. Since mammogram screening is a low priority in public health care and is not recommended to the general female population, most women are unaware of its actual benefits.

About 68.0% women in the study had practiced BSE. This percentage was higher than other previous local studies (Fung, 1998; Abdullah et al., 2001; Chan et al., 2007). This increase in BSE practice can be explained by acceptance of the health education and promotion campaigns of the government and other non-government organizations, such as the Pink Revolution. Further, the cost-free nature of BSE also attracts women to perform this preventive action.

Not knowing how BSE is done was the primary reasons for not performing BSE by the non-practicers. Most women were unsure what to look for at BSE. The correctness and accuracy of performing BSE was discovered to be associated with instructions of doing this preventive intervention (Chie et al., 1993). Lack of accuracy in performing BSE would reduce the competence of early lump detection (Champion, 1992). Thus, it is crucial to demonstrate the techniques in BSE performance in breast health education.

5.1 Limitations of the study

The present study is exploratory in nature. In interpreting the findings, its limitations should be kept in mind. Since this study was based on a convenience sample, both selection and responder bias should not be ignored. The response rate was 49.6% that reflected the unwillingness in questionnaire survey participations because the public is concerned about the ubiquitous use of survey. Thus, the sample may not be representative and may affect the ability to make inferences about the knowledge level of breast cancer of Chinese women. And the results may not be generalized to the Chinese female population in Hong Kong and should be interpreted cautiously.

6. Conclusion

The results of this study reveal that Chinese women in Hong Kong have poor knowledge of breast cancer risk factors, and limited understanding of screenings despite the efforts of breast cancer prevention campaigns of both the government and non-government organizations. The lack of inclusive knowledge of breast cancer would lead to a low priority in prevention health care. It is crucial to convey breast cancer information in comprehensible manner and the health literacy of the general female population needs to be taken into consideration when delivering this information. It is also important for health care professionals to advise and help disseminate breast health information and screening program to women. Further, future research should be directed to the understanding of the knowledge and perception of breast cancer of minority women, such as Thais, Filipinos, Indians and Pakistanis in Hong Kong so that comprehensive breast health programs and campaigns can be developed to the general female population.

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Table 1. Demographic characteristics of respondents

	Total Number	Percentage (n) (%)
Age		
20-29	100	20.2
30-39	130	26.2
40-49	152	30.6
50-59	80	16.2
60-69	28	5.6
≥70	6	1.2
Marital Status		
Single	183	36.9
Married	313	63.1
No of child =0	85	27.2
No of child =1	133	42.5
No of child =2	67	21.4
No of child ≥3	28	8.9
Education		
Primary	44	8.9
Secondary	256	51.6
College or above	196	39.5
Employment		
Full-time	84	16.9
Housewife		
Employed	326	65.8
Unemployed	31	6.3
Retired	29	5.8
Students	26	5.2
Monthly Income (in HK\$)		
≤\$10,000	239	48.2
\$10,001-\$20,000	154	31.0
\$20,001-\$30,000	73	14.7
\$30,001-\$40,000	16	3.3
\$40,001-\$50,000	8	1.6
>\$50,000	6	1.2
Total (N)	496	

Table 2. Responses to statements on Health Belief Model variables

Statement	Strongly Disagree (%)	Disagree (%)	Uncertain (%)	Agree (%)	Strongly Agree (%)
Perceived susceptibility					
1. Breast cancer is unavoidable	1.6	17.7	8.7	61.7	10.3
2. I worry about getting breast cancer	7.5	24.2	24.2	36.3	7.8
3. I am likely to get breast cancer as others	10.1	24.2	29.2	32.3	4.2
Perceived severity					
1. Breast cancer is a serious disease	1.0	8.7	10.5	64.9	14.9
2. Cause of death if untreated	0.4	4.2	10.5	42.1	42.8
3. Breast has to be removed	1.6	24.0	33.5	30.6	10.3
4. Cause problems in sexual relationship	4.2	30.0	31.3	29.2	5.3
5. Being a burden to family members	3.0	12.3	17.9	55.0	11.8
6. Would affect work/social life	5.4	24.0	14.3	48.8	7.5
7. Can be cured if detected early	0.6	1.4	6.0	59.3	32.7
Perceived benefits					
1. Help early detection of abnormal mass	0	1.4	9.9	77.4	11.3
2. If detected early, period of treatment can be reduced	0.2	1.4	12.5	70.0	15.9
3. Prevent anxiety	0.4	6.0	21.6	63.5	8.5
4. Effective in detecting abnormality in breast	0	2.0	22.6	64.3	11.1

Table 3. Responses to statements on perceived barriers to (a) mammography and (b) breast self examination

(a) Perceived barriers to mammography (n =181)

Statement	Strongly Disagree (%)	Disagree (%)	Uncertain (%)	Agree (%)	Strongly Agree (%)
Do not know how the test is done	3.3	9.9	5.5	72.4	8.9
No free time	13.3	37.6	12.1	36.5	0.5
Discomfort	14.4	39.8	9.3	34.8	1.7
Embarrassment	18.8	34.8	7.2	36.5	2.7
Fear of positive result	22.1	50.8	6.6	19.4	1.1
Cost	13.3	20.4	3.3	52.5	10.5

(b) Perceived barrier to breast self examination (n =158)

Statement	Strongly Disagree (%)	Disagree (%)	Uncertain (%)	Agree (%)	Strongly Agree (%)
Do not know how BSE is done	7.0	38.0	13.3	37.3	4.4
No Free Time	15.8	62.7	8.2	12.7	0.6
Embarrassment	24.1	55.1	10.8	10.0	0
Fear of discovering abnormality	18.4	46.8	15.2	19.6	0



Barriers to Optimal Control of Type 2 Diabetes in Malaysian Malay Patients

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Abstract

There are a growing number of people diagnosed with diabetes. But, with the growing number of people diagnosed with diabetes, Malaysia is not spared of this phenomenon, as prevalence stands at 14.9% of adult population. Adequate blood glucose control is vital in diabetes management to prevent complications. Even so there is a lack of diabetic control among people with diabetes in Malaysia and we need to understand why this is. This study set out to explore the perspectives and experiences of Malay patients in managing Type 2 diabetes as a chronic illness and provide recommendations that aim to enhance adherence to treatment and help patients to improve their self-management skills. In-depth interviews were carried out on a purposeful sample of patients and their health care professional (HCPs). Interviews were recorded, transcribed and audiotapes were analysed using NVivo software to identify emerging themes and code according to categories. Interviews were conducted in an Endocrinology clinic in Malaysia with 18 Malay patients (15-75 years, 9 males and 9 females) and 13 HCPs. Results indicated that themes that emerged from interviews with the patients included problems with integrating the treatment regimen and difficulty developing coping skills to achieve the desired blood glucose level. Most patients lacked understanding of diabetes and management of diabetes, nature of diabetes, awareness of having diabetes, diabetic education, knowledge of diabetes, duration of illness, patients' understanding of diabetes, physical effects of treatment, severity of symptoms and disease. Patients believed that they needed to integrate many treatment requirements such as diet, medications, blood glucose monitoring and exercise into their daily routine. However, barriers to achieving good control of diabetes were found to be the constraints in their ability to control diabetes. Education and knowledge related to diabetes that influenced understanding of the disease were also reasons for non-adherence to treatment regimen. Their beliefs and ability to minimise these barriers shaped their attitudes towards disease management. Patients were willing to discuss their problems about self-managing diabetes if some of these barriers were addressed during consultations. It can be concluded that more positive approaches are needed in self-management of diabetes and health care professionals involved in the management of diabetes need to understand their patients' beliefs about their diabetes and constraints faced by their patients to promote more awareness and to foster greater control of diabetes and improve health outcomes.

Keywords: Type 2 diabetes, Malay patients, Control, Barriers, Qualitative, Personal interview

1. Introduction

WHO estimated the number will increase to 300 million by year 2025 (Cockram, 2000a). Total health care spending on the disease worldwide is estimated to be US\$ 213 billion and US\$ 396 billion by year 2025 (IDF, 2003). It was predicted that 75% to be from developing countries because of rapid cultural and social changes and also increasing urbanisation (Ma et al, 2003 & Chuang, 2003). With this scenario, diabetes will burden the health care system, which is already strained with other chronic diseases such as coronary heart disease, asthma, hypertension, and kidney failure (New Straits Times Press, 2006). Adequate blood glucose control is vital in diabetes management to prevent complications. Yet, despite the various interventions, diabetes control remains a global problem to health care professionals (HCPs). As more people suffer from diabetes due to the increase in the level of obesity worldwide.

Uncontrolled diabetes has led to an increase in complications and thus has doubled the cost of treating these patients. With rapid changes and faced with the prospect of a changing health scenario, Malaysians are already affected by western health problems (Ma et al, 2003 & Ismail, et al, 2002). As 2001 study noted that 10% of the population was diagnosed with diabetes (Ismail, 2001). But, with the growing number of people diagnosed with diabetes, Malaysia is not spared of this phenomenon, as prevalence stands at 14.9% of adult population (National Diabetes Study III, 2006).

Studies also found that the majority of diabetes patients did not have their disease under control⁴ where 61.1% of patients had HbA_{1c} greater than 8.0% (Ismail, 2001). The studies found that 87.1% were hypertensive, 63.5% had a family history of diabetes, 51.6% were not on any hypertensive medications, and 37.2% had microalbuminuria (MAU) were also hypertensive. Complications of diabetes have caused Malaysia to be ranked as number one in kidney failure due to diabetes (New Straits Times Press, 2005). A great concern as it implied that diabetes was not well controlled in Malaysia. These statistics also indicated Malaysians suffering from end-stage renal failure was 43 in 1980, increasing 56-fold to 12,000 in 2005. There could also be more unregistered cases. To tackle this problem the Ministry of Health (MoH) has embarked on a new strategy to reduce these alarming figures through education, counselling and getting doctors' cooperation. Among these measures are applying new knowledge and innovations gained from multiple sources and disciplines to ensure much needed changes in the health care system for example, the use of genetic informatics and role of genetic markers in risk of chronic diseases of diabetes and cardiovascular diseases. Implementing new strategies and understanding behaviour of patients to achieve better health (Merican, 2008).

Despite various measures taken, there is still lacked of diabetic control among people with diabetes in Malaysia and there is a need to understand why this is. This study hoped to explore and understand the patients' perspectives as to why the problem of uncontrolled diabetes which contributed to alarming kidney failures due to diabetes in Malaysia and that this paper presents the results of part of the study. The purpose of this study was to explore Malay patient's perspectives on why the lack of control of diabetes and to understand the barriers they faced to prevent complications using interview qualitative methodology. A pilot study was done to determine the suitability and clarity of the interview questions and the data obtained was not used and not as part of the main study. The study hopes to provide recommendations to enhance adherence to treatment and help patients to improve their self-management skills.

2. Methods

2.1 Location and design of study

Once the ethics approval from the study site was obtained, interviews were conducted in the endocrinology clinic of a teaching hospital in Kuala Lumpur. Participants (N = 18) were briefed about the study as in the information leaflets and given their oral and written consent to take part in the study. Qualitative methods was used to research doctor-patient communication about drugs and insights into how such studies are actually carried out to stimulate others to embark on similar studies in this relatively unexplored area was pointed out by Stevenson (2000). A qualitative approach using in-depth interviews was used and following grounded theory approached, when major trends begin to recur, and outlying or secondary themes have already emerged, the qualitative research data is said to reach a saturation point. At that point, researchers can stop adding new informants to their sample (Glaser and Strauss, 1967). The sample selection in this current study includes informants with a range of views of the topic and from a range of different backgrounds as in cross-cultural research as mention by Twinn, (1997) which emphasized that the selection of informants for the study provides a check on the validity of the study.

In qualitative studies, sample sizes are necessarily small because of the complexity of the data, which are expensive and time-consuming to analyse (Bowling, 2002), is not based on quantity of the sample (Kelle and Laurie, 1995), but more on the quality and purposeful sampling to ensure that the investigated cases display theoretical relevant aspects of the empirical domain under study. The data are aimed to provide rich insights in order to understand social phenomena rather than statistical information. A sample size of 'one' however, obviously could not give any generalisations, but there was no clear guideline about what constitutes an appropriate cut-off point. The 'rule of thumb' applied most frequently was that when the same stories, themes, issues and topics emerged from the study subjects, then a sufficient sample size had been reached (Bowling, 2002).

2.2 Selection of respondents

Purposeful sampling of 18 Malay patients (9 males and 9 females) was used ranging from 15-75 years to ensure broad representation of all patients that met the study criteria such as duration of illness, age, complications, medications and who had drug-related problems with their medicines to enhance the trustworthiness of the data after reviewing their medical records. When approached, the patients agreed to take part in the study while they waited between 2-3 hours to see the doctor and they found it convenient to be interviewed in an allocated room near the clinic than in their homes (Stevenson et al, 2000).

The Hawthorne effect was minimised by ensuring that the patients understood that the researcher is not to influence them on their responses. Richards & Emslie (2000) discussed the importance of the professional identity of researcher.

To minimise the effect, the research process must be as unobtrusive as possible by using a small tape recorder with built in microphones. Participants were asked to relax and they were reassured that their responses would be used anonymously.

2.3 Open-ended interview

The interview schedule for patients comprised data regarding their medication which was obtained from their records. The data included were their demographic data (patient id, age, gender, years of being diagnosed, prescribed medicines, HBA1c data, fasting blood glucose data. Additional interview schedule included the patients' knowledge of use and side effects of their medicines, compliance and systems of taking medications, information adequacy and problems related to their diabetes. These interviews conducted by SMA were audio taped and common pitfalls of the interviewing and transcribing processes were avoided (Easton et al., 2000). Durations of interviews varies from 60 minutes to 30 minutes as some patients were willing to share their experiences while some patients needed prompts and encouragement to share their views. Thirteen health care professionals out of 16 (nine doctors, three pharmacists and one diabetic nurse educator) were interviewed to explore their views on diabetes management among patients as they were available during the data collection and agreed to participate in the study. Three HCPs (two dieticians and one diabetic nurse educator) were not available during the data collection. The interview schedule for HCPs were similar to the patients with some criteria added such as their perceptions on patients' ability to control their diabetes, psychosocial and cultural factors that may be contributory to non-adherence to diabetes management. Grounded theory based on iterative and inductive processes where data "collected, theories, potential concepts and categories were developed during the process repeated, until an understanding of the phenomena is achieved" (Bowling, 2002). The interview schedules were developed from the literature review and from previous research and feedback on the suitability of questions after pilot study was done, and during the interviews, the participants were asked the questions that allowed them to share their experiences of having diabetes and their concerns. Questions were particularly directed at how they perceived their diabetes, their knowledge of the disease, their self-management approaches, and their relationships with their health care providers and what they thought they should do to manage their diabetes. The sample size was determined when no new themes were observed and a saturation point was reached (Glaser and Strauss, 1967)

2.4 Data analysis

The transcripts were coded, then analysed for emerging themes and trends by SMA and crosschecked to ensure the categories were agreed by other two researchers (CA and NAK) and to minimise biases. Other concepts have been used to meet various aspects of trustworthiness (Graneheim & Lundman, 2004).

Following methods described by many authors in qualitative research as a guide, (Glaser and Strauss, 1967; Bowling, 2002; Pope and Mays, 1995; Pope and Mays, 2000a; Pope and Mays, 2000b; Miles and Huberman, 1994; Burns, 1989; Burns, 2000; Morse, 1994; Morse, 1999; Morse and Field, 2002; Silverman, 2000; Silverman, 2001; Silverman, 2004); initial work of data analysis started as the audiotapes interviews were transcribed as this helped to be familiar with the data. In qualitative research, the analytical process occurs during the data collection phase using sequential analysis or interim analysis (Huberman & Miles, 2002). However, once the data collection has ceased, data analysis would continue in the form of texts as interviews produced transcripts or texts.

The need to validate qualitative research arises from positivist paradigm and it does not fit well in qualitative research due to different epistemological approach in this type of study. One approach to ensuring rigour of qualitative research is to use a method of triangulation. Thurmond (2001) who described the various triangulation methodologies has also cautioned the disadvantages of triangulation such as increased time needed, difficulty in handling a vast amount of data, disharmony due to researchers' biases, conflicts of theoretical framework and lack of understanding of why triangulation strategies were used. Thus, reliability, validity, and generalisation may not be appropriate tools for demonstration of robustness in qualitative inquiry. The concept of crystallisation suggested by Tobin and Begley (2004), which allows for various angles of approach, was more suitable as a means of establishing completeness in naturalistic inquiry rather than confirmation. Caelli (2001), suggested that if qualitative research is to become part of a playing field of equal opportunity with more traditional research and be a viable choice for researchers, it must be made more open, more "user friendly," and less daunting for researchers who wish to engage in it. With that in mind, the researchers in this study addressed this issue collectively to ensure the robustness of this type of naturalistic research. The concept of crystallisation, which allows for various angles of approaches were more suitable as a means of establishing completeness in naturalistic inquiry rather than confirmation.

Data collection was done properly, systematically and rigorously (Pope and Mays, 2000b) through researcher's skill, vision, and integrity to ensure a good data analysis in qualitative research. The ongoing reflections and inductive steps taken during the process would add to the quality of qualitative research.

All relevant data to each category were identified and examined using constant comparison, in which each item is checked or compared with the rest of the data to establish analytical categories. Once all the interviews were

transcribed, coding of the themes was done using the data management software NVivo 2.0, to assist in the data analysis (Kelle & Laurie, 1995); Lee & Fielding, 1995; Lee & Esterhuizen, 2000; Gibbs, 2002). The transcribed interviews were analysed thematically and revised with ease using the software until all the transcripts were coded. Letter R was used to code patient's responses and H was used for health care professionals.

3. Results and discussion

The patients' demographics data is summarised in Table 1. Themes identified were categorised in terms of their beliefs and contributory factors raised during interviews. Themes that emerged included problems with integrating the treatment regimen and difficulty in coping to achieve the desired blood glucose level.

3.1 Understanding of diabetes and management of diabetes

Participants' gave varied responses regarding the management of their diabetes. SMA coded the themes according to their occurrences such as patients' understanding of diabetes as a disease, education and knowledge about diabetes and complexities of the disease. The patients believed that many factors influenced their control of diabetes. For diabetics to be able to self-manage their disease, they must understand the treatment and disease characteristics which include various factors that influence adherence to treatment and hence the control of their diabetes. It is important to see this through the eyes of the patients and their health care professionals in order to achieve high quality of care. Overcoming some of the barriers would be a start to achieve this objective. Personal barriers to optimal diabetes care by Simmons (2001) were among themes that were mentioned by the patients in this current study (Salmiah, 2006). The barriers were summarised in Figure 1.

3.2 Nature of diabetes

Nature of diabetes contributed to one of the barriers to diabetes control as no symptoms or signs during early stage of diabetes. Diabetic patients said that diabetes is a silent disease because diabetes does not manifest itself long after it has been diagnosed. Patients were unaware that they had diabetes until they suffered the complication of the disease or were hospitalised due to diabetes hyperglycaemia (e.g. R01, R06 and R18). A survey found that 36% new diabetics admitted to having the classical symptoms of diabetes (Zaini, 2000). Some were hospitalised due to severe complications. Thus, this led to problems in the treatment of diabetes (Standl, 1998).

R01, (had diabetes for 17 years) was not aware of the disease until he was diagnosed, shared his experience: *"You don't feel sick... that's why you don't go for check up or go for treatment... what is diabetes. Diabetes is not like gonorrhoea or something... why are you worried about ...[....] and you don't suffer, this is the problem... being diabetes.... you don't suffer.... you don't for example.... like other illness.... where you have fever.... diabetes no... you suffer maybe later.... like your heart.... your leg get amputated.... "*

Patients usually blamed themselves for the disease (Hampson, 1997) and for not seeking treatment earlier. Patients like R03, R08 and R19 did not know what diabetes could do to their bodies. They understood the symptoms of the disease but were unable to understand that the disease could progress into something more serious. In the case of R11, he was not aware that diabetes could cause "extreme thirst" and this led to him wanting to drink more sweet drinks to compensate the thirst.

3.3 Awareness of having diabetes

Most patients interviewed were not aware they had diabetes until they experienced the signs and symptoms of the disease like blurred vision, micturition, extreme thirst, and other signs. These signs prompted them to seek treatment at the private clinic or they were hospitalised. R08 attended the clinic for the first time when interviewed. He had eye problems (more than six months), *"like not able to see.... like there is a shadow... then it disappears.... then it occurs again..."* which were due to retinopathy (Younis et al, 2003)⁴². He was not aware that his eye problem was due to the progression of the disease to severe complications. Other patients like R11, R12, and R20 were not aware they had diabetes until they experienced complications and faced the consequences of severe diabetes: "micturition" and extreme thirst *"I woke up at night.... I experience extreme thirst... I drink a lot of canned (soda) drinks... It's planted in my mind that if thirsty...I must have soda drinks. Can relieve my thirst...every 2 weeks I must drink (soda) (R11)*. Some experienced (R13, R18, R19) extreme tiredness, a common symptom for diabetes, was not suspected among patients, and they dismissed it as work stress and they merely ignored it until complications were visible or they were hospitalised as recounted by R13.

Health care professional, (H01), agreed that most patients were not aware that they had diabetes. *"That is very important because.... From our own diabetes study about half of the patients are not aware that they have diabetes"*.

Some patients were aware that they have diabetes because of their lifestyles and dietary habits while some were due to hereditary factors. R01 believed that his diabetes could be due to food as *"you work in the studio.... you drink a lot of coffee.... drink tea... I think that's the cause.... I'm not sure..."*. However, most patients believed that hereditary was the main cause of their diabetes similar to a study where 80% of patients believed that hereditary was the cause of their

diabetes (Hunt, Valenzuela and Pugh, 1998)⁴³. R02 said both his parents had diabetes and *“it was not surprising anyway”* and R18 had a family history and had diabetes with hypertension. *“I couldn’t get up... I felt dizzy... All my family members... my siblings... me... all had diabetes”* (R18). While R23 said her mother had diabetes that diabetes runs in the family (R06). Having family members or relatives with diabetes helped the patients to understand the disease better. H09 believed that the awareness of diabetes among patients was of an ‘acceptable level’ and that ‘a lot of patients understand, comply, and try to meet diet, exercise, and medication’.

3.4 Diabetic education

The patients also said that they were not given information about the disease and its complication. Some patients were not informed because some doctors did not think that their disease was at a critical level. But, some patients had received diabetic education from the diabetic nurses when they were diagnosed with diabetes. R01 *“read a lot of materials about diabetes”* and *“discuss about diabetes”* with his doctor, while R11 used the Internet to get his information. R19 (a student) *“relied on his mother”*, who was also a diabetic, for information and support. Beliefs, attitudes, and behaviour already existed in the culture that promote good diabetes control, prevent complications, and improve quality of life (Greenhalgh et al., 1998). When asked what diabetes could do to their bodies, not many patients could give a simple account of the disease. H01 commented that there was still a lot to be done in diabetes education where only a small proportion of patients had benefited from the programmes and were motivated to control their diabetes but a greater proportion of the diabetic population needed an approach that is more aggressive to *“educate and motivate patients.”*

Besides health care professionals, non-governmental organizations (NGOs) took up diabetic education actively. He added that the implementation of the diabetes education programmes must be looked at so that it would help more patients to benefit from it. Like other chronic diseases, diabetes treatment involved many types of drugs being prescribed; this could lead to non-compliance. H01 was concerned that *“generally, most of the patients...sad to say ... they don’t ask about (disease or medication)... they took for granted.”* Medical officer (H06) believed that diabetes is an “epidemic” that patients needed to be educated in to prevent complications of the disease later.

3.5 Knowledge of diabetes

Some patients acquired knowledge about diabetes on their own initiatives (R11) to help with management of their disease. They stressed that they would be grateful if there were more information given by health care professionals. R01 was concerned if patients were not able to read about diabetes to understand the disease as he believed patients *“must be told what to control and how to control”* and which he *thought was “lacking”*. From his experiences, he explained that there was lack of education among diabetic patients. This could enhance management of their chronic disease if they are expert patients (Department of Health, 2001).

H04 believed that patients’ constant denial was a barrier to successful diabetes treatment among patients, and *“think the patients are very well aware of the complications... they know that... because I think ...they took supplements, they have family members, amputation, heart disease, kidney disease.... they know all that...but I think sometimes they’d rather not know (pause)... and just hope for the best... that kind of attitude.”*

3.6 Duration of illness

Most patients were given diabetic education during their early diagnosis to care for their bodies (Mensing, et al, 2004). But, according to R01, it was inadequate, and *“think there must be a lot more information...to diabetic patients”*. He suggested that *“... the doctors talk to the patients ...what it is. ... What’s wrong with them.... they come here, I think ...they see the doctor... they get the medication... whether they use the medicines.... do they know what’s wrong with them... when they have diabetes.... what’s strong with them... why is it they become diabetic... I think there is no (enough knowledge)”*.

However, balancing the hypoglycaemia and hyperglycaemia was difficult for most patients interviewed. Some patients almost “gave up” (R22) caring for themselves when they have to control their diet and face problems to maintain it to the reasonable levels *pressure, you blood pressure still goes up...sometimes my blood sugar goes down to 3.6. It becomes very unpredictable/erratic...H14 found that elderly patients were difficult to educate as “they may not listen... because it is very long time... there are complications... so it’s difficult... there are problems...”*

3.7 Patients’ understanding of diabetes

From the interviews with health care professionals, they said that most patients wanted to know more about their disease (H02, female doctor). They needed to know about the progression of the disease, the tests and the levels of their cholesterol. She added that some patients thought their diabetes was due to obesity, lifestyles or other factors. Thus, she stressed that education was essential. H03 (specialist, Chinese female), felt that patients sometimes did not bother to understand the disease better. The patients’ perceptions were that they did not suffer from diabetes in the early stages until they suffered from the complications, *“they don’t see the problems. Diabetes is a chronic disease so they don’t see*

the outright complications for now... it will only develop five to 10 years later. They don't see that.... They feel proud... they feel why should I be bothered with it now...they don't see it. Until the heart attack comes.... blindness comes...". Patients knew of the need to control their sugar levels. However, she explained that patients' knowledge was lacking in certain areas, like *"how good is good or how bad is bad... the HbA_{1c}, what is defined as good control also keep changing, so sometimes we don't update our patients"* (H04, A doctor).

On the other hand, pharmacists H10 and H11 felt that patients only knew of complications and did not know how diabetes affected their bodies. H11 believed that the patients' education level played an important role in understanding the disease. *"it's not more of ethnic. It's more of level of education. You can see in educated Malays, they care. You tell them and they say 'thank you' and they follow. Next time when they come back, they tell you 'yes, I did what you said'. ... and for the older ones are not educated, the Malays, the kampong folks, they believe in traditional medications, many times what you said they cannot really accept."* To make a point, she stressed the importance of patients' 'education level' to understand the disease. H11 also pointed that patients believed diabetes "could be cured" and they also thought that they could eat anything if they took their insulin. Patients' mistaken belief that their condition has been cured should also be addressed (Parry et al, 2006).

3.8 Physical effects of treatment

Another condition related factor that posed a problem to some patients was poly-pharmacy. One patient, who had a brain tumour operation, had 12 types of drugs to take, also had diabetes and hypertension. Compliance can be aided by sensible use of drug combinations that are already available (particularly for blood pressure), the use of once daily preparations (for example, glimepiride, sustained release gliclazide, or even glibenclamide) and careful explanation to patients of the reason for prescribing drugs. This action was actively taken by the doctors and patients were informed of the results of their glycated haemoglobin, cholesterol, and blood pressure, along with an explanation of the targets to be achieved, to help them with compliance with their medication (Chowdhury & Lasker, 2002).

Patients also brought up the problem of multiple medication/treatment regimens that they have to perform. Some said they forgot to take their medications when they were to be taken more than twice a day and more than one type. R13 could not remember taking medications due to the many types of medicines. Contrary to findings by Billups et al (2000), H01 added that poly-pharmacy contributed to non-compliance among some patients, as *"In terms of acceptance, we have to look at the implementation.... We give them many drugs that end up with poly-pharmacy.... A few of them complain but they very well know the need for the medication... that can lead to compliance... becomes a big issue"*.

3.9 Severity of symptoms and disease

As a diabetic, patients should be able to tell the signs and symptoms of hyperglycaemia and hypoglycaemia in order for them to self-manage their disease. According to Dowell (2002)⁵⁰, patients' experiences help to build their beliefs. Some patients explained through their experiences: R01 said *"I think, it is important for the diabetic to understand the systems... you are shaking...your eyes blur.... and sweat...and you know.... the problem is you don't know whether it's low or highso you need to test...if it's low you can always sort it out by taking some sugar or sweets, but if it is high you can't take anything..."* Some of the patients said 'you will have gangrene...all that stuff...' (R11), and 'I know that...if you have diabetes...you must be amputated.... If you cut yourself.... it is difficult to heal... that's all' (R12 and R21). Some patients were aware of the severity of the diabetes when they have *heart failure* (R06 and R31). H11 believed some patients lacked the knowledge of diabetes and its complications *"sometimes they don't know why the family got kidney failure...until you explain...diabetes can cause kidney failure, or blind or get their leg amputated... they don't really connect it."* The complex nature of the disease⁵¹ has caused R06 to postpone other treatments so that he would not risk the complications where doctors need to consider patients' values and choice.

Anderson et al (1995) stressed the complexities of the disease. Patients were asked if they knew the complex nature of the disease that they had to manage. Some patients said their health care professionals did inform them but some were not able to explain the complications of the disease. R02 expressed her worries when she was diagnosed with diabetes like *"that are emotions.... once you know you have diabetes...you start thinking all sort of things related to it"* and the complexities that she had to manage. Some patients mentioned that due to complications such as retinopathy, they could not read the markings on the syringe because they were too small. R06 did not take his insulin when his wife was away and no one could help with his injection. One patient (with a pacemaker implanted) said the severity of disease prevented her from exercising. Level of disability (R06 who had a stroke) and complications of diabetes (R06 and R08) who had cardiovascular complications) also contributed to non-adherence to treatment. Some patients thought that they would not suffer from the complications because of their beliefs that they would occur later in their lives. They would need constant reminders about diabetes complications. Even so, they might have attitude problems. As mentioned by H02: *"Yes, we talk to the patients. There is communication among the doctors and patients. We ask them their problems and advise them of their cooking for their family. We face patients who can't accept our suggestion"*.

Patients were willing to discuss their problems in managing diabetes. Many factors contribute to personal barriers to optimal diabetes care (Fig.1). Patients lacked coping strategies and difficulties in integrating the treatment regimen into their lifestyles were contributed to their beliefs and their experiences. Diabetes being a silent disease, caused problems for patients to manage it in the earlier stages of the disease as compared with other diseases (Zaini, 2000). Some patients believed that diabetes showed 'no symptoms, no problem' (Murphy & Kinmonth, 1995) to them initially. Help were sought after they suffered from severe complications like blurred vision, nicturition, polyuria, and extreme thirst. "Veterans" patients (Lawton et al, 2005a) due to long *duration of illness* were more experienced in controlling their diabetes but some recently diagnosed were initially able to control it but had lost interest and cited reasons such as social obligations and external factors which prevented them to be more adherent to treatment requirement of diabetes (Schoenberg et al., 1998). The web of complications due to many patho-physiology changes caused poorly managed diabetics (Standl, 1998) which they are required to take greater initiatives in managing their disease to prevent complications later. Experience and duration of illness could affect the control of diabetes (MacLean, 1991) ⁵⁶. Participants who were diagnosed some years ago could explain very well what happened to their bodies when they had diabetes. As compared to young diabetics or recently diagnosed participants. They did not realise that diabetes is a silent disease, which will not manifest its effects long after it is diagnosed. Diabetes is an intriguing disease with its complexities of treatment, management, and complications. The patients were not aware or did not show much experience during the early stages of the disease for them to take early preventive measures. As they become aware of the disease through their experiences down the years or had suffered from the disease for some time, the disease had progressed into severe complications. At this stage, all the patients could do was to prevent further progression of the disease. This could be seen in some of the patients who failed to realise that when they were recently diagnosed with diabetes.

Diabetic education and health literacy is important to diabetics in order for them to understand what is happening to their bodies when they have hypo- or hyperglycaemia (Lawrence & Cheely, 1980). Patients with diabetes must acquire knowledge about the disease to help them to manage it. Some patients showed they had good knowledge about the disease as they took their own initiatives to find out more about it.

Many patients said they understood what diabetes is and its complications. But in-depth interviews, they showed lack of understanding and were unable to explain the disease. This could be one of the reasons why some patients could not control their diabetes. Consistent with Anderson's et al study (1995), on Euro-Canadian women with diabetes, a significant association was found between knowledge and the management of diabetes. However, there was no significant association between knowledge and medication, exercise or diet management. As Johnson (1984) commented, "While knowledge may be a necessary condition for adequate health care, it is not a sufficient condition as the patient may know what to do, but not do it" (pg 509). According to H07, most of the patients knew that the medicines prescribed were to reduce their blood sugar levels. Due to rotation basis at the Endocrinology Clinic, when asked about the education programmes most medical officers were not aware of diabetes education (H07) and even if there is the programmes "*can do a bit more because we are short handed...(lack of educators)*". Thus, the health care professionals were aware that diabetic education is important to the control of diabetes. Muhlhauser (2002) & Berger et al (2002) stressed that diabetes education or self-management programmes are complex interventions. Their evaluation is difficult because of problems in identifying and separately assessing the effect of the various components of the intervention. Their evaluation has presented for discussion a new system for reporting the evaluation of complex interventions such as diabetes treatment and teaching programmes. Patients should be informed of the risk in diabetes complications so that they will be able to share their experiences with their health care professionals.

Cooper et al (2003) in their purely quantitative perspective study showed that patient education appears to have short-term clinical effects, long-term psychological effects and no effects on lifestyle behaviours (pg. 51). Their findings suggest that patient misperceptions of understanding, lack of formal knowledge testing, and the neurological consequences of aging might be more important causes for poor performance than the educational system itself. The findings are clearly disappointing as insulin-treated veterans with stable Type 2 diabetes have major deficits in diabetes knowledge. The degree of deficiency is not strongly correlated with attitudes but is highly influenced by demographic and clinical factors, depression, years of schooling and cognitive function. The study reinforces the ADA recommendations for periodic re-assessment of patient's knowledge and the use of educational strategies that are matched to the patients' abilities (Murata et al, 2003). Interviews with R23 indicated that she took normal foods like the rest of her family members who did not 'suffer from the disease'. She found this difficult as she 'couldn't plan a good diet and couldn't do more exercise'. This was not possible 'because she prepared food for her family'. R21 was a former nurse who was diagnosed with diabetes after the birth of her youngest child. Being in the medical profession, she was able to give an account of her experiences. She described her experiences as an "active" diabetic as she preferred to do housework to maintain physical activity. She also believed that her diabetes was predisposed as her "*parents...had diabetes...at that time... and her "favourite drink was coca-cola..."*"

Family support is another personal barrier to diabetics. Interviews with R23 indicated that she took normal foods like the rest of her family members who did not 'suffer from the disease'. She found this difficult as she 'couldn't plan a good diet and couldn't do more exercise'. This was not possible 'because she prepared food for her family'. Educational and psychosocial interventions studies showed beneficial effects on various diabetes management outcomes and is effective if there is relatedness of the various aspects of management (Younis et al, 2003). Davies et al (2001) in their study concluded that diabetes specialist nurses were potentially cost saving by reducing hospital length of stay (LOS). However, there was no evidence of an adverse effect of reduced LOS on re-admissions, use of community resources, or patient perception of quality of care. Thus, the services of diabetic nurse educator would help patients in managing their diabetes. In Lawton et al's (2005a) studies, some patients said that knowing too much would worry them more. Thus, the constant denial acted as a barrier to the uptake services offered by the hospital. Some patients might want to dissociate from diabetic identity, where they constantly deny of having the disease. Reinforcement of education was found to be positive towards diabetes education (Bruttomesso et al, 2003). H02 (medical doctor) and H14 (nurse educator) emphasised that "the traditional educational approach might not be sufficient and patients need to be addressed on an individual basis". Simmons (2001) stressed that diabetes education is not the only factor that influences treatment success but is determined by other barriers but Snoek, (2003) differed on this and insisted, "Education is considered the corner stone of overall diabetes management".

At another point, the doctor (H03) said that some patients had difficulty in understanding what the doctors were trying to say about the disease due to their socioeconomic background. The problem was to convince them about the risks of the disease, if it was left unchecked. They must be convinced that they have a 'potentially life-threatening disease for which rigorous self-management is necessary' (Lawton et al, 2005a). Some patients lacked knowledge of diabetic complications and perceived the seriousness of their disease when other family members suffered the same disease. They were the ones who would be taking positive initiatives in the self-management of their disease. But those who did not know the seriousness of the disease were less likely to take steps to control their blood glucose levels. They were not aware of the complications that could set in if their glucose levels were not controlled to acceptable levels. Most patients suffered from other diseases and diabetic complications. The patients also said that they were not informed of the diabetes and its complication. Frijling et al (2003) found that patients showed inadequate perceptions of their risk of cardiovascular disease. Perceptions by some patients showed that their worries and concerns when complications were evident in later stages of the disease and being hospitalised or referred to hospital signalled that their health is deteriorating (Lawton et al, 2005c). These were perceived by some patients who had difficulty in taking care of their bodies; they did not see the risks involved in having high blood glucose in the body.

4. Conclusion

By reducing some of the barriers, some patients reported better ability to practice diabetes care. Diabetes care is complex and requires great effort on the part of patients in controlling their blood glucose to acceptable levels. Factors that contributed to the control of diabetes needed to be identified in patients as treatment requirement is individualized in caring of diabetes patients. This study has uncovered the perceived beliefs of Malay Type 2 diabetes patients and their coping strategies and illness stress. Understanding patients' experience and beliefs would help both the patients and HCPs to identify areas of concerns and make recommendations for future treatment to enhance adherence to treatment of diabetes. Patients were willing to discuss their problems about self-managing diabetes if some of these barriers were addressed during consultations. Therefore more efforts should be generated to implement the forwarded recommendations in order to achieve more desirable diabetes control in Malaysia.

Patients reported better ability to practice diabetes care when they understood their disease better. The complexity of diabetes requires patients to be aware of their disease and they must be educated to enhance their coping strategies and overcoming their stress of having the illness. Factors that contributed to the control of diabetes once identified could be used in management of diabetes and enhance treatment outcomes. Balancing hypoglycemia and hyperglycemia is a difficult task for most patients and health care professionals need to address the factors and treatment outcomes should be individualised. Health care professionals need to understand the problems patients had in controlling their diabetes especially their ability to balance the contributing factors and adherence to treatment requirement.

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Table 1. Demographics of patients' sample

RESPONDENT NO.	AGE (Years)	GENDER	BACKGROUND	COMMENTS
R01	75	M	Retired	17 years as diabetic
R02	35	F	Teacher	Pregnant
R03	15	F	Student	Overweight, two years as diabetic
R06	58	M	Ex-army	CVS-stroke, 20 years as diabetic.
R08	47	M	Postman	6 months diagnosed
R11	40	M	Ex-army and part-time tour guide	10 years as diabetic
R12	46	M	-	Operated for brain tumour and on 7 types of drugs
R13	31	M	Food business	3 years as diabetic
R14	48	M	International relations	3 types of drugs
R18	50	F	Staff nurse	Hypertension and IHD, Diabetes
R19	18	M	Student	5 years diagnosed
R20	47	F	Housewife	
R21	50	F	Housewife	15 years as diabetic, retired nurse
R22	50	F	Part-time work	Coronary by-pass (use pacemaker) and diabetic
R23	39	F	Teacher	8 years as diabetic
R24	47	M	Government sector	17 years as diabetic, diagnosed when 30 years old
R28	39	F	Clerk in government office	Recently diagnosed
R31	46	F	Housewife	4 years as diabetic, during pregnancy

(Gender: (M=male, F=Female))

Demographic data for health care professional were not presented to protect their identities and confidentiality due to the small number; they could be identified through the dialogues.

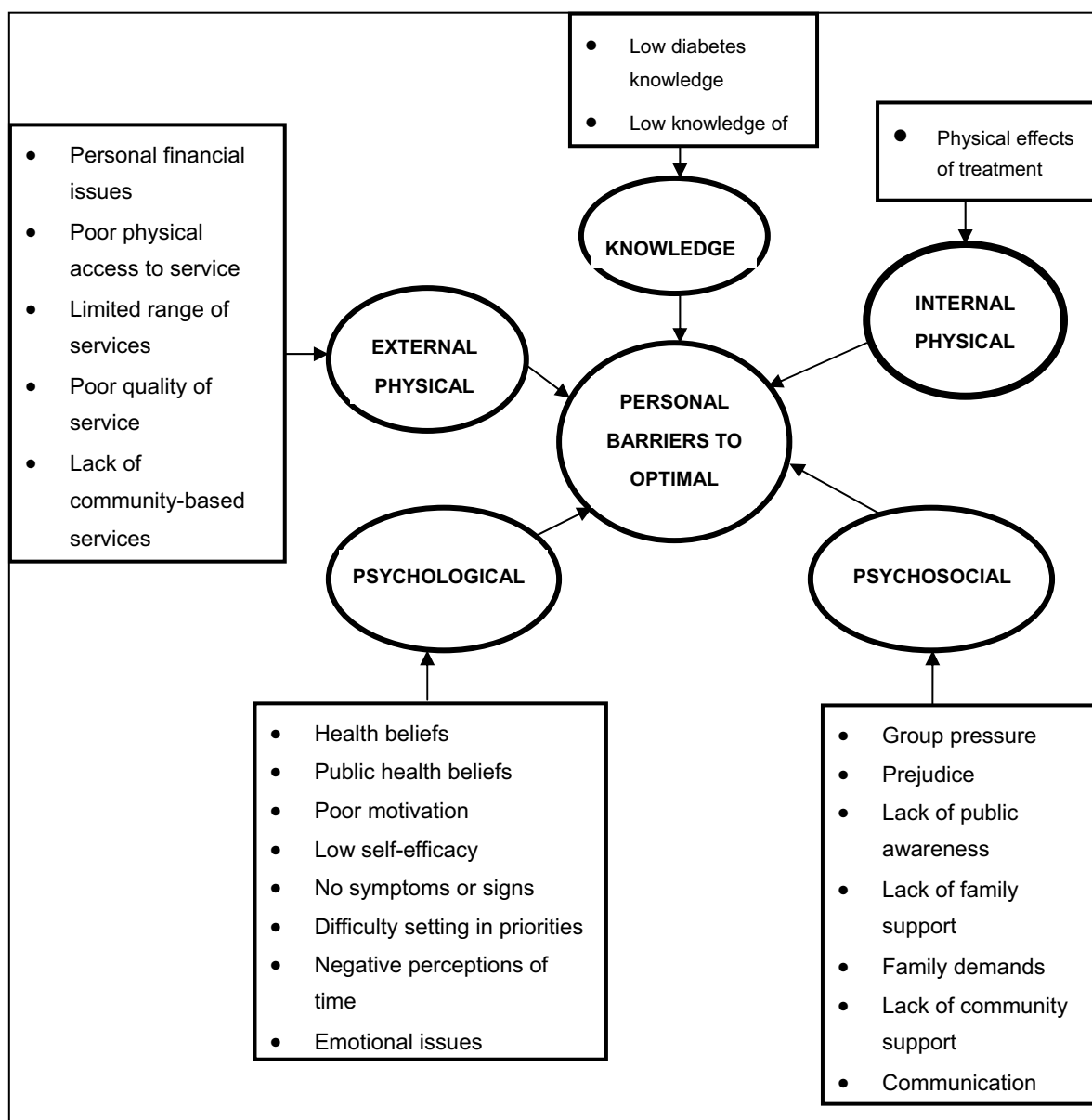


Figure 1. Personal Barriers to diabetes care (Adapted and Modified from Simmons, 2003).



Effects of Polysaccharide Extracted from Traditional Chinese Medical Herbs on Lymphocyte Transformation Rate and AI-HI Antibody Titer in Chicks

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Abstract

[Object]: Detect whether different concentrations of Chinese herbs compound polysaccharides (CPS), astragalus polysaccharides (APS) and angelica polysaccharides (ASP), epimedium herb polysaccharides (EPS) have effects on the immunity function of healthy Roman chicken. [Method]: 260 one-day-old chickens were divided into thirteen groups randomly, 20 birds each group. The physiological saline, Chinese herbs compound polysaccharides, APS, ASP or EPS had been hypodermically injected for seven days continuously, and the blood was drawn on the 7th, 14th, 21st, 28th, 35th, 42nd, 49th and 56th day to evaluate the activity of the translation rate of blood lymphocyte and AI-HI antibody titers in chickens. [Result]: The results of the experiment showed that the translation rate of blood lymphocyte and AI-HI antibody titers increased markedly after the use of Chinese herbs compound polysaccharides, APS, ASP and EPS to the chickens. Chinese herbs compound polysaccharides had more effective function improving the translation rate of blood lymphocyte and AI-HI antibody titers than others. [Conclusion]: The Chinese herbs compound polysaccharides, APS, ASP and EPS could promote the immunity function of the chickens. The Chinese herbs compound polysaccharides were the strangest one among them.

Keywords: Chinese herbs compound polysaccharides, Translation rate of blood lymphocyte, Antibody titer

1. Introduction

Chicken is sensitive to many infectious diseases, such as Newcastle Disease, Avian Influenza (AI) and Infectious Bursa Diseases, which caused high mortality and economic loss world widely. But there are no effective drugs to cure these diseases and the most effective way is to use Vaccines to prevent the occurrence of these. But them another problem comes which is that, vaccines is not always as effective as people expected.

Sometimes, because of weak immunity, poor quality, short protective terms or virus mutation immunity failure which often appears all can cause immunity failure(Chen X, 2002, p18-20). One way to solve it is to find a safe and effective immunopotentiator. Many papers in recent years showed that polysaccharides can enhance immunity and have no obvious side effect. So they are potential immunopotentiator. But the majority scholars only aim at single polysaccharide like angelica sinensis polysaccharide (Yang T H, 2005, p782-783), astragalus polysaccharide (Li S P, 2005, p51-54), lycium barbarum polysaccharide (Tao D Y, 2007, p6816-6818) and so on, to conduct the research, or several polysaccharide composed by a certain percentage of polysaccharide (Wang D Y, 2005, p3704-3708) conducted a study. The traditional Chinese medicine compound prescription polysaccharide (Yan G Q, 1998, p31-32) had not reported as the immunity intensifier's research. In this study, we focused on effect of compound polysaccharides (CPS), astragalus polysaccharides (APS), angelica polysaccharides (ASP), epimedium herb polysaccharides (EPS) on

immunity in health Roman chicken. Because the four selected polysaccharides are neglected by others, although other polysaccharides have been investigated by many studies. In the study, we check the effect of the four polysaccharides. In the next step our goal is to observe whether their application to the new discovered medicines can enhance their effects.

2. Materials and methods

2.1 Traditional Chinese medicine

The traditional Chinese medicine compound prescription by radix astragali, poria, radix rehmanniae preparata, fructus psoraleae, radix polygoni multiflori, herba epimedii, radix angelicae sinensis, radix codonopsis, rhizoma chuanxiong, fructus crataegi and radix ophiopogonis were bought from Shihezi Pharmaceuticals Company in Xinjiang, smashed. The extraction compound polysaccharides (CPS), astragalus polysaccharides (APS), angelica polysaccharides (ASP), epimedium herb polysaccharides (EPS) were processed in Shihezi University. The polysaccharides content is 42.82%, 27.35%, 27.73%, 32.30% respectively. The injection dose in the experiment refers to the actual pure polysaccharide, entering into the chick's body after calculating. Dissolve the APS with distilled water before injecting. Then the solution is autoclaved at 115°C for 30min.

2.2 Reagent

The live vaccine of the Avian Influenza - Newcastle Disease reorganizes (rL-H5) was provided by the Shihezi veterinary station. Avian Influenza H5 the hypotype HI antigen was provided by the Xinjiang army corps raising livestock veterinary services main terminal. Cell nutrient fluid: takes the TC199 culture medium to dissolve according to the instruction booklet in the 1000ml doubled distilled water, filters after the fungus loads separately, restored at 4°C. Joins 10% calf blood serum near the time (56°C the 30min deactivation, filtration eliminates fungus) and penicillin 100U/ml, chain mildew element 100g/ml, and adjusts pH with 60.0g/L NaHCO₃ to 7.2~7.4; The plant haemagglutinin (PHA) 10mg/ml filters has eliminated the fungus.

2.3 Equipment

DNP-9082 electric heating constant temperature incubator (Shanghai fine great test installation Limited company, Shanghai); PHS-3C precise PH counts (Shanghai instrument 3rd factories, Shanghai); DGW-99 table model high speed miniature centrifuge (Ningbo new iris biotechnology Limited liability company, Ningbo); HHS21-6 electric heating constant temperature water-bath (Beijing Chang An Scientific instrument factory, Beijing); OLYMPUS-CX21FS1 biology microscope (Guangzhou bright beautiful science and technology Limited company, Guangzhou); Ultra-clean work table.

2.4 Experimental design

Experimental chickens are from the chick's farm in Shihezi city, and their health is tested clinically. To divide 260 one-day-old chickens into 13 groups at random and each group has 20 chickens. Use the medication on them when they're one day old. The program is as follows: group 1 is the normal control, and receive 0.2ml/d normal saline, group 2~13 receive 0.2ml/d i.p. 12.5mg/ml, 25 mg/ml, 50 mg/ml compound polysaccharides(CPS), astragalus polysaccharides(APS), angelica polysaccharides(ASP), epimedium herb polysaccharides(EPS) respectively. The inject continuously for 7 days.

2.5 Breeding and management

The breeding method, condition, environment, feeder quality and husbandry of four groups' chicks are unified. The chickling on 7th the age with the live vaccine (rL-H5) the drop nose, and the spot eye immunity, on 21st the age carries on the second immunity.

2.6 Lymphocyte transformation rate determination (Lin Q H, 1999, p188-189)

In the 7, 14, 21, 28, 35, 42, 49 and 56 days after treatment, we take 10 chickens from each group to prepare the blood stochastically separately, and antifreeze with the sodium citrate. Takes 0.1ml, add 1.8ml TC199 nutrient fluid, and PHA 0.1 ml, to 0.1ml anti-hemogglutination samples, and then mix uniform postpositioned 37°C nurtures 72h warm. Shake them one time a day. Take them out after the raise had ended blot the majority of supernates, join 8.3g/L NH₄Cl 4ml to mix uniform, and set them at 37°C water bath 10min. After taking out, 2000r/min centrifugal 5min, abandons clear, the settling adds the 5ml fixture, sets at room temperature 10min. The offcenter abandons clear, takes 2~3 drop of settling in ice-cold and has on the moisture content slide glass, causes it to unfold evenly, after rapid drying up, the dye liquor dyes 15min with Giemsa Ranye. Then laundering, dry, oil mirror inspection. Observes 200 lymphocytes, the counting transformation cell number. According to the equation below equation:

$$\% \text{ lymphocyte transformation rate} = \frac{\text{transformed lymphocyte}}{(\text{transformed lymphocyte} + \text{untransformed lymphocyte})} \times 100$$

2.7 AI-HI antibody examination

In experiments 7, 14, 21, 28, 35, 42, 49, 56 days, takes 10 chickens from each group to pick the blood stochastically, the

separation blood serum, examines the AI-HI antibody titer with the β -micromethod. The result expressed with the log₂ geometry average value.

2.8 Statistical analysis

Statistical analyses were carried out by One-way-ANOVA, Tukey and Dunnett's *posthoc* tests by using SPSS 12.0.1 Statistical Package (SPSS Inc., Chicago, IL). P values less than 0.05 ($p < 0.05$) were regarded as statistically significant. All the values are presented as mean \pm SEM (the standard error of the mean).

3. Results

The result of table 1: each polysaccharide elevated lymphocyte transformation at the checkpoint 7th, 14th, 21st, 28th, and arrived at the peak at 28th. Compared with control, by 56th day, only 25mg/ml compound polysaccharides (CPS) showed significant difference ($P < 0.05$).

The result of table 2: each polysaccharide elevated AI-HI titers, AI-HI titers arrived at the peak at 28th and 35th. Compared with control group, even at 56th, compound polysaccharides (CPS), 25mg/ml astragalus polysaccharides (APS) have the significant effect ($P < 0.01$).

4. Discussion

In the study, compound polysaccharides (CPS), astragalus polysaccharides (APS), angelica polysaccharides (ASP), epimedium herb polysaccharides (EPS) enhanced the proliferation of lymphocyte and AI-HI. This result is in accordance with others. The result showed that the four polysaccharides can enhance herb's immunity. The findings of Xu Y (Xu Y, 2000, p434-437), Wang D Y (Wang D Y, 2006, p194-196), Gu X L (Gu X L, 2005, p813-820) and Li N (Li N, 2004, p61-64) coincide with our experimental result, which shows that the four polysaccharides can enhance herb's immunity.

At the three checkpoints 7th, 14th, 21st, the detection index of each experimental group was elevated which compared with the normal control group. At 28th day, it reached the peak, in the experiment, effect of 25mg/ml groups was better than 12.5mg/ml and 50mg/ml groups in all of the four polysaccharides groups. It indicated that there was not a positive correlation between concentration and improvement of immunity and its mechanism is expected to be further studied.

Cell immunity is mediated by T cells; lymphocyte transformation rate was an important index for evaluating cell immunity. The results of this study indicated that compound polysaccharides(CPS), astragalus polysaccharides(APS), angelica polysaccharides(ASP), epimedium herb polysaccharides(EPS) elevated lymphocyte transformation rate. By 49th day, lymphocyte transformation rate recovered to normal level in ASP, EPS and 12.5mg/ml APS, 50mg/ml APS groups.

In the study, vaccines were used together with compound polysaccharides(CPS), astragalus polysaccharides(APS), angelica polysaccharides(ASP) or epimedium herb polysaccharides(EPS) could elevated antibody titer(CPS) of Avian Influenza, and this result was in accordance with others(Kong X F, 2004, p468-472). Polysaccharides especially 25mg/ml APS, 12.5mg/ml and 25mg/ml compound polysaccharide (CPS) advance production, accelerate Rise Velocity of antibody, and also prolong effective period of antibody. All of these results showed that these polysaccharides can use as immunopotentiator.

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Table 1. The effect of different density polysaccharides on the translation rate of blood lymphocyte

Groups	PS.CO mg/ml	7th day exp %	14th day exp %	21st day exp %	28th day exp %	35th day exp %	42nd day exp %	49th day exp %	56th day exp %
saline	0	40.6±1.435	40.8±1.497	40.8±0.583	41.0±1.612	41.2±1.158	40.8±1.158	40.6±0.748	40.8±1.068
APS	12.5	43.2±0.860	44.6±0.927*	44.8±0.860**	45.2±0.860**	44.8±0.860*	44.0±0.707*	42.8±0.860	40.0±1.000
APS	25	45.2±1.114**	45.8±1.594**	49.2±1.241**	55.6±1.077**	48.8±1.158**	46.0±0.707**	43.4±0.927*	41.2±1.241
APS	50	42.4±0.927	44.4±0.927*	44.6±0.927**	45.0±0.707**	44.4±0.927*	43.6±1.030*	42.0±0.707	40.4±0.927
ASP	12.5	41.4±1.077	44.4±0.927*	44.4±0.927*	44.0±0.707*	45.6±1.030**	43.4±0.927*	41.6±1.208	40.6±1.077
ASP	25	44.4±0.927*	45.2±1.655**	48.6±1.030**	47.2±1.497**	45.6±1.030*	44.2±1.356*	42.2±0.583	40.8±1.281
ASP	50	41.6±1.208	44.2±0.860*	43.8±0.860*	44.0±0.707*	43.8±0.860	43.0±0.707*	41.2±0.860	40.2±0.860
EPS	12.5	40.8±1.158	44.0±0.707	44.2±0.860*	44.0±0.707*	43.8±1.158	43.4±0.927*	40.8±0.860	40.4±1.228
EPS	25	40.4±0.707*	45.0±1.225**	46.0±1.000*	49.6±1.435**	45.0±1.000**	44.0±0.707*	41.4±1.228	40.6±1.030
EPS	50	41.0±0.707	44.2±0.860*	44.4±0.927*	44.2±0.860*	44.0±0.707*	43.8±0.860*	41.2±0.860	40.8±1.068
CPS	12.5	44.4±0.927*	44.6±0.927*	46.0±0.707**	52.2±0.860**	46.0±0.707**	44.8±0.870**	43.6±1.600*	41.6±0.927
CPS	25	45.6±1.720**	46.2±1.158**	50.2±1.281**	62.2±1.030**	54.6±0.927**	49.0±0.707**	44.0±0.707*	44.2±0.860*
CPS	50	44.2±1.158*	44.8±1.241*	47.8±0.860**	51.0±0.707**	45.2±1.068**	43.8±0.860*	43.4±0.927*	41.4±1.077

Note: Compared with the control group, in same Column, * P<0.05, ** P<0.01.

Table 2. The effect of different density polysaccharides on AI-HI antibody titers

Groups	PS.CO mg/ml	7th day exp	14th day exp	21st day exp	28th day exp	35th day exp	42nd day exp	49th day exp	56th day exp
saline	0	3.8±0.200	5.0±0.707	6.4±0.245	7.2±0.200	7.0±0.707	6.2±0.200	5.4±0.245	4.2±0.200
APS	12.5	4.4±0.245	6.0±0.707*	7.6±0.245**	8.4±0.245**	8.2±0.200**	7.2±0.200*	6.2±0.200*	5.0±0.316*
APS	25	4.8±0.374*	6.2±0.447**	7.8±0.200**	8.6±0.245**	8.4±0.245**	7.4±0.245**	6.4±0.245**	5.2±0.200**
APS	50	4.2±0.200	6.0±0.707*	7.2±0.200*	8.2±0.200**	8.0±0.000**	7.0±0.316*	6.2±0.200*	4.8±0.200
ASP	12.5	4.0±0.316	5.8±0.447*	7.2±0.374*	8.2±0.200**	8.0±0.316**	7.0±0.316*	6.0±0.316	4.8±0.200
ASP	25	4.4±0.245	6.0±0.707*	7.6±0.245**	8.2±0.200**	8.0±0.316**	7.0±0.316*	6.2±0.200*	5.0±0.316*
ASP	50	4.2±0.200	5.6±0.548	7.4±0.245**	8.0±0.316*	7.8±0.200*	6.8±0.374	5.8±0.200	4.6±0.245
EPS	12.5	4.2±0.200	5.8±0.447*	7.4±0.245**	8.0±0.316*	7.8±0.200*	6.8±0.200	5.8±0.200	4.6±0.245
EPS	25	4.4±0.245	6.0±0.707*	7.6±0.245**	8.2±0.200**	8.0±0.316**	7.0±0.316*	6.2±0.200*	5.0±0.00*
EPS	50	3.8±0.374	5.8±0.447*	7.2±0.200*	8.0±0.316*	7.6±0.245	6.8±0.200	5.6±0.245	4.4±0.245
CPS	12.5	4.6±0.400	6.2±0.447**	7.8±0.200**	8.6±0.245**	8.4±0.245**	7.4±0.245**	6.4±0.245**	5.2±0.200**
CPS	25	5.2±0.374**	6.4±0.548**	8.0±0.316**	8.8±0.200**	8.6±0.245**	7.8±0.374**	6.6±0.245**	5.4±0.245**
CPS	50	4.8±0.374*	6.0±0.707*	7.6±0.245**	8.4±0.245**	8.2±0.200**	7.2±0.200*	6.4±0.245**	5.2±0.200**

Note: Compared with the control group, in same Column, * P<0.05, ** P<0.01.



Acute on Chronic Pancreatitis Masking Falciparum Malaria: A Case Report

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Abstract

Malaria is one of the leading causes of morbidity and mortality reported worldwide. Malaria caused by *P. Falciparum* is a multisystem disorder and may have diversity of clinical presentations. We are presenting a case report of patients of *Falciparum* Malaria masking acute on chronic pancreatitis. We suggest that *Falciparum* Malaria should be included in differential diagnosis of acute pancreatitis presenting with fever especially in endemic countries.

Keywords: *Falciparum*, Malaria, Pancreatitis, Acute

1. Introduction

Falciparum malaria is a common disorder in the tropics associated with myriad complications that can often be life-threatening and fatal. Malaria is one of the leading causes of morbidity and mortality reported worldwide. Malaria caused by *P.Falciparum* is a multisystem disorder and may have diversity of clinical presentations. So it is crucial for a treating physician to reach the correct diagnosis and management to reduce the morbidity and mortality in malaria endemic zones.

2. Case presentation

We report here a case of 33 year old male presenting as atypical case of *Falciparum* malaria, mimicking acute on chronic pancreatitis to the Emergency of AIIMS, New Delhi, India. The patient was a chronic alcoholic and diagnosed as a case of chronic pancreatitis. He was admitted to a private nursing home with fever and pain in abdomen for the last 3 days and the ultrasound of abdomen showed chronic calcific pancreatitis with no free fluid, undergone some

instrumentation, most likely ERCP. Subsequently, the patient's condition deteriorated and he was referred to emergency of AIIMS.

On examination, patient had altered consciousness, high grade fever with chills, pallor, pedal edema and facial puffiness. In addition, his pulse was 100/min., BP 90/70 mm of mercury and bilateral basal crepts in chest. On abdominal examination, hardboard rigidity with decreased bowel sound was present. Arterial blood gas analysis showed severe metabolic acidosis and x-ray was normal with no air under diaphragm. It was diagnosed a case of severe acute on chronic pancreatitis (post-ERCP induced) with DIC, Sepsis and ARF. Patient was admitted in Gastroenterology unit. Blood investigations were: Hemoglobin: 3.2 g/dl, TLC: 17,700/cumm., platelet: 30,000/cumm., PT: 24 sec (control 13 sec), blood urea: 141 mg/dl and Serum creatinine: 4.0 mg/dl. Management of patient included IV fluids, dopamine 20 microgram/kg/min. Antibiotic used were piperacillin, tazatobactam, imipenem but patient's condition kept on deteriorating and he was intubated electively to maintain respiratory functions and put on ventilator on day 4. However, this patient failed to respond to above treatment and on day 8, a peripheral smear was sent to rule out malaria. The results were positive for falciparum malaria with parasite count of 1920 / μ l. Now on 9th day of presenting to emergency, patient was put on antimalarials, initially artesunate and doxycycline with addition of quinine two days latter.

Although the parasite count declined (<200/ μ l), patients' peripheral smear continually showed presence of falciparum malaria. On next morning, patient had bleeding per rectum from hemorrhoids followed by upper GI bleed. Platelet count was 13,000/cumm. and PT was 22.5 sec. (11 sec.), 3 units platelet, 2 unit FFP and 2 units RBC was transfused to the patient. Patient developed bilateral extensive pneumonia with ARDS on ventilation support on day 14 and his condition deteriorated rapidly with severe upper GI, per rectum and tracheal bleeding. Patient finally succumbed to his illness on morning of day 15.

3. Discussion

Typically, malaria presents with fever and shivering, poor general condition, diarrhea, nausea and vomiting also occur frequently. Malignant malaria can results in alteration of consciousness, convulsions and paralysis leading to complications like hypotension, kidney failure, DIC, infectious jaundice, shock and coma. Suspected cases are detected by rapid diagnostic test and confirmed by microscopic detection of parasite in blood on peripheral smear.

Although abdominal pain is a frequent symptom in malaria, in this patient, the persistent and worsening of abdominal pain was related to severe pancreatitis. The causes of abdominal pain in malaria are protean and include hepatitis/hepatomegaly (Beg et al, 2008) acalculous cholecystitis (Anthonie-Milhomme et al, 2007), acute surgical abdomen (Gopisetty et al, 2007) and splenic rupture (Jimenez et al, 2007). Apart from typical presentations, lot of patients were seen with unusual presentation with symptoms suggestive of upper and lower respiratory tract infections including acute lung injury, meningitis, acute hepatitis including fulminant hepatic failure and acute gastroenteritis (Ahsan & Rab, 1993; Bhalli & Samiullah, 2001; Kyriacou et al, 1996 & Seshadri et al, 2008). Patient with altered consciousness in malaria endemic region should be investigated for severe malaria. This case is an atypical presentation of falciparum malaria, which was misdiagnosed and subsequently led to death of patient. Patient was initially diagnosed and managed as a case of chronic pancreatitis at the private nursing home. At AIIMS, on the basis of clinical and laboratory findings, he was managed as a case of acute on chronic pancreatitis post-ERCP with DIC, ARF and Sepsis although no evidence was present to support the diagnosis of sepsis. Patient showed no improvement despite supportive hemodynamic management and broad-spectrum antibiotics. Only on day 9th patient was put on antimalarials subsequent to a peripheral smear that showed high level of parasitemia. But patient died due to complications

4. Conclusion

In view of various presentations of falciparum malaria should be considered as a possibility in all febrile patients even with various unusual presentations. This case reiterates the need to carry out peripheral smear as mandatory and first line investigation in any case with symptoms of fever with chills, especially in endemic country like India.

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Indoor Air Quality and Sick Building Syndrome in Malaysian Buildings

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Abstract

This study was done to investigate the association between sick building syndrome (SBS) and indoor air pollutants in two different buildings (old and new). Hundred and seventy six office workers were randomly selected in this study from April to September 2008. One office from Tower 1, in one private building at Kuala Lumpur City Center (KLCC) categorized as Building A (old building), while another government building, Malaysia Energy Center categorizes as Building B (new building). Modified IAQ and Work Symptoms Survey, NIOSH Indoor Environmental Quality Survey

(1991) was used to measure the SBS occurrence. Measurement of IAQ was performed according to IAQ Code of Practice, Department Occupational Safety and Health, (DOSH, 2005) Malaysia. Building A and B recorded 93 and 83 respondents respectively. Ventilation rate were significantly higher in Building B compared to Building A with median 21.10 cfm/person and 18.60 cfm/person respectively ($z = -11.70$, $p < 0.001$). Higher prevalence of SBS recorded in Building A, compared to Building B ($\chi^2 = 11.9$, $p = 0.001$). Significantly higher of IAP in Building A compare to B for CO₂, CO, TVOC, PM₁₀, PM_{2.5}, while Building B showed higher concentration of Ultrafine Particle and Temperature Humidity Index (THI) value. There were significant association between ventilation rate and the prevalence of SBS (OR = 3.13, 95% CI = 1.62 – 6.06). Study result showed that indoor pollutants in old building were high, while new building showed indoor pollutants high for THI value and UFP. The level of THI and CO₂ concentration was major factor contribute to SBS complain among office workers.

Keywords: Indoor air quality (IAQ), Sick building syndrome (SBS), Old and new building, Indoor Air Pollutants (IAP), KLCC, PTM

1. Introduction

Energy crisis in year 1970s leading the engineer and building manager to design and maintain indoor environment more efficiently by sealing up the building and thus cause less ventilation rate to save the electricity (WHO, 1986). The indoor air quality (IAQ) in any building can be compromised by microbial contaminants (mold, bacteria), chemicals (such as carbon monoxide, formaldehyde), allergens, or any mass or energy stressor that can induce health effects (John et al. 2000). The sick building syndrome (SBS) has become common issues in Malaysia recent years due to the construction of buildings designed to be energy-efficient with air conditioning system (Berardil, 1991) but poor maintenance and services of Heating, Ventilation and Air Conditioning (HVAC) system resulting the increasing of indoor air pollutants (IAP) levels.

Studies have demonstrated that SBS is influenced by the type of ventilation system, with the prevalence of SBS being higher in buildings with mechanical ventilation systems compared to normal ventilation system (Burge et al. 1987). Few researches in Tropical Country focus to demonstrate the age of the building and IAP characteristics with the prevalence of SBS and other health effects. New building normally reported to have high concentration of total volatile organic compounds (TVOC) while old building recorded poor ventilation rate with the increasing of Carbon Dioxide (CO₂) level. The inadequate ventilation per occupants and the elevated indoor chemical pollutants concentrations can lead to the SBS prevalence (Michael et al. 2000). SBS symptoms can be on upper respiratory and mucous membrane symptoms for example irritated eyes, nose, sinus, or throat. And the other symptoms are on the lower respiratory for example cough, tight chest, wheeze, or difficulty in breathing (Michael et al. 2000).

The symptoms experienced are non-specific and predominantly upper respiratory in origin (nasal, eye, and throat) but headache and lethargy, potentially more multifactor in origin, are also experienced. This study investigates the different age of the building as the important factor influence SBS with hypothesis if the building is old; the IAP will be increase thus the SBS prevalence will recorded high.

The current study was designed to investigate which etiological factors were still relevant to reported symptoms within state of the art buildings of modern design, where there was expected to be a low prevalence of symptoms associated with SBS. This study was a collaborative project conducted from April to September 2008 in two buildings office in Malaysia with epidemiological study design of the SBS and specialist agency with focus in detailed about occupational hygiene aspects of monitoring indoor environmental conditions and thus provides information of indoor air quality and its associations with the SBS prevalence among office workers in different buildings.

2. Methods and materials

2.1 Subject recruiting and selection

To recruit the study subject, lists of names were obtained from the Human Resource Department in both buildings' office. From the list available, 93 office workers in the first office at Tower 1, KLCC building was recruited and categorized under the old building group named as Building A. The other 83 office workers, who fulfill the stated criteria and matched as a group, were recruited from the Pusat Tenaga Malaysia office building as new building group named Building B. All respondents were explained about the procedure of the study and consent letter was obtained from all respondents before the study begins.

A cross-sectional comparative study was conducted between the Building A (old building) and Building B (new building). Building A was selected as an old building because of its seven years of occupancy after commissioning. However, Building B was considered new due to its occupancy was just three months after commissioning. Both of these buildings were being chosen because these buildings used the same centralized air conditioning unit and the office was completely dependent only on the general ventilation to provide sufficient air for occupants.

2.2 Questionnaires survey

A set of questionnaires were used to get the demographic background and socio-economic of the respondents such as personal information, health status, educational status and income. SBS symptoms questions were based on the Indoor Air Quality and Work Symptoms Survey, NIOSH (National Institute Occupational Safety and Health) Indoor Environmental Quality Survey (1991). The questionnaires include the worker's health status and symptoms of SBS such as chronic cough, cough with phlegm, chest tightness, and shortness of breath. Questionnaires also contain information on the previous workplace, working history, and location of current workstation (near the entrance door, near to photocopied area, etc), and also working background such as overtime, shift work schedule, duration of work per day, duration of work per week and the employment years at the office. Zoning of each worker's workstation then categorized accordingly with the reference of floor plan. Reported SBS symptoms were given to the respective respondents on each day of IAQ assessment conducted and the score given in the analysis of data commence.

The office workers will be defined as having SBS if they had at least one symptom of SBS symptoms and the symptoms appear at least once in a week. The building occupants also must had reported symptoms occurrence of at least 1-3 days per week during four weeks past and the symptoms shown improvement when she/he away from work (Ooi et al. 1998).

2.3 Indoor air quality measurements

Assessment of indoor air quality (IAQ) in Building A and B were conducted according to Malaysia Indoor Air Quality Code of Practice (IAQ, COP), Department Occupational Safety and Health (DOSH), Malaysia 2005. Partial period of consecutive sampling was conducted in three times (morning, afternoon, evening) to represent the IAP status inside the building for the whole day. The office workers from both office buildings were selected based on the proximity of their workstations (according to the zoning area) to the IAQ air sampler. Workers closest to the air sampler were selected first and the selection continued, concentric circles from the air sampler location, until the required number of available office workers was achieved. Sampler was located in the center of the location in the office area 75 cm above the ground.

The indoor air quality was measured using the TSI 8554 Q-Trak Plus. The TSI 8554 Q-Trak Plus measure Temperature (Temp), Relative Humidity (%RH), Carbon Dioxide (CO₂), Carbon Monoxide (CO) and ventilation rate. The concentration of CO₂ in this research was used as the ventilation indicator for the fresh air supply, supply air from diffuser, return air and outside air. TSI 8386 Velocicalc Plus (Velocicalc) was used to assess the air movement, air flow, velocity, volume, pressure different and ventilation rate in both building. The location of all parameter sampling spot was recorded on the layout plan, and then the entire instrument was run simultaneously using specific procedure by IAQ, COP (DOSH, 2005) and ventilation measurement using guideline given by ASHRAE – 62 (2003).

All indoor air pollutants data were downloaded in specific TSI Trak Pro Software for TSI equipment and PROSuite for RAE instruments. There were five important variables in this study. For the CO₂, CO, temperature and humidity detection, the TSI 8554 Q-Trak Plus was used. TVOC were recorded by using the MiniRAE PGM-7600. For the particulate matter (PM₁₀ and PM_{2.5}), the TSI Model 8520 Dust TrakTM Aerosol Monitor and TSI Side PackTM (Side Pack) were respectively used in this study. TSI Model 8525 P-Trak[®] Ultrafine Particle Counter (UFP) was used in this study to collect the UFP concentration on selected location in both building.

2.4 Ethical issues and quality control

Approval from Medical Researcher Ethic Committee, UPM was obtained. Permission from the employer and written consent were gained during data collection period. A set of Pre test was performed on 10% of the sample size before the study begins to ensure the understanding of the questions. The entire instrument was calibrated by the manufacture before air sampling was performed and method of calculation for the indoor air quality was guided by the professional IAQ assessor.

3. Result and discussion

3.1 Socio-demographic information

The descriptive statistics of the respondents show in Table 1. The Malay workers made up the highest number of the office workers in Building A (87.1%) as well as the Building B group (86.7%). The majority of the respondents were married. Table 2 shows respondents were similar in their work duration in a week but significantly different in age, anthropometric data and working history in the building ($p < 0.001$).

3.2 Indoor air quality Supplied Air and Ventilation Measurement, Air temperature, humidity, and velocity

Indoor Air Quality Supplied Air and Ventilation Measurement (IAQ-SAVM) was measured by the adequacy of the IAQ supplied air into the indoor environment in cubic feet minute per person (cfm/person). Carbon dioxide (CO₂) gas was used as the main indicator for detect the efficiency of supplied air ventilation. Indoor air quality supplied air and ventilation measurement were conducted and measured according to zoning of the indoor sampling location. The value of 20 cfm per person was determined as the median value of the indoor air quality level (ASHRAE Standard-62, 2003). Table 3 showed

the differences between the cfm/person levels in both buildings. The result of Mann Whitney U Test showed the Building B showed significantly higher indoor air quality supplied air compared to Building A. (Table 4).

3.3 Comparison of indoor air pollutant in both building

Building A had 31 sampler spots while 21 sampler spots in the Building B. Normality test were performed and both data were not normally distributed. Building A showed significantly higher parameter of CO₂, CO, TVOC, PM₁₀, and PM_{2.5} compared to Building B. Building B however, showed significantly higher of UFP concentration and THI values compared to Building A (Table 5).

3.4 Prevalence of Sick Building Syndrome

Building A was operated more than 10 years vice versa for Building B (Runeson et al. 2003). The score of the SBS had been done according to the positive response, if one symptoms recorded nearly everyday, the mark given to the SBS scale. If two symptoms reported everyday, two score were given and so on (Ooi et al. 1998). As showed in Table 6, number of respondents that had been categories as having SBS using above criteria given, Building A were recorded 68.8% office workers having SBS compared to 36.1% of office workers in Building B.

Indoor Air Quality (IAQ-SAVM) and ventilation measurement were conducted and found that there were significant association between the level of IAQ and SBS (Table 7). Indoor air pollutants (IAP) (CO₂, CO, TVOC, UFP, PM₁₀, PM_{2.5} and THI values) were categories into high concentration (High) and low concentration (Low) depending on the median value, either above or lower. Based on Table 8, result showed there were significant association between SBS and the IAP concentration namely CO₂, CO, TVOC, and THI value. Logistic Regression was run to obtain adjusted Odd Ratio/ risk (OR) for parameters: CO₂, CO, TVOC, and THI values with the SBS prevalence. The OR was adjusted for age, medical condition, Upper Respiratory Tract Infection (URTI), smoking, having pet at home, and other medical problems. For multiple regression statistics, the factors that significantly influenced the SBS and pollutant concentration were CO₂ and THI values (Table 9).

Carbon Dioxide concentration is a key parameter for assessing indoor air quality and ventilation efficiency (Godish, 2000). IAQ supplied air and ventilation measurement were different in Building A (old building) and B (new building). Low IAQ-SAVM recorded 18.60cfm/person in Building A compare to recommended ASHRAE Standard – 62 (General Ventilation) which suggested office environment require minimum 20 cfm/person IAQ-SAVM (Janssen, 1994). However this IAQ-SAVM in Building A was still acceptable and meets the Code of Practice Indoor Air Quality (COP, IAQ), DOSH Malaysia. Indoor environment recorded lower IAQ-SAVM level of ASHRAE Standard – 62 recommended may introduce thermal comfort issues and improper dilution of IAP that may cause irritating to the eyes, headaches and dizziness if prolonged exposure. Effectiveness of the air handling unit system (HVAC system), its maintenance, cleaning procedures and periodical inspection can improve the ventilation and increase the IAQ-SAVM level in office environment (Irtishad, 2000).

Clear association seen between elevated of indoor CO₂ levels and increases in certain SBS symptoms. Analyses conducted using average and median concentration of indoor CO₂ had similar findings with previous study (Ooi et al. 1998). The reduction of CO₂ could come through large increases in ventilation rates, improved effectiveness in providing fresh air to the occupants' breathing zone (Seppanen et al. 1999), or through identification of the symptom-causing agents in the indoor air and control of their sources. The ventilation that inadequate and insufficient fresh air intake can contribute to high level of CO₂ in certain area in the building (Ooi et al. 1994). The low intake of fresh air will also influence the Temperature Humidity Index (THI) value in the building. Similar conclusion observed in study conducted by Bayer et al. (1990) who stated that the SBS may occur due to inadequate ventilation and high level of humidity and temperature. After adjusting for confounding, we found important and statistically significant associations of SBS symptoms was the increases of CO₂ and THI value.

Building A recorded significantly higher all IAP measured except for UFP concentration and THI values. However all the indoor pollutant measures were below IAQ-COP limit and this indicate that the HVAC maintenances are well in both buildings. Structured of high rise building (Petronas Twin Tower, KLCC) can influence the inadequate of the air exchange in the building (Turiel et al. 1983) thus influence dilution of pollutant by HVAC unit in Building A. Another suspected insufficient fresh air supply from the HVAC systems may due to blockage of humidifier (Godish et al. 1996) by occupants' activities and renovations.

Second parameter which influences the SBS was the Carbon Monoxide (CO). In this study, after adjusted the cofounder it showed that the SBS are not influencing mainly by CO exposure. CO exposure in this study was low and below maximum limits (COP of IAQ, 2005). Carbon monoxide concentration in both areas were recorded slightly similar with the previous study conducted by Berardil et al. (1991) who stated that the concentration of CO was low at the range of 0.01 to 3 ppm. The concentration of CO in previous study conducted by Jonathan et al. (2001) stated that the CO level more than 10 ppm was observed due to outdoor source especially from parking lot. The CO concentration above 10 ppm was significantly associated with SBS symptoms such as dizziness, fatigue and headache (Samet, 1993).

From the result of indoor air pollutants and SBS comparison, the most significant pollutant that influence the SBS was CO₂, CO, TVOC and THI (OR = 4.63, 95% CI = 2.45 – 8.76). Indoor air pollutant result from this study showed that, the indoor air pollutant CO₂ mean was lower compared to previous study conducted by Ooi et al. (1998). Increasing the level of CO₂ in each building showed positive association to the occurrences of sick building syndrome thus increases in certain lower respiratory syndrome (Michael et al. 2000). The mechanical floor mechanism was one of the factor influence the higher level of CO₂ in old building. However CO₂ concentration in Buildings B showed in the range of 350.25 – 544.50 ppm. This slightly the same result showed in the study conducted by Berardil et al. (1991) which stated that the concentration of CO₂ in new building work area was at range 400 – 500 ppm.

TVOC showed significant association with the SBS prevalence (OR = 2.25, 95% CI = 1.18 – 4.27). The respondents recorded having SBS for high concentration of TVOC was 43.6%. The similar trend of SBS symptoms such as headache, fatigue and dizziness significantly associated with the TVOC exposure more less than 3 ppm was observed (Runeson et al. 2003). THI values obtained from the calculation of temperature with the humidity level inside the building. High humidity level indoor environment can cause sensation of dryness of office respondents (Fang et al. 2004).

Thermal Humidity Index (THI) value was gathered from temperature and humidity data from this study. From the result there was a significant difference of THI value in both building that have mean of THI value, 21.55. This result supported by study conducted by Ooi et al. (1998), who showed that the THI index of the mean from the study was 21.22. The higher humidity observed in the Building B which recorded higher range of THI values at 21.78 – 23.84 compared to Building A which THI range at 19.43 – 21.49. High levels of THI when above 23 can create a non comfortable condition of building occupants (Brager et al. 1994). Beside the factor of indoor air pollutants, the there were few studies on health-related selection in relation to the indoor thermal comfort environment or in relation to personality of the respondents (Runeson et al. 2003). Effects of temperature and humidity on the perception of air quality can occur due to insufficient indoor cooling air and slightly raised temperature and humidity (Fang et al. 2004).

4. Conclusion

This study suggested that increases in the ventilation rates per person among typical office buildings will, on average, significantly reduce prevalence of SBS, even when these buildings meet the existing ASHRAE ventilation standards for office buildings. The magnitude of the reduction will depend on the magnitude of the increase in ventilation rates, improvement in ventilation effectiveness, or reduction in sources of SBS causing pollutants.

There is no direct causal link between exposure to CO₂ and SBS symptoms, but rather CO₂ is approximately correlated with other indoor pollutants that may cause symptoms. Behind the study expectation, it found that the temperature and humidity are important indoor factors that can influence prevalence of SBS. UFP also are the common issues that need to be focus on in the new building, because this pollutant can also influence SBS.

Concern about the indoor air quality has been increasing as the public becomes aware that exposure to inadequate supplied air and the exposure to indoor air pollutants may increase the risk of getting health risk. Over the years many types of mitigation (correction) strategies have been implemented to solve indoor air quality problems. Mitigation of indoor air quality problems may require the involvement of building management and staff representing such areas of responsibility as firstly facility operation and maintenance, secondly housekeeping, thirdly policymaking and lastly staff training. All efforts to prevent or correct IAQ problems should include an effort to identify and control pollutant sources. Source control is generally the most cost effective approach to mitigating IAQ problems in which point sources of contaminants can be identified. In the case of a strong source, source control may be the only solutions that will work.

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Table 1. Demographic information of respondents

Variables	Building A		Building B	
	N=93	%	n=83	%
Race				
Malay	81	87.1	72	86.7
Chinese	11	11.8	8	9.6
Indian	1	1.1	2	2.4
Others	0	0.0	1	1.2
Status				
Single	24	25.8	19	22.9
Married	69	74.2	64	77.1

Table 2. Background information of respondents

Variables	Median (IQR)		z	p
	Building A	Building B		
Age (years)	36 (31.5 – 41.0)	32 (30.0 – 35.0)	-3.64	<0.001**
Height(m)	1.64 (1.58 – 1.69)	1.62 (1.55 – 1.69)	-3.23	0.001*
Weight (kg)	68.00 (62.50 – 70.50)	63.51 (55.0 – 69.00)	-2.04	0.041*
BMI	25.00 (23.8 – 26.4)	24.21 (22.15 – 25.44)	-2.01	0.04*
Working history in building (month)	60.00 (24.00 – 84.00)	4.00 (2.00 – 4.00)	-11.02	<0.001**
Work duration (week)	41.48 (40.00 – 43.00)	40 (40.00 – 45.00)	-1.52	0.13

*significant at $p < 0.05$ **significant at $p < 0.001$

Table 3. The differences of IAQ Supplied Air in both buildings

Parameter	Building A			Building B		
	Mean (SD)	Median	Range	Mean (SD)	Median	Range
CFM/Person	18.63 (1.96)	18.6	16.20-21.01	22.45 (1.59)	21.10	21.1-24.30

Table 4. Comparison of the IAQ in KLCC and PTM building

Parameter	Median (Inter Quartile Range)		z	p
	Building A (n = 93)	Building B (n = 83)		
CFM/person	18.60 ^c (16.20-21.01)	21.10 ^c (21.1-24.30)	-11.70	$p < 0.001^*$

*significant at $p < 0.05$ ^cUnit in CFM/person

(N = 176)

Table 5. Comparison indoor pollutant concentration between two buildings

Parameter	Median (Inter Quartile Range)		z	p
	Building A n = 93	Building B n = 83		
CO₂ (ppm)	643 (412 – 647)	412 (405.5-423)	-11.38	p < 0.001*
CO (ppm)	0.78 (0.14 – 1.43)	0.23 (0.08 – 0.5)	-5.19	p < 0.001*
TVOC (ppm)	0.58 (0.36 – 1.03)	0.33 (0.1 – 0.43)	-6.30	p < 0.001*
UFP (pt/cm ³)	1283 (396.89 – 1378.16)	1964 (1831 – 1983.75)	-11.34	p < 0.001*
PM₁₀ (µg/m ³)	61.00 (50 – 72.5)	37.80 (29.3 – 51.00)	-6.96	p < 0.001*
PM_{2.5} (µg/m ³)	61.23 (48.7 – 72.00)	35.8 (35.1 – 45.2)	-8.90	p < 0.001*
THI (N/A)	20.80 (20.62-20.94)	22.28 (22.01 – 22.81)	-11.44	p < 0.001*

*significant at p < 0.001

N = 176

Table 6. Comparison of the prevalence of SBS between two groups

Variables	Prevalence of SBS N = 176 (100%)		χ^2	p
	Yes	No		
Building A n= 93	64 (68.8)	29 (31.2)	11.90	0.001*
Building n= 83	30 (36.1)	53 (63.9)		

*significant at p < 0.05

N = 176

Table 7. Association of SBS between two groups of IAQ level

Variables	Prevalence of SBS N = 176 (100%)		OR	95%CI
	Yes n = 94	No n =82		
High IAQ level (>20cfm/person)	50 (53.2)	64 (78.0)	3.13*	1.62 – 6.06
Low IAQ level (<20cfm/person)	44 (46.8)	18 (22.0)		

*OR significant at 95% CI > 1

N = 176

Table 8. Association between SBS and pollutant levels

Parameter	Parameter Category	SBS N = 176 (100%)		OR	95% CI
		Yes	No		
		n = 94	n =82		
CO₂	High	62 (66)	30 (36.6)	3.36*	1.81 – 6.24
	Low	32 (34)	52 (63.4)		
CO	High	44 (46.8)	24 (29.3)	2.13*	1.14 – 4.00
	Low	50 (53.2)	58 (70.3)		
TVOC	High	41 (43.6)	21 (25.6)	2.25*	1.18 – 4.27
	Low	53 (56.4)	61 (74.7)		
UFP	High	36 (38.3)	54 (58.7)	0.32	0.17 – 0.60
	Low	58 (61.7)	28 (41.3)		
PM₁₀	High	38 (40.4)	36 (43.9)	0.62	0.22 – 1.76
	Low	56 (59.6)	46 (56.1)		
PM_{2.5}	High	44 (46.8)	41 (50)	0.82	0.26 – 2.56
	Low	50 (53.2)	41 (50)		
THI	High	30 (31.9)	53 (64.6)	4.63*	2.45 – 8.76
	Low	64 (68.1)	29 (35.4)		

*OR significant at 95% CI > 1

N = 176

Table 9. Logistic Regression for SBS and Concentration of pollutants after controlling cofounders

Parameter	Parameter Category	SBS		OR (95% CI)	*OR (95% CI)
		N = 176 (100%)			
		Yes n = 94	No n =82		
CO ₂ (ppm)	High	62 (66)	30 (36.6)	3.36	2.19 ^a
	Low	32 (34)	52 (63.4)	(1.81-6.24)	(1.32-11.89)
CO(ppm)	High	44 (46.8)	24 (29.3)	2.13	0.68
	Low	50 (53.2)	58 (70.3)	(1.14-3.97)	(0.26-1.76)
TVOC (ppm)	High	41 (43.6)	21 (25.6)	2.25	0.63
	Low	53 (56.4)	61 (74.7)	(1.18-4.27)	(0.26-1.48)
THI (°C/RH %)	High	30 (31.9)	53 (64.6)	4.63	11.37 ^a
	Low	64 (68.1)	29 (35.4)	(2.45-8.76)	(1.35-16.19)

* Adjusted OR for age, medical condition, URTI, smoking, having pet at home, other medical problems.

^aOR significant at 95% CI > 1

N = 176



On the Essentials of Theoretical Education and Clinical Practice for Advanced Nursing

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Abstract

The author of the present paper, on the basis of her current experience and deep practice, has suggested seven essentials of theoretical education and clinical practice for advanced nursing, which are centered and documented the perspectives of the notions, talent training, responsibilities, development and forwardness of the advanced nursing further education and practice in the process of building up the harmonious society in China, while presented relevant strategies to ensure the program feasible of each essential.

Keywords: Essentials, Theoretical education, Clinical practice, Advanced nursing

1. Introduction

Nursing as a practice profession requires both practice experts and nurse scientists to expand the scientific basis for patient care. A series of theoretical education in nursing are designed to prepare nurses for the highest level of exercise and practice and scientific inquiry, which has great benefits for nurses specifically to prepare individuals for specialized nursing practice. Even more, individuals who acquire the the theoretical education and clinical practice for advanced nursing will seek to fill roles as educators and will use their considerable practice expertise to educate the next generation of nurses.

Some teaching strategies and learning principles will be incorporated into the curriculum for theoretical education and clinical practice for advanced nursing, as it relates to patient education. This preparation is in addition to that required for their area of specialized nursing practice or research in the case of the higher education.

2. Essentials of Theoretical Education and Clinical Practice for Advanced Nursing

The following essentials outline the curricular elements and competencies that must be present in programs conferring the theoretical education and clinical practice for advanced nursing, the trainees will be prepared for a variety of nursing practice roles (Zen Fengrui P29). The essentials delineated here address the foundational competencies that are core to all advanced nursing practice roles. However, the depth and focus of the core competencies will vary based on the particular role for which the trainee is preparing. For example, trainees preparing for organizational leadership or administrative roles will have increased depth in organizational and systems' leadership; those preparing for policy roles will have increased depth in health care policy; and those preparing for the roles such as nurse practitioners, clinical nurse specialists, nurse anesthetists, and nurse midwives, will have more specialized content in an area of advanced practice nursing.

Additionally, it is important to understand that the delineation of these competencies should not be interpreted to mean that a separate course for each of the essentials should be offered. Curricula will differ in emphases based on the particular specialties for which students are being prepared.

The essentials document outlines and defines the eight foundational essentials and provides some introductory comments on specialty competencies/content. The specialized content, as defined by specialty organizations, complements the areas of core content defined by the essentials and constitutes the major component of theoretical education and clinical practice for advanced nursing programs.

2.1 Essential I: Scientific Underpinnings for Practice

The practice in nursing provides the terminal academic preparation for nursing practice. The scientific underpinnings of

this education reflect the complexity of practice at the doctoral level and the rich heritage that is the conceptual foundation of nursing. The discipline of nursing is focused on: The principles and laws that govern the life-process, well-being, and optimal function of human beings, sick or well; The patterning of human behavior in interaction with the environment in normal life events and critical life situations; the nursing actions or processes by which positive changes in health status are affected; and the wholeness or health of human beings recognizing that they are in continuous interaction with their environments (Donaldson & Crowley, 1978). Preparation to address current and future practice issues requires a strong scientific foundation for practice. The scientific foundation of nursing practice has expanded and includes a focus on both the natural and social sciences. These sciences that provide a foundation for nursing practice include human biology, genomics, the science of therapeutics, the psychosocial sciences, as well as the science of complex organizational structures.

In addition, philosophical, ethical, and historical issues inherent in the development of science create a context for the application of the natural and social sciences. Nursing science also has created a significant body of knowledge to guide nursing practice and has expanded the scientific underpinnings of the discipline. Nursing science frames the development of middle range theories and concepts to guide nursing practice. Advances in the foundational and nursing sciences will occur continuously and nursing curricula must remain sensitive to emerging and new scientific findings to prepare the education and practice for advanced nursing for evolving clinical practice realities, which always carries on the goals to integrate nursing science with knowledge from ethics, the biophysical, psychosocial, analytical, and organizational sciences as the basis for the highest level of nursing practice, to use science-based theories and concepts to determine the nature and significance of health and health care delivery phenomena and health and health care delivery phenomena, and to develop and evaluate new practice approaches based on nursing theories and theories from other skills and clinical exercises.

2.2 Essential II: Clinical Scholarship and Analytical Methods for Evidence-Based Practice

Scholarship and research are the hallmarks of higher training education. Although basic research has been viewed as the first and most essential form of scholarly activity, an enlarged perspective of scholarship has emerged through alternative paradigms that involve more than discovery of new knowledge (Boyer, 1990). These paradigms recognize that (1) the scholarship of discovery and integration's reflects the investigative and synthesizing traditions of academic life.(Boyer, p. 21); (2) scholars give meaning to isolated facts and make connections across disciplines through the scholarship of integration; and (3) the scholar applies knowledge to solve a problem via the scholarship of application (referred to as the scholarship of practice in nursing). This application involves the translation of research into practice and the dissemination and integration of new knowledge, which are key activities of trainees of the theoretical education and clinical practice for advanced nursing. The scholarship of application expands the realm of knowledge beyond mere discovery and directs it toward humane ends. Nursing practice epitomizes the scholarship of application through its position where the sciences, human caring, and human needs meet and new understandings emerge.

Nurses have long recognized that scholarly nursing practice is characterized by the discovery of new phenomena and the application of new discoveries in increasingly complex practice situations, which is especially constructed and admitted in the nursing field of China. The integration of knowledge from diverse sources and across disciplines, and the application of knowledge to solve practice problems and improve health outcomes are only two of the many ways new phenomena and knowledge are generated other than through research. Research-focused doctoral programs in nursing are designed to prepare graduates with the research skills necessary for discovering new knowledge in the discipline. In contrast, the nurses trained with theoretical education and clinical practice for advanced nursing should engage more in advanced nursing practice, use analytic methods to critically appraise existing evidences to determine, implement the best facts for practice and population trends, evaluate quality improvement methodologies to promote safe, timely, effective, efficient, equitable, and patient-centered care, apply relevant findings to develop practice guidelines and improve practice and the practice environment. And disseminate findings from evidence-based practice and research to improve healthcare outcomes, which is vital for today China's public nursing care and health concern.

2.3 Essential III: Information Systems and Patient Care Technology for the Improvement and Transformation of Health Care

Those who are undergoing the theoretical education and clinical practice for advanced nursing are distinguished by their abilities to use information systems/technology to support and improve patient care and healthcare systems, and provide leadership within healthcare systems and/or academic settings. Knowledge and skills related to information systems/technology and patient care technology prepare them to apply new knowledge, manage individual and aggregate level information, and assess the efficacy of patient care technology appropriate to a specialized area of practice and care systems. Information systems provide a mechanism to apply budget and productivity tools, practice information systems and decision supports, and web-based learning or intervention tools to support and improve patient care.

2.4 Essential IV: Health Care Policy for Advocacy in Health Care

Health care policy--whether it is created through governmental actions, local decision making, or organizational standards--creates a framework that can facilitate or impede the delivery of health care services or the ability of the provider to engage in practice to address health care needs. Thus, engagement in the process of policy development is central to creating a health care system that meets the needs of its constituents. Political activism and a commitment to policy development are central elements of professional nursing practice. Health policy influences multiple care delivery issues, including health disparities, cultural sensitivity, ethics, the internationalization of health care concerns, access to care, quality of care, health care financing, and issues of equity and social justice in the delivery of health care.

As we know, each individual in the advanced nursing has the capacity to engage proactively in the development and implementation of health policy at all levels, including institutional, local, state, regional, federal, and international levels. Preparing graduates with the essential competencies to assume a help and a need in the development of health policy requires that the nurses have opportunities to contrast the major contextual factors and policy triggers that influence health policy-making at the various levels, such as critically analyze health policy proposals, health policies, and related issues from the perspective of consumers, nursing, other health professions, and other stakeholders in policy and public forums; influence policy makers through active participation on committees, boards, or task forces at the institutional, local, state, regional, national, and/or international levels to improve health care delivery and outcomes; educate and set up examples for others; advocate for the nursing profession within the policy, healthcare communities, social justice, equity, and ethical policies within all healthcare areas.

2.5 Essential V: Interprofessional Collaboration for Improving Patient and Population Health Outcomes

Today's complex, multi-tiered health care environment in the urban and rural areas in China depends on the contributions of highly skilled and knowledgeable individuals from multiple professions. In order to accomplish the perfect policy "Public Medical Care and Cure" for safe, timely, effective, efficient, equitable, and patient-centered care in harmonious China, healthcare professionals must function as highly collaborative teams and be fluid depending upon the patients' needs. Therefore, nurses have preparation in methods of effective teamspirit with the doctors and are prepared to play a central role in establishing interprofessional teams, participating in the work of the team, and assuming cooperative collectives of the team when appropriate to realize the ideals of employing effective communication and collaborative skills in the development and implementation of practice models, peer review, practice guidelines, health policy, standards of care, and/or other scholarly products(Cheng Jiae P77).

2.6 Essential VI: Clinical Prevention and Public Health for Improving the Nation's Health

Clinical prevention is defined as health promotion and risk reduction/illness prevention for individuals and families. Population health is defined to include aggregate, community, environmental/occupational, and cultural/socioeconomic dimensions of health. Aggregates are groups of individuals defined by a shared characteristic such as gender, diagnosis, or age. These framing definitions are endorsed by representatives of multiple disciplines including nursing (Allan et al., 2004). The implementation of clinical prevention and population health activities is central to achieving the national goal of improving the health status of the population of China. In an effort to address this national goal, it appears very important to support the transformation of clinical education by creating an objective to increase the proportion of schools of medicine, nursing, and other health professionals that have a basic curriculum that includes the core competencies in health promotion and disease prevention (Allan et al., 2004). Nurses trained in the theoretical education and clinical practice for advanced nursing would easily engage in leadership to integrate and institutionalize evidence-based clinical prevention and population health services for individuals, aggregates, and populations. Consistent with these national calls of building up a harmonious society for action and with the longstanding focus on health promotion and disease prevention in nursing curricula and roles, they have a foundation in clinical prevention and population health. This foundation will enable the trained nurses to analyze epidemiological, biostatistical, occupational, and environmental data in the development, implementation, and evaluation of clinical prevention and population health.

2.7 Essential VII: Advanced Nursing Practice

The increased knowledge and sophistication of healthcare has resulted in the growth of specialization in nursing in order to ensure competence in these highly complex areas of practice. The reality of the growth of specialization in nursing practice is that no individual can master all advanced roles and the requisite knowledge for enacting these roles. Theoretical education and clinical practice for advanced nursing surely provide preparation within distinct specialties that require expertise, advanced knowledge, and mastery in one area of nursing practice (Huang Jinyue P16). The relative nurse is prepared to practice in an area of specialization within the larger domain of nursing. Indeed, this distinctive specialization is a hallmark of the trained nurses. Such programs provide learning experiences that are based in a variety of patient care settings, such as hospitals, long-term care settings, home health, and/or community settings. These learning experiences should be integrated throughout the program of study, to provide additional practice

experiences beyond those acquired in a baccalaureate nursing program. These experiential opportunities should be sufficient to inform practice decisions and understand the patient care consequences of decisions. Because a variety of differentiated roles and positions may be held by the trainees, role preparation for specialty nursing practice, including legal and regulatory issues, is part of every program's curricula, such as how to conduct a comprehensive and systematic assessment of health and illness parameters in complex situations, incorporating diverse and culturally sensitive approaches; how to design, implement, and evaluate therapeutic interventions based on nursing science and other sciences; how to develop and sustain therapeutic relationships and partnerships with patients (individual, family or group) and other professionals to facilitate optimal care and patient outcomes; and how to demonstrate advanced levels of clinical judgment, systems thinking, and fiscal issues.

3. Conclusion

Analyzing the essentials of theoretical education and clinical practice just presentign the focus on advanced nursing practice, on expanding responsibility and accountability in the care and management of individuals and families, and on carrying on the socialist medical spirits in the harmonious construction of China. By virtue of this direct care focus, the nurses, developing additional competencies in direct practice and in the guidance and coaching of individuals and families through developmental, health-illness, and situational transitions, working with diverse stakeholders for inter- or intra-organizational achievement of health-related organizational or public policy goals; and, designing patient-centered care delivery systems or policy level delivery models, must bring about great efforts and benefits for modern China.

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Health Risk Implications of High Background Radiation

Dose Rate in Kampung Sungai Durian, Kinta District, Perak, Malaysia

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Abstract

Terrestrial gamma radiation dose rate measurement has been conducted around Kampung Sungai Durian (Kg. Sg. Durian), Kinta District, Malaysia. The mean value of outdoor terrestrial gamma radiation (TGR) dose rate and indoor in the area are 458 nGy h^{-1} and 286 nGy h^{-1} , respectively. It causes fatal cancer risk of about 9.90×10^{-5} per year to each individual. The activity concentrations of ^{238}U , ^{232}Th and ^{40}K in soil samples were measured by gamma spectrometry. It ranged from 32 Bq kg^{-1} to 554 Bq kg^{-1} , 64 Bq kg^{-1} to 1806 Bq kg^{-1} and 21 Bq kg^{-1} to 2522 Bq kg^{-1} , respectively. Activity concentration of uranium and thorium ranged from $<0.49 \text{ mBq kg}^{-1}$ to $996.38 \text{ mBq kg}^{-1}$, and $<0.21 \text{ mBq kg}^{-1}$ to 1274 mBq kg^{-1} in plant samples respectively, which cause fatal cancer risk of about 4.7×10^{-8} per year. The activity concentration in water samples ranged from $<0.24 \text{ mBq L}^{-1}$ to 31.96 mBq L^{-1} , and $<0.21 \text{ mBq L}^{-1}$ to 5.69 mBq L^{-1} for uranium and thorium respectively. It causes fatal cancer risk of 2.70×10^{-8} per year. The terrestrial gamma radiation, activity concentration from soil, leafy plants and water contribute fatal cancer risk per capita of 9.91×10^{-5} per year

Keywords: Gamma radiation, Health risk, Dose assessment

1. Introduction

A radiation survey was conducted throughout the State of Perak, Malaysia, to assess the environmental impact of *amang* deposits (*amang* being the local name for tin tailings that is a tin mining by product) (to be published). As a result of the survey, areas around Kg. Sg. Durian in the Kinta District of Perak, was identified as having the highest background radiation in the state. In the context of determining the significance of a critical pathway, an assessment on health physics implications of the high radiation dose in the area was carried out. The results obtained for this area can be used to determine the natural radiological status of Perak state and then be used as one of the baseline data in the assessments of the environmental impact of *amang* deposits in Perak State.

The concentration of uranium and thorium in high radiation area is associated with soil originating from igneous rocks (Kogan et al., 1969). Background terrestrial gamma radiation dose rate is influenced by soil type, geological feature and geographical condition (Florou & Kritidis, 1992; Ramli, 1997).

The world average values for terrestrial gamma radiation dose rate outdoor and indoor are 57 nGy h⁻¹ and 75 nGy h⁻¹ respectively (UNSCEAR, 2000). The highest concentrations of radioactive minerals in soil are found in Brazil and India (Radhakrishna et al., 1993). The abnormally high terrestrial gamma radiation in Brazil is due to the presence of monazite sand along the Atlantic coast and volcanic intrusion in the state of Minas Gerais. Dose rate in this area ranged up to 2.1 µGy h⁻¹ (Malanca et al., 1993; Roser and Cullen, 1964; the Brazilian Academy of Science, 1977).

The study area as shown in figure 1 is located between the latitudes 4°15' to 4°21' North, and the longitudes 101°00' to 101°04' East (Director of National Mapping Malaysia, 1996). The area is situated in the South East of Kinta district, Perak, Malaysia. The climate is tropical with temperature between 28°C to 32°C. The area is 40 m to 70 m above sea level. It has a population of 1 643, within an area of 71 km². Kampung Sungai Durian is underlying by two geological formations (Director General of Geological Survey, 1985) (i) Carboniferous, with limestone and sedimentary rocks in the western part, and (ii) Acid undifferentiated with igneous acidic rocks, these are mostly granitic rocks and are found in the eastern part. The soil types present according to FAO/UNESCO classification (Director General of Agriculture Peninsular Malaysia, 1973) are dystic histosols (peat), gleyic acrisols (*Lunas*), haplic acrisols (*Rengam*), ferric acrisols (*Bukit Temiang*) and disturbed land (urban and mining land).

2. Materials and Methods

The samples were taken randomly along the longitudinal and latitudinal grid line. Figure 2 shows Kg Sg Durian with its soil types and geological background and where the samples were taken. The measurement of terrestrial gamma radiation dose rate was done from September 2004 to April 2006.

2.1 Terrestrial gamma radiation (TGR) dose rates

The measurements were carried 1 m above the ground. The detector used was model 19, micro roentgen (µR) meter, manufactured by Ludlum, USA. It uses 1" × 1" (2.54 × 2.54 cm²) sodium iodide (NaI) crystal doped with thallium (TI). The instrument was calibrated by Malaysia Nuclear Agency; it is a Secondary Standard Dosimetry Laboratory (SSDL). The measurement indoor in concrete houses and outdoor for TGR dose rates were done on the same sites. The terrestrial gamma radiation dose rate measured from 270 outdoor locations and 70 indoor locations. For indoor measurement was done in living room, with 1 m from the surface and 1.5 m from the wall. Figure 3 shows a correlation between indoor and outdoor measurements, the linear correlation is good with R = 0.98. The Intercept of 114 on the y-axis indicates the presence of intrinsic gamma radiation from the building materials.

2.2 Soil, water and plant samples preparation

Twenty eight of soil samples were collected about 15 cm depth from the soil surface. The sample were dried by placing them in an oven at 110°C for 24 hours then crushed and ground to fine powder by using a grinding mill (Herzog-D4500/type HSM 100, No. 62B/529, German-made). The samples were sieved by passing through a 200 mm test sieve/150 microns to be homogenized in size. Samples were placed and sealed in marinelli beaker for at least one month, before gamma spectrometric analysis, to ensure secular equilibrium (Mollah et al., 1987; Ibrahim et al., 1993).

Twelve of water samples were collected from ground water, fish ponds, stream, and river. Two liters of water from each sampling point was taken and filtered using 4.5 mm pore size filter paper to eliminate impurities from soil, plant, sandstone, and other materials. 2 ml nitrite acid (HNO₃) was added to a liter of the sample, so that the water pH became less than 2 (IAEA, 1989). Water samples were evaporated by boiling to a volume of about 20 ml. continuing evaporated by boiling in a polyethylene vial to a volume about 2 ml for NAA analysis.

Fourteen of plant samples were collected from moss, tapioca, oil palm, banana, jack fruit, rambutan and water spinach. Distilled water was used to clean and remove soil contaminants to the plant samples. The samples were dried by placing them in an oven at 60°C for 24 h. Their dry weights were determined. The samples were turned into ashes in a furnace at 450°C for 24 h. The ashes were powdered and homogenized to a 0.2 g sample and packed in a polyethylene vial for NAA analysis

2.3 Samples analysis

Soil samples were prepared to determine ^{236}U , ^{232}Th and ^{40}K concentration by using gamma ray spectrometry with a coaxial high purity germanium (HPGe) detector. The radionuclide considered was determined the peak at ^{212}Pb (239 keV), ^{208}Tl (583 keV) and ^{228}Ac (911 keV) for ^{232}Th , the peak at ^{214}Pb (352 keV) and ^{214}Bi (609 keV) for the ^{238}U and the peak at 1 460 keV for ^{40}K . The standard samples IAEA SL-14 and IAEA SL-2 were used as reference materials and were mixed with SiO_2 in Marinelli beakers. For calibration, the IAEA reference materials ^{133}Ba , ^{22}Na , ^{137}Cs , ^{60}Co and ^{152}Eu , were used. The minimum detectable activity for counting time 10 800 s were estimated to be 4 Bq kg^{-1} , 9 Bq kg^{-1} and 19 Bq kg^{-1} for ^{238}U , ^{232}Th and ^{40}K respectively.

Plants and water samples were prepared to determine ^{238}U and ^{232}Th concentration by using NAA method in the TRIGA Nuclear Reactor available at Malaysian Nuclear Agency. Quality assurance and control procedure used have been described elsewhere Ramli et al., (2005).

2.4 Estimation of health risk.

To estimate the fatal cancer risk to an individual, \hat{R}_i . The equation below is used (Alvarez, 1997):

$$\hat{R}_i = a \sum H_E \text{ or } \hat{R}_i = a (H_{E_{in}} + H_{E_{out}}), \quad (1)$$

Where a is the risk factor, that uses the value of 0.05 per sievert (public) for terrestrial gamma radiation dose (ICRP 1990), $H_{E_{in}}$ and $H_{E_{out}}$ are effective dose rates indoor and outdoor respectively. Dose factor for intake rate is $4.50 \times 10^{-8} \text{ Sv Bq}^{-1}$ and $2.30 \times 10^{-7} \text{ Sv Bq}^{-1}$ for ^{238}U and ^{232}Th respectively for adult members of the public (UNSCEAR 2000).

3. Results and Discussion

The terrestrial gamma radiation dose rate outdoor locations, ranged from 78 nGy h^{-1} to $1\,039 \text{ nGy h}^{-1}$ with the mean value of $(458 \pm 295) \text{ nGy h}^{-1}$, Figure 4 shows the isodose of terrestrial gamma radiation dose rate at Kg Sg Durian, Perak. This value is about 9 times the world average value of 57 nGy h^{-1} and 5 times the Malaysian average value of 92 nGy h^{-1} (UNSCEAR 2000). For indoor values, TGR dose rates were measured at 70 locations inside concrete houses, the value obtained ranged from 195 nGy h^{-1} to 390 nGy h^{-1} . For all data, using the indoor mean value was estimated to be $(286 \pm 95) \text{ nGy h}^{-1}$. The corresponding annual effective dose equivalent average for TGR dose rates indoor and outdoor are $(1.39 \pm 0.72) \text{ mSv}$ and $(0.59 \pm 0.21) \text{ mSv}$ respectively. The TGR annual effective equivalent dose for this area is 1.98 mSv that is 4 times higher than the reference value of 0.48 mSv (UNSCEAR 2000). This value, by using equation (1) cause fatal cancer risk of about 9.90×10^{-5} per year to each individual in the area.

Table 1 shows the value of TGR dose rates from different soil types and geological features in the study area. The highest TGR dose rate outdoor of $1\,039 \text{ nGy h}^{-1}$ were found at locations with soil type haplic acrisols - ferric acrisols (*Rengam Bukit Temiang*) that originate mainly from granitic rock. The annual effective dose in the area with 100% outdoor occupancy is 6.37 mSv . This value will cause fatal cancer risk of about 3.19×10^{-4} per year.

The gamma dose rates at soil sampling location involving different soil types and geological background are given in Table 2. The activity concentration for the 28 soil samples ranged of 32 Bq kg^{-1} to 554 Bq kg^{-1} , the mean value is $(196 \pm 43) \text{ Bq kg}^{-1}$ for ^{238}U ; 69 Bq kg^{-1} to $1\,806 \text{ Bq kg}^{-1}$, with mean value of $(628 \pm 169) \text{ Bq kg}^{-1}$ for ^{232}Th ; and 21 Bq kg^{-1} to $2\,522 \text{ Bq kg}^{-1}$, with mean value of $(475 \pm 89) \text{ Bq kg}^{-1}$ for ^{40}K . These values are higher than the world average as given by UNSCEAR. The most abundant radionuclide was thorium (^{232}Th). Thorium to uranium ratio is and thorium to potassium is 3.20 and 1.32 respectively, they are higher than reference value. The highest level of concentration was found in haplic-ferric acrisols (*Rengam Bukit Temiang*) soil type which originates mainly from granitic rock.

Table 3 shows the activity concentration of uranium and thorium in plants. The mean activity concentration of uranium and thorium in oil palms sample are $(64 \pm 41) \text{ mBq kg}^{-1}$ and $(60 \pm 33) \text{ mBq kg}^{-1}$ respectively. The mean activity concentration of uranium and thorium in leafy vegetable samples are $(30 \pm 13) \text{ mBq kg}^{-1}$ and $(19 \pm 12) \text{ mBq kg}^{-1}$, respectively. The mean activity concentration of uranium and thorium in fruits samples are $(3.7 \pm 1.8) \text{ mBq kg}^{-1}$ and $(2.1 \pm 1.5) \text{ mBq kg}^{-1}$ respectively. Those values are higher than the reference values for uranium and thorium in leafy vegetables, fruit and grain (UNSCEAR 2000). If the annual consumption rates of oil palm, leafy vegetables and fruit respectively are used, which are 30 kg, 60 kg, and 170 kg, respectively, the resulting annual intake for uranium and thorium will be 1.9 Bq and 1.8 Bq in oil palm samples, 1.8 Bq and 1.1 Bq in leafy vegetables, and 0.6 Bq and 0.3 Bq in fruits, respectively. This will contribute to annual effective doses of $0.19 \text{ }\mu\text{Sv}$ and $0.74 \text{ }\mu\text{Sv}$ for uranium and thorium, respectively. The plant annual effective dose for uranium and thorium of $0.93 \text{ }\mu\text{Sv}$ is higher than the reference values of $0.63 \text{ }\mu\text{Sv}$ for adult (UNSCEAR 2000). The annual intake due to the consumption of plant is low. Activity concentration in plant contributes only insignificant small risk towards fatal cancer that is 4.7×10^{-8} per year. Moss samples were collected for comparing uranium and thorium concentration with plant samples. Moss is a nonvascular plant and is a good absorber of uranium and thorium compared to other plants. Uranium activity in moss samples varies from 355 mBq kg^{-1} to 996 mBq kg^{-1} , and thorium activity varies from 464 mBq kg^{-1} to 1274 mBq kg^{-1} , with the mean value of $(599 \pm 346) \text{ mBq kg}^{-1}$ and $(820 \pm 413) \text{ mBq kg}^{-1}$ for uranium and thorium, respectively. These values indicated that

moss is a more efficient absorber of uranium and thorium compared to oil palms, leafy vegetables and the fruit, as similarly reported by Say and Whitton (1983), Mouvet (1984), Tremolieres et al. (1994) and Ramli (2005)

The concentrations of uranium and thorium in water samples are shown in Table 4. The mean activity concentration of uranium and thorium in all water samples is (9.6 ± 7.0) mBq l⁻¹ and (2.5 ± 1.6) mBq l⁻¹ respectively. These values are higher than the reference values of drinking water in the word of 1 mBq l⁻¹ and 0.05 mBq l⁻¹ for uranium and thorium respectively (UNSCEAR, 2000). The estimated annual intake of radioactivity due to the consumption of water is calculated using water ingestion rate of 500 l y⁻¹ (UNSCEAR 2000). The value will contribute to annual intake of 4.8 Bq and 1.3 Bq for uranium and thorium, correspondingly. The annual effective dose for water sample is 0.21 µSv for uranium and 0.33 µSv for thorium. It will cause fatal cancer risk of about 2.70×10^{-8} per year.

4. Conclusions

The mean natural terrestrial gamma radiation dose rate in Kg. Sg. Durian is about 5 times higher than the Malaysian average and about 9 times higher than the world average value (UNSCEAR 2000). The population does receive relatively higher background TGR exposures, however the increase in fatal cancer risk of about 9.90×10^{-5} y⁻¹ per capita is not high enough to cause for alarm.

The results indicate that the radionuclide contribution to annual effective dose rate from plant and water are higher than the reference values provided by UNSCEAR, nevertheless their contribution of 4.7×10^{-8} y⁻¹ for plant and 2.70×10^{-8} y⁻¹ for water per capita towards fatal cancer risk is relatively insignificant from health physics point of view. It might be a good policy to institute basic and simple radiological health monitoring for the affected area but probably nothing more than that.

The results obtained indicate that the most critical natural radiation area in Perak does not pose significant health physics risk, therefore the overall natural radiological status of Perak state is not out of norm.

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Table 1. Terrestrial gamma radiation dose rate from different soil types and geological background around Kg Sg Durian

Soil type and Geology features	N	Mean	Std Dev	95% Confidence Interval for Mean		Min	Max
				Lower Bound	Upper Bound		
<i>Soil types</i>							
Disturbed Land	32	266	192	197	335	104	780
Gleyic Acrisols	41	300	277	213	388	91	909
Dystric Histosols	19	256	159	179	332	117	747
Haplic Acrisols, Ferric Acrisols	178	550	283	508	592	78	1 039
<i>Geological background</i>							
Acid Undifferentiated (granitoid)	194	530	281	490	570	117	1 039
Carboniferous	76	274	244	218	329	78	974
<i>Overlayer between soil type and geological background</i>							
Disturbed Land and Granitoid	9	316	187	172	460	169	780
Gleyic Acrisols and Granitoid	7	473	353	147	800	130	909
Dystric Histosols and Granitoid	19	256	159	179	332	117	747
Haplic Acrisols, Ferric Acrisols and Granitoid	159	577	271	535	620	117	1 039
Disturbed Land and Carboniferous	23	247	194	163	331	104	747
Gleyic Acrisols and Carboniferous	34	265	251	177	352	91	909
Haplic Acrisols, Ferric Acrisols and Carboniferous	19	322	288	183	461	78	974
<hr/>							
Present study		458	295	422	493	78	1 039
Malaysian average (UNSCEAR 2000)		92					
World median (UNSCEAR 2000)		57					

Table 2. Concentration of uranium and thorium in soil samples collected from different soil types and geological background around Kg. Sg. Durian, Perak, Malaysia.

Soil Samples	Soil Type (FAO/UNESCO)	Geology	Concentration (Bq kg ⁻¹) ± σ			TGR dose rate at the point sampling (nGy h ⁻¹)
			²³⁸ U	²³² Th	⁴⁰ K	
S1	Haplic-Ferric Acrisols	Acid Undifferentiated	174 ± 39	138 ± 32	210 ± 21	780
S3	Disturbed Land	Carboniferous	87 ± 7	160 ± 27	356 ± 123	157
S4	Haplic-Ferric Acrisols	Acid Undifferentiated	295 ± 24	1 286 ± 187	177 ± 17	974
S5	Gleyic Acrisols	Carboniferous	72 ± 5	126 ± 11	85 ± 5	130
S6	Disturbed Land	Acid Undifferentiated	197 ± 19	1 298 ± 212	210 ± 37	1039
S7	Haplic-Ferric Acrisols	Acid Undifferentiated	181 ± 15	732 ± 35	226 ± 41	611
S8	Haplic-Ferric Acrisols	Acid Undifferentiated	426 ± 24	399 ± 82	1940 ± 177	812
S9	Haplic-Ferric Acrisols	Acid Undifferentiated	554 ± 87	1 806 ± 276	1014 ± 137	1039
S2	Haplic-Ferric Acrisols	Carboniferous	137 ± 12	729 ± 78	414 ± 69	487
S10	Haplic-Ferric Acrisols	Acid Undifferentiated	267 ± 41	203 ± 23	101 ± 19	780
S11	Gleyic Acrisols	Carboniferous	384 ± 67	880 ± 29	413 ± 48	909
S12	Dystric Hystosols	Acid Undifferentiated	44 ± 5	69 ± 9	95 ± 14	117
S13	Haplic-Ferric Acrisols	Acid Undifferentiated	167 ± 21	1 209 ± 216	147 ± 31	974
S14	Haplic-Ferric Acrisols	Carboniferous	355 ± 50	707 ± 29	2 522 ± 101	747
S15	Dystric Hystosols	Acid Undifferentiated	75 ± 6	153 ± 21	237 ± 24	156
S16	Gleyic Acrisols	Carboniferous	255 ± 31	812 ± 121	522 ± 54	650
S17	Gleyic Acrisols	Acid Undifferentiated	248 ± 23	244 ± 38	1 539 ± 203	325
S18	Dystric Hystosols	Acid Undifferentiated	79 ± 6	142 ± 23	105 ± 4	143
S19	Disturbed Land	Carboniferous	60 ± 7	97 ± 13	132 ± 28	148
S20	Haplic-Ferric Acrisols	Acid Undifferentiated	225 ± 27	1 400 ± 154	486 ± 49	1039
S21	Haplic-Ferric Acrisols	Acid Undifferentiated	394 ± 19	1 629 ± 156	631 ± 93	1039
S22	Gleyic Acrisols	Acid Undifferentiated	233 ± 35	1 037 ± 78	674 ± 51	909
S23	Gleyic Acrisols	Carboniferous	52 ± 7	83 ± 12	97 ± 14	104
S24	Gleyic Acrisols	Carboniferous	38 ± 8	95 ± 13	85 ± 11	117
S25	Gleyic Acrisols	Carboniferous	32 ± 9	78 ± 23	21 ± 18	104
S26	Gleyic Acrisols	Carboniferous	61 ± 5	123 ± 18	78 ± 8	130
S27	Haplic-Ferric Acrisols	Acid Undifferentiated	308 ± 25	1 752 ± 216	326 ± 30	974
S28	Disturbed Land	Carboniferous	90 ± 9	193 ± 19	451 ± 87	169
Present study mean			196 ± 43	628 ± 169	475 ± 89	458 ± 295
Malaysia average (UNSCEAR, 2000)			66 (49 - 86)	82 (63 - 110)	310 (170 - 430)	92 (55 - 130)
World median (UNSCEAR, 2000)			35 (16 - 110)	30 (11 - 64)	400 (140 - 850)	57 (18 - 93)

Table 3. Concentration of uranium and thorium in plant samples (dry weight)

Plant Samples	Plant	Scientific name	Concentration (mBq kg ⁻¹)		Th to U ratio	TGR dose rate at the sampling point (nGy h ⁻¹)
			Uranium	Thorium		
P 1	Moss	<i>funaria hygrometrica</i>	355.21	464.48	1.31	156
P 2	Moss	<i>funaria hygrometrica</i>	446.91	722.16	1.62	780
P 3	Moss	<i>funaria hygrometrica</i>	996.38	1 274.24	1.28	1 039
P 4	Oil Palm (seed)	<i>Elaeis guineensis</i>	17.23	50.99	2.96	325
P 5	Oil Palm (seed)	<i>Elaeis guineensis</i>	95.75	73.47	0.77	974
P 6	Oil Palm (seed)	<i>Elaeis guineensis</i>	79.61	55.27	0.69	974
P 7	Tapioca (leafy)	<i>Manihot esculenta</i>	44.81	36.95	0.82	909
P 8	Tapioca (leafy)	<i>Manihot esculenta</i>	36.02	18.88	0.52	487
P 9	Tapioca (leafy)	<i>Manihot esculenta</i>	25.78	11.51	0.45	143
P10	Water spinach (leafy)	<i>Ipomoea aquatici</i>	13.28	8.96	0.67	117
P11	Banana (fruit)	<i>Musa sapientum</i>	< 0.49	< 0.21	-	130
P12	Rambotan (fruit)	<i>Nephelium lappaceum</i>	2.80	1.25	0.45	650
P13	Jack fruit (fruit)	<i>Artocarpus heterophyllus</i>	5.44	4.26	0.78	812
P14	Papaya (fruit)	<i>Carica papaya</i>	6.22	2.33	0.37	974
Reference value (UNSCEAR, 2000)						
Root vegetables and fruits			3	0.5	0.17	
Leafy vegetables			20	15	0.75	
Grain product			20	3	0.15	

Table 4. Specific activity of uranium and thorium in water samples

Samples	Water Sources	Specific Concentration (mBq L ⁻¹)		Th to U ratio	TGR dose rate close to the sampling point (nGy h ⁻¹)
		Uranium	Thorium		
W1	Tumboh River	7.05	1.34	0.19	130
W2	Tumboh River	4.59	2.51	0.55	909
W3	Tumboh River	1.39	< 0.21	-	104
W4	Pond	6.96	3.54	0.51	325
W5	Pond	16.25	0.62	0.04	130
W6	Ground water	< 0.24	< 0.21	-	974
W7	River	2.36	1.70	0.72	1039
W8	pond	16.16	3.69	0.23	117
W9	Ground water	31.96	5.69	0.18	143
W10	Pond	1.18	0.72	0.61	1039
W11	Ground water	8.56	3.22	0.38	487
W12	Stream	9.62	2.54	0.26	974
Reference value					
River, China (IAEA, 2005)		21.61	1.26		
Surface water, Japan (IAEA, 2005)		0.31	0.01		
Central Poland (Pietrzak-Flis, 2001)		8.32	0.02		
Ground water dug well, Finland (IAEA, 2005)		<0.12-446.89	<0.08-6.11		

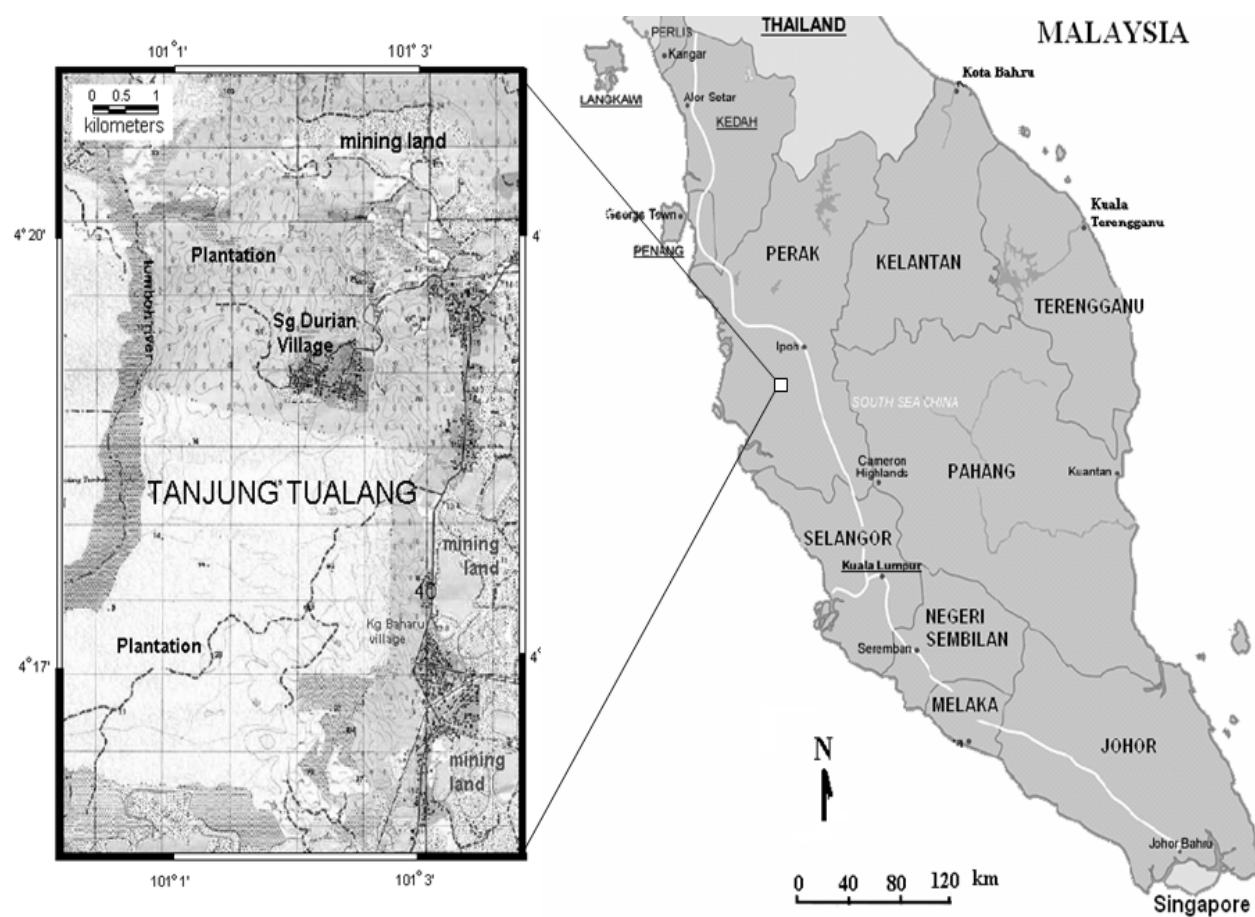


Figure 1. Study location at Kg Sg Durian, Malaysia

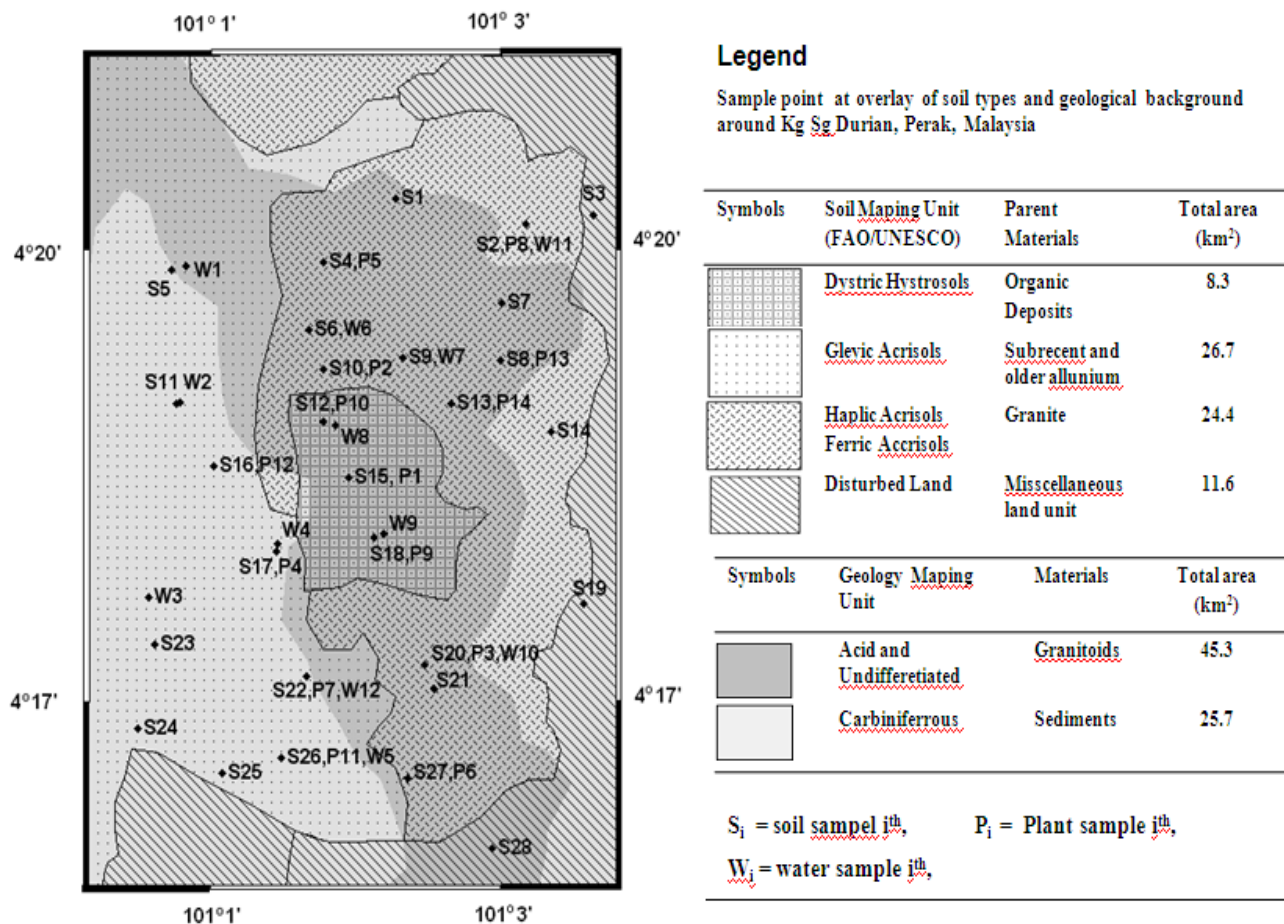


Figure 2. Sample point at overlay of soil types and geological backgrounds around Kg. Sg. Durian

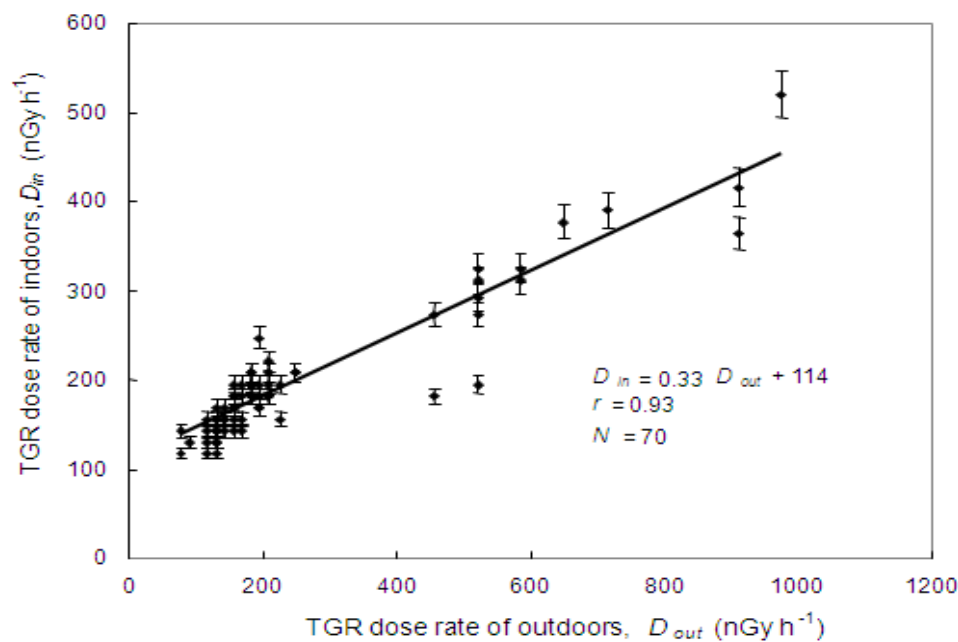


Figure 3. Correlation between Terrestrial Gamma Radiation (TGR) dose rates outdoor and indoor

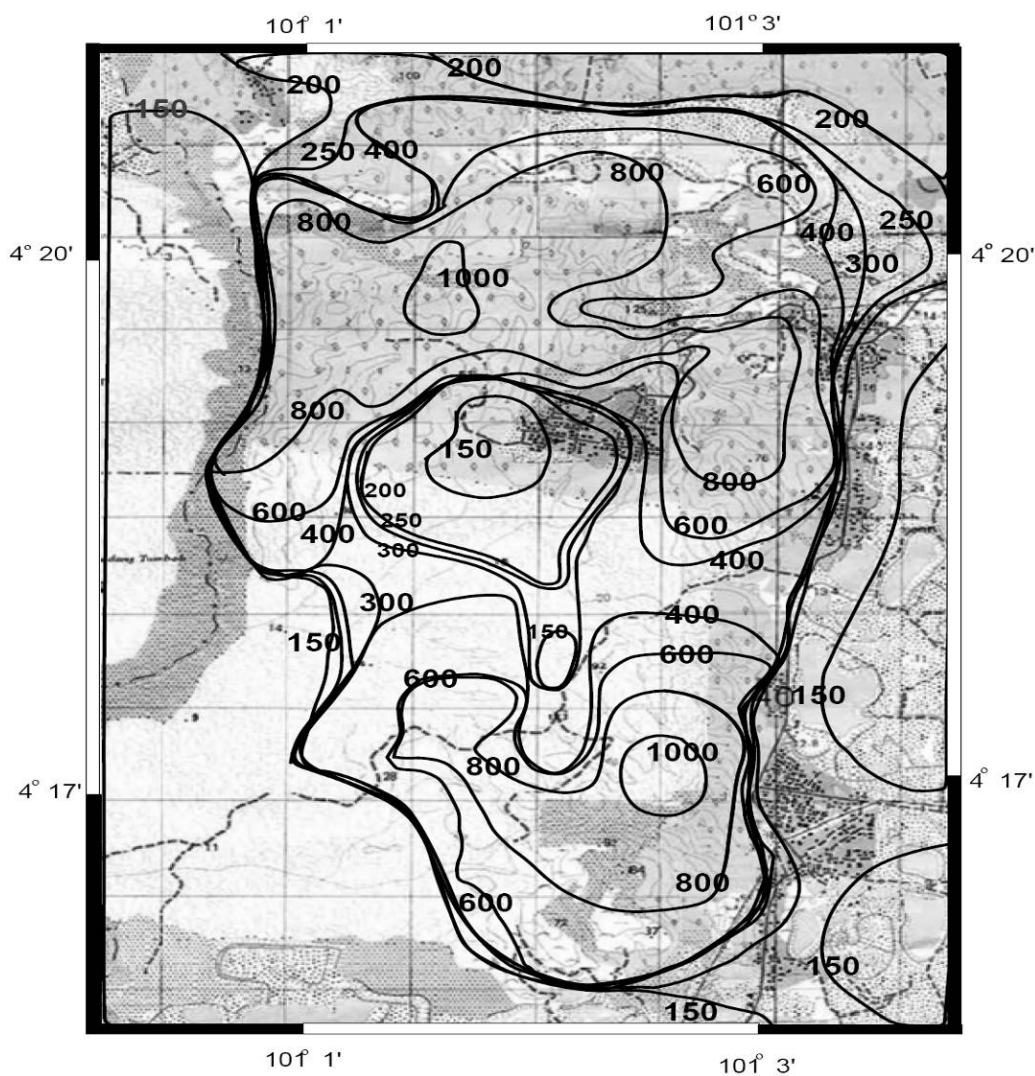


Figure 4. Isodose map of TGR dose rate around Kg. Sg. Durian, Perak. The dose rate unit is in nGy h^{-1}



Chromosome 17 Aberration of Oral Squamous Cell Carcinoma in Malaysia

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Abstract

In most tumours including Oral squamous cell carcinoma (SCC), acquisition of genetic instability is an essential step during carcinogenesis that involves generalized increased rate of errors during DNA replication, and defective repair of DNA. The genomic change results in numerical and structural chromosomal alterations, particularly in chromosomes 3, 9, 11 and 17. Chromosome 17 abnormality was chosen in my study because it shown strong correlation with neoplastic development and progression. In my study, twenty Oral SCC archival blocks were selected retrospectively from two referred Malaysian oral cancer centres. Histopathological findings were prior diagnosed by experienced Oral Pathologist, then Fluorescent in-situ Hybridization (FISH) technique was conducted subsequently by using specific probe of chromosome 17 in these oral SCC cases. In this study, the numerical aberration of chromosome 17 by FISH method in oral SCC in apparently normal tissues was evaluated. In this study, normal control cases showed $67.8 \pm 11\%$ cells of disomic signals in their nuclei, whereas the numerical aberration of chromosome 17 is frequent demonstrated in oral SCC (17/20, 85%) cases. In hence, FISH can be used as a possible prognostic marker for the degree of genomic instability and aneuploidy in excised specimens of oral SCC containing invasive cancer in Malaysia.

Keywords: Aneuploidy, Carcinogenesis, Chromosome, Fluorescent in-situ Hybridization, Oral squamous cell carcinoma

1. Introduction

Oral SCC is the sixth most common malignancy in developed countries accounting for 3% of all malignancies, (Joanna and Zakrzewska, 1999) but third in the developing countries. (Parkin et al., 1988) In Malaysia, oral cancer is the sixteenth most common cancer for female and twenty-one for male of overall cancer incidence per 1,000,000 populations in the year of 2002, according to the governance manual of National Cancer Registry. (Lim, 2002) Despite that, the most common form of oral cancer is oral SCC in Malaysia. (Ng and Siar, 1997). The acquisition of genetic instability is an essential step during carcinogenesis. In most tumours, including oral SCCs, such a genomic change results in numerical and structural chromosomal alteration. A high frequency of chromosome 17 abnormality has been reported in some human such as breast carcinoma, (Marta et al., 2005) colon carcinoma, (Petra et al., 2002) and bladder

carcinoma. (Fadl-Elmula, 2005) Chromosome 17 abnormality has been shown to have a strong correlation with neoplastic development and progression. (Fadl-Elmula, 2005; Naoko et al., 2003) FISH can be used as possible prognostic markers for the degree of genomic instability and aneuploidy in excised specimens of oral SCC containing invasive cancer. In this study, the numerical aberrations of chromosome 17 by FISH method in oral SCC were evaluated.

2. Materials and methods

2.1 Sample collection

The samples of 20 oral SCC cases were retrieved from the archives of two referred oral cancer centres in Malaysia, namely the Department of Oral Pathology, Oral Medicine & Periodontology, Faculty of Dentistry, University of Malaya, and the Unit of Stomatology, Institute for Medical Research, Kuala Lumpur, Malaysia. All cases were representative specimens of the free resection margins of oral mucosa of oral SCC patients. 5 normal controls from mucosal specimens of non oral cancer patients were also obtained for this study as a comparative study.

2.2 Histological grading

For all cases, 4 µm thick paraffinized sections were stained with Haematoxyline & Eosin stain for detailed histological examination. Histopathological diagnosis of SCC was verified by an experienced Oral Pathologist according to the classification of the World Health Organization (WHO). (Pinborg et al., 1997)

2.3 FISH analysis

A directly labeled probe for the α satellite probe specific for centromeric region of chromosome 17 (Fluorescein labelled CEP-17; VYSIS, USA) were applied to 4 µm thick paraffinized sections of all cases, as well as reagents necessary for hybridization were purchased. Color hybridization of Fluorescein Isothiocyanate (FITC) was performed using a supplement probe kit (VYSIS) by following the manufacturer's instructions.

2.4 Analysis of chromosome copy number

Areas for analysis were selected by the pathologist by comparing hybridized slides to a corresponding H&E stained section. The hybridized signals appear as small spots since the region of a chromosome occupies only a small region of the interphase nucleus. At least 200 nuclei were scored using a 100X objective in each defined histological area, and each nucleus was assessed for the chromosome copy number. Chromosome polysomy was defined as the fraction of the cells demonstrating three or more signals in each nucleus.

2.5 Evaluation of FISH

Evaluation of the preparations was performed by counting 200 nuclei per slide, according to criteria described before (Soder et al., 1995). Normal control from mucosal specimen of non tumor patients were obtained, yielding disomic hybridization signals. For the tumor specimens under study, a significant deviation from the disomy observed in the control hybridization required a percentage of cells with the respective number of FISH signals which was greater than the mean+2SD (standard deviation) of the controls.

For chromosome 17 aneusomy (Table 1), the resulting cut-off value for monosomy was set at 55% ($29+2 \times 12.8$) therefore, when the cell numbers with one signal in nucleus was above 55% it was evaluated as monosomy 17. On the other hand, polysomy 17 were considered when cell numbers with 3 or 4 signals in nucleus above value of 7% ($3.2+2 \times 1.8$). Chromosomes were designated as polysomic (and tumour polyploidy) if more than three chromosome signals/cell were counted.

<<Table 1>>

2.6 Image analysis

The number of hybridization signals was determined by observing 200 nuclei per slide under the objective power of 100X, by using a Nikon fluorescent microscope. Images for documentation were then captured by using a photometrics cooled CCD camera and processed by Image-Pro Express version 4.01.

2.7 Interpretation

Normal: Disomy, when nuclei with 3 or more signals were not observed for 1 or both chromosomes.

Abnormal: Aneusomy, when multiple nuclei with 3 or more signals were observed for 1 or both chromosomes.

2.8 Statistical analysis

Descriptive statistics was performed by Statistical Package of Social Sciences (SPSS) software program for window student version 12.0 to analyze the data obtained. The significance level for chromosome 17 aneusomy was considered at p value < 0.05.

3. Results and discussion

3.1 Histopathological

In this study, normal control samples shown normal mucosa under microscopic histological examination according to the classification of the WHO. Test sample consisted of 13(65%) cases of well-differentiated (WD) oral SCC and 7(35%) cases of moderately-differentiated (MD) oral SCC (Table 2, Figure 1).

<<Table 2>>

<< Figure 1>>

3.2 Fluorescent in-Situ (FISH)

In this findings, the signals showed in the pericentromere of chromosome 17, were detected in interphase cells. In the 5 normal control cases, $67.8 \pm 11.0\%$ cells had two hybridized signals in their nuclei indicative of disomy, whereas cells with more than two signals were rare ($3.2 \pm 1.8\%$). For the test sample, the mean FISH signals were $43.7 \pm 13.0\%$ for monosomy 17, $40.9 \pm 11.1\%$ for disomy 17 and $15.3 \pm 9.03\%$ for polysomy 17 (Table 1). Within the test group, only the cells with polysomy 17 and disomy 17 were significantly different from the normal controls ($p < 0.05$). Our study demonstrated that numerical aberration of chromosome 17 is frequent in oral SCC (17/20 cases, 85%) (Figure 2). Only 2 cases showed monosomy and one case was a disomy (Table 3, Figure 3).

<<Table 3>>

<<Figure 2>>

<<Figure 3>>

In the present study, we applied DNA probes specific human chromosome 17 to both 5 cases of normal control, and specimen tissues collected from 20 archival blocks of oral SCC. FISH was performed on the normal buccal mucosa to ascertain whether the hybridization technique was successful and also to obtain baseline values of the distribution of hybridization signals within the nuclei of cells in the control sample. We found that in chromosome 17 FISH assay, most of the cells (mean, $67.8 \pm 11.0\%$; range, 38-89%) in the normal control had two hybridization signals, indicative of chromosome 17 disomy (Figure 3), followed by cells (mean, $29 \pm 12.8\%$; range, 5-61%) with single hybridized signal (chromosome 17 monosomy) (Figure 3) and the least common were cells (mean, $3.2 \pm 1.79\%$; range 0-7%) with more 3 or more signals (chromosome 17 polysomy) (Figure 3). These findings are not unexpected as in a normal sample cells tend to yield disomic signals and the cutoff value for disomy is 61%. These results suggest that formalin-fixed, paraffin-embedded materials are suitable for FISH analysis. In addition, the result also demonstrated that the FISH technique allows the evaluation and detection of chromosome aneusomy in interphase cells in individual cases of oral SCC.

We detected that 17 cases of oral SCC yielded more than three hybridized signals of chromosome 17, indicative of chromosome 17 polysomy. An extensive amount of chromosomal abnormalities has been previously described also in head and neck squamous cell carcinoma (HNSCC) by various methods, including classical and molecular cytogenetics (CGH and interphase FISH) and loss of heterozygosity (LOH) assays. (Jin et al., 1995; Komyiama et al., 1997; Bhuvanesh, 2002) To some extent, all these techniques disclosed similar results, mainly represented by an extensive genomic imbalance, which was also confirmed in our study.

Genetic instability is putatively involved in the multistep process of carcinogenesis of most cancers. Current evidence suggests that this genomic instability occurs at two levels: the nucleotide level and the chromosome level. (Lengauer et al., 1998) Gains or losses of whole or large portion of human chromosome in tumor cell (aneuploidy) are found in most cancers. (Mitelman et al., 1994) This has been proposed as a major driving force for determining the rate of accumulation of specific genetic hits in several human cancers. (Kahlenberg et al., 1996; Limoli et al., 1997) In the present study, a significant population of aneuploid cells was detected in most of the tumor cells, and this was frequently represented by chromosome gain rather than loss. There were 17 cases of chromosome 17 polysomy and only 2 cases of chromosome 17 monosomy detected in this study, and this implies that chromosome gains was more frequently encountered than chromosome loss in the series of oral SCCs studied here. It has been observed that the frequency of cells with polysomy increased with histological progression. (Charlotte et al., 2002) Within each histological grade, there was an intersubject variation in the levels of chromosome polysomy present, suggesting that the biological factors might influence the rate of accumulation of genetic hits. Genomic instability may also lead to chromosome non-disjunction and the generation of cells with zero, one, two, and three or more chromosome copies. Hence, the presence of cells exhibiting three or more chromosome copies (chromosome polysomy) might be considered a quantitative marker of ongoing or accumulated genomic instability in tumors. (Kanekawa et al., 1999) Although there were only 2 cases of WDSCC showing an increase number of cells with monosomy 17, this seems to suggest that the loss of chromosome 17 may have occurred as an early event before its transformation to oral SCC.

Interestingly, in our study the chromosomal imbalance appeared in low frequencies in cells within apparently normal cell populations. This finding support the field cancerization hypothesis originally postulated by Slaughter et al in his study on multi-centric primary tumors of the oral cavity. Subsequently, others also demonstrated this chromosomal imbalance in a variety of HNSCC. (Choi and Chung, 1996; Papadimitrakopoulou et al., 1996; Scoles et al., 1998; Shin et al., 2001; Poh et al., 2006) Although the frequency of polysomic cells was relatively low in this area, it must be remember that nuclear truncation happened during sectioning, and this may lead to under representation of the chromosomal frequency. Furthermore, altered genomes presenting in a low frequency may also be masked by majority of normal cells.

4. Conclusion

This study conducted in two referred Malaysian oral cancer center, demonstrated that the most common histological grading of oral SCC was WD, and the most common numerical abnormalities of chromosome 17 were trisomy and tetrasomy, which considered as polysomy 17 groups. Our results showed frequent numerical aberrations of chromosome 17 in oral SCC. Cells with polysomy 17 significantly increased ($p=0.0005$) while cells with disomy 17 significantly decreased ($p=0.0005$) in oral SCC. This demonstrated than numerical chromosome 17 abnormality, was associated with carcinogenesis of oral SCC. Although there were only 2 cases of monosomy 17 found in our study, it might be an early event of oral SCC. Furthermore, the degree of numerical abnormality of chromosome 17 varied from case to case. This finding suggests that numerical chromosome 17 abnormality is involved in the process of carcinogenesis and development of oral SCC as observed by FISH. Therefore, FISH can be used as a marker for evaluating neoplastic activity at the surgical margin of oral SCC in Malaysia.

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Table 1. Mean number of hybridization signals for chromosome 17 in normal control and test sample

Type	Mean No. of Signals (%)		
	Monosomy	Disomy	Polysomy
Normal	29±12.8	67.8±11.0	3.2±1.8
Test	43.7±13.0	40.9±11.1	15.3±9.03

Table 2. Distribution of oral SCC according to their histological grades

Histological Grades	No of Cases	Percentage (%)
WDSCC	13	65
MDSCC	7	35

Table 3. Distribution of oral SCC according to their chromosomal aneusomy

Chromosomal Aneusomy	No of cases	Percentage (%)
Monosomy	2	10
Disomy	1	5
Polysomy	17	85

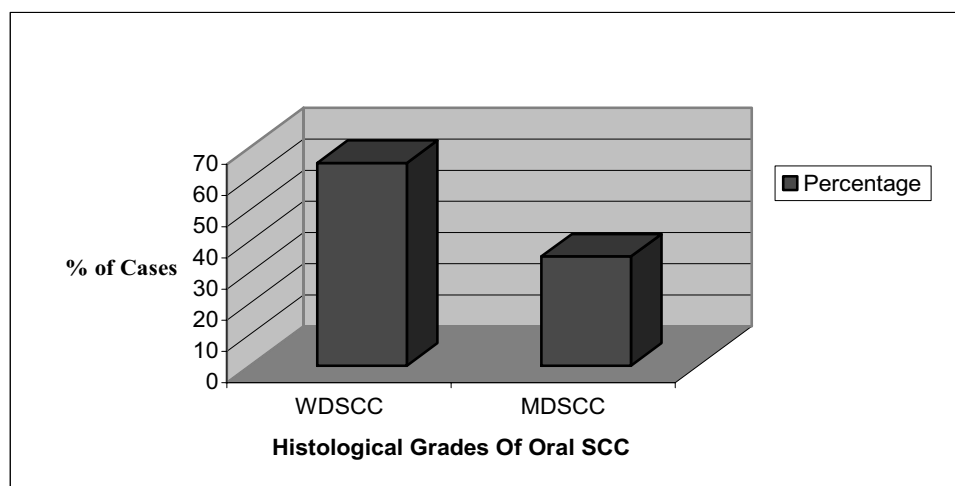


Figure 1. Percentage distribution (%) of 20 oral SCC cases according to their histological grades

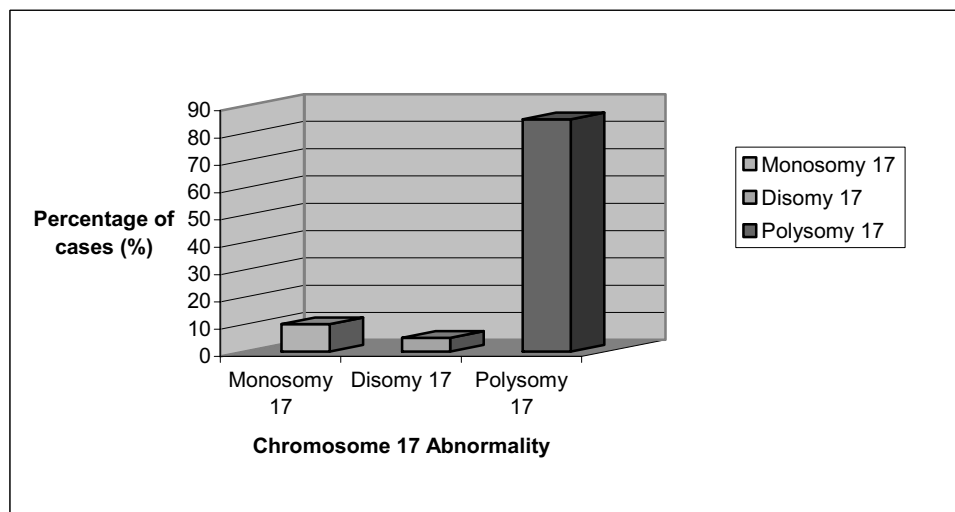


Figure 2. Percentage of Cases (%) of Chromosome 17 Abnormality

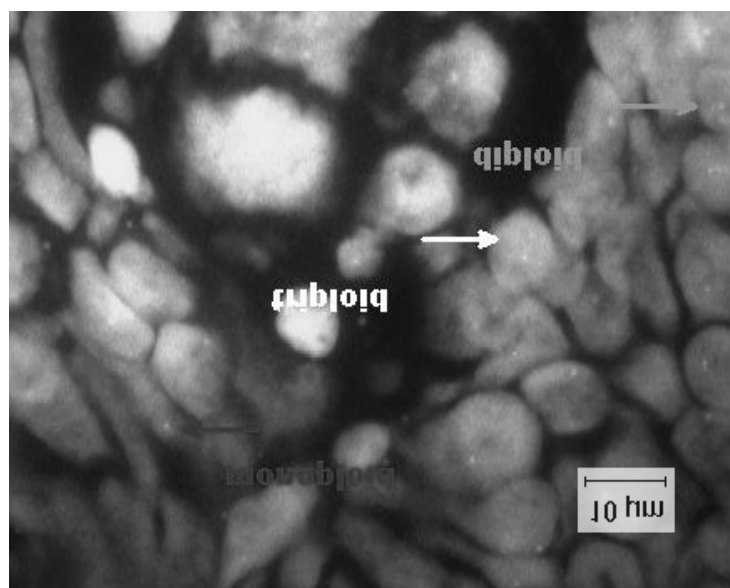


Figure 3. Various signal probe of Chromosome 17. Monoploid, diploid and triploid green signals were observed in the cells. (Original magnification x 400)



Reinforcement on Establishment of Medical Ethics and Construction of Harmonious Hospitals

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Abstract

Medical ethics establishment is one of the most important components in the management of a hospital in the new situation, a significant and necessitous task encountered by ideological and political practitioners in a hospital, and more an important content for establishment of socialist cultural and ideological progress of the health system. Reinforcement on establishment of medical ethics in a new situation and construction of a harmonious doctor-patient relationship is to establish the patient-oriented logos, to reach a common understanding, to cohere public feelings, to promote rapid, healthy and coordinate development of health care industry, and furthermore, to provide forceful guarantee for building a well-off society in an all-round way and for ensuring health of the public.

Keywords: Medical ethics, Harmonious hospital

With development of the socialist market economy and gradual penetration of reform and opening-up, there have emerged a pattern of “diversification” in thinking concepts of medical personnel. Furthermore, interpenetration of ideological sphere and internationalization of health care industry also has brought some new subjects to ideological and political work of the hospital. Therefore, it requires that the medical department should strengthen vigor of the ideological and political work, reinforce establishment of medical ethics based on the scientific outlook on development and create a perfect spiritual atmosphere and public opinion environment for reform and development of medical care and for stabilization of the whole situation.

1. To deeply recognize significance of establishment of medical ethics from the perspective of an overall situation and strategy and to practically intensify sense of responsibility and urgency.

Medical care is a career that benefits the people, so reinforcement on establishment of medical ethics in a medical care team relates to vital interests of the people, to the implementation of policies of the sanitation work of the CPC, to happiness of every family, to the harmonious development of economy and the society, and also to the image of the CPC and the government in the people. The CPC and the government have always been attaching great importance to and the people have always been focusing on establishment of medical ethics in a medical care team. The General Secretary Hu Jintao repeated with eagerness in the Political Bureau of the Central Committee that, To promote with enthusiasm establishment of medical ethics, to further carry out education on socialist outlook on honor and shame, and to enable the extensive medical practitioners to keep to the service goal, to strengthen the service consciousness, to improve the service quality and to maintain a perfect image of the medical care industry.” It was definitely proposed in the 17th National Congress of the CPC that, “To consolidate establishment of medical ethics and to improve service quality of medical care.” It has been the first time in the history to include establishment of medical ethics in the report of National Party Congress, which indicates that its establishment is not merely a job of medical care industry any more, but has been escalated into a significant job of the whole CPC and the entire country. Establishment of medical ethics is an important component of cultural and ideological progress, and is an indispensable spiritual pillar for building the socialism with Chinese characteristics. Medical practitioners are guards to health of the people, and also a window for connection of the CPC and the government with the people. Condition of the medical ethics is closely bound up with the people, and means a lot to the authority of the CPC and the government. In recent years, medical care industry has been encountered with competition and challenges from the market economy. World outlook, philosophy of life and values of medical practitioners have been changed, and traditional medical ethics has been undergone an ordeal, some

hot spot issues becoming obvious which the people are dissatisfied with. For instance, affected by negative effects of the market economy, a minority of medical practitioners do not pay attention to their political study, indifferent in their thinking concepts of serving for the people, and have some mistaken understandings in construction of the style of work, which are revealed in the fact that they concentrate on economic benefits, neglect social benefits, with weak service consciousness, lacking in the sense of responsibility, uncared in examination on patients and in the diagnosis and treatment, and not abiding by rules and regulations, etc. At present, the hot spot issue is that of inadequate and overly expensive medical services, excessive prescription and examination for patients, much use of expensive medicine, too high expenditure and increasing burden of patients. Although these issues are related to a minority of people, still their influences cannot be underestimated, because they bring about a great gulf and even distrust between doctors and patients, which has a directly negative effect upon the medical care industry and simultaneously might cause unhealthy impacts to the CPC and the government.

2. To try to put the scientific outlook on development into practice and to promote harmonious development of the hospital with innovation.

2.1 To intensify ideological and political education and to improve quality of the medical care team.

Firstly, to equip all medical staff with the latest sinicized Marxism achievements, to lead them to correct recognition of all sorts of cultural thoughts, to improve their political sensitiveness and discriminability, to intensify their ability to distinguish right from wrong, to enable them to further understand and recognize great practices of socialism with Chinese characteristics, to strengthen their theoretical recognition, political recognition and emotional recognition of the socialism with Chinese characteristics, to confirm their ideal belief in the path of socialism with Chinese characteristics, and to enable them to accept education, improve their quality and contribute to the society in their practice in the core value system of the socialism. To make efforts in strengthening professional ethics and spirit of medical staff, to consist in regarding establishment of medical ethics as the primary task of construction of the medical care team, to frequently pay special attention to and to update the task, and to improve ideological standards and political awareness, professional ethics and ability to cure the sickness and save patients on the side of medical care team from all aspects. The extensive medical staff should show loyalty to the medical care of the CPC, establish favorable medical ethics, treat patients as their close relatives, heal the wounded and rescue the dying, bring into effect revolutionary humanism and truly utter devotion to others without any thought of self. Secondly, to perpetually conduct education about service for the people, to make them firmly bring into mind a thought to serve the people wholeheartedly, and to bear in mind love, patience, attentiveness and responsibility. Thirdly, to insist on education of anti-corruption and encouragement of honesty. Medical practitioners should frequently be organized to learn relevant decision to rectify malpractice in various trades by the Chinese Party Central Committee, State Council, and Ministry of Health, so as to understand necessity of further reform in health care industry under the new circumstance, and to cultivate their feelings of responsibility and push-and-go. Thereby, they can be conscientious and meticulous in work, regard patients as the center, start from requirements of patients, and, in a real sense, realize the goal of lofty medical ethics, and serving the people honestly. Fourthly, to strengthen professional skill learning and to bring in constant renewal in knowledge. Professional skills of medical practitioners are closely associated with quality of serving the people. Therefore, professionally technical personnel should be organized in a planned way to learn all sorts of medical techniques, such as conducting continuing education, casuistics, and sending personnel abroad for further study etc, so as to improve their professional skills and quality of serving the people.

2.2 To firmly establish the patient-oriented logos and to strengthen the service consciousness

2.2.1 To strengthen the "patient-oriented" concept

The goal of "Patient-oriented" is the specific reflection of serving the people wholeheartedly. The extensive medical practitioners should be educated to firmly establish the values of patient-supreme, further improve their service attitude, transform their service style, intensify the honest construction, and enhance communication with patients and all social circles, so as to construct a harmonious relationship. Firstly, to have a perfect service attitude, use civilized and polite words, and to put an end to the phenomena of being strange, cold, stiff, contradiction and avoidance of responsibility. Secondly, to standardize professional behaviors according to different professional requirements, and to further optimize the service by means of professional etiquette and training, etc. Thirdly, to establish physician-patient communication mechanism in a hospital and to standardize communication content and form. Fourthly, to continue to perfect the complaint handling system, regularly organize different types of communication, and to resolve contradictions between doctors and patients in time. Medical practitioners should regard satisfaction, worry and trust of patients as a touch-stone for testing their work, try to serve all patients for all their pains, and do their utmost to satisfy reasonable requirements from patients and their dependents. They should feasibly offer humanistic medical care service, consistently standardize the non-technical service, treat with all patients and service targets in strict accordance with requirements of non-technical service standard, and standardize their service behavior with the system. Furthermore, medical practitioners should simplify the whole service flow, reduce the whole procedure, improve level and efficiency

of medical care service, and to bring patients the feelings of comfort, warmth, and satisfaction.

2.2.2 To upgrade quality of the medical care and to improve professional level of medical care.

Medical care quality is the most significant sign of the culture in a hospital, and a lifeline of the hospital, so the hospital should strengthen its management in the quality of medical care, and pay special attention to medical care security all the time. Medical institutions should carry out the standardized management in medical care quality, and operate in strict accordance with all rules and regulations of medical care quality. For those who cause mistakes as a result of not complying with rules and regulations, the institutions should call to their account, implement strict control and serious punishment, and put an end to such happenings. They should reinforce medical research, improve medical research level, and promote construction of key medical discipline. They should also organize various activities, create an academic atmosphere, and improve the overall level of medical care system.

2.3 To intensify establishment of medical ethics, to strengthen the humanistic construction and to improve the overall quality of a team

Medical ethics and style is an ideological issue in medical care practice. Medical ethics is the essence, while medical style is the expression. Targets of medical service are those with high thinking and rich sentiment, so medical practitioners should treat with their patients with a humanism spirit and sincere ardor, and regard them as close relatives, not merely caring about the disease and technique, regardless of feelings of patients. Therefore, reinforcement of construction of medical ethics is to innovate the management system, establish scientific interest-orientation, establish the system of both awarding and punishment, unfold poetical justice, build a permanent mechanism of perfect medical ethics, and put an end to harmful phenomena from the source. To combine organically implementation force of the authority, persuasion force of education, constraint force of the system, restriction force of supervision, deterrent force of punishment and infectivity of the environment, to carry out “veto by one vote” in medical ethics, to protect health rights of patients to the greatest extent, to escalate professional ethical standard of medical practitioners, and to realize the fundamental transformation from temporary solution to a permanent cure. Firstly, the hospital should conduct education of professional ethics, professional conduct and professional discipline among the entire staff. Secondly, the hospital should formulate medical ethical program, assessment standard and principle of itself based on requirements of “professional ethics criterion of health workers” by the Ministry of Health, set up medical ethics file of medical practitioners, and form a whole set of medical ethics assessment, supervision and awarding and punishment system. Thirdly, to continue organizing advanced and typical educational activities in combination with activities of selecting advanced health workers and advanced groups. Fourthly, to intensify cultural construction, carry forward uprightness by organizing various cultural activities and to create a sound social environment. The hospital should by all means improve humanistic quality of medical practitioners, correct their practice motive, standardize their medical care behavior, firmly establish the service consciousness of “patient-centered”, and “consider what patients think about and worry what patients are worried about”. They are forbidden to earn any extra income and all sorts of “commission by billing”; they should insist on reasonable examination, rational use of medicine and rational charging, and carry out the system of concentrative medicine tendering; druggists are prohibited to “promote sales of medicine”; medical practitioners are forbidden to accept “kickback” and “eat on invitation”. To insist on the service philosophy of “human-oriented, integrity and hard working, civilized medical practice”, reduce medical care expense of patients, alleviate economic burden of patients, resolve the hot issue of inadequate and overly expensive medical services, and lay a good foundation for establishing a harmonious physician-patient relationship.

2.4 To improve communication consciousness and ability between doctors and patients.

In order to establish a harmonious physician-patient relationship, mutual respect and trust in the guarantee, while communication is the bridge for respect and trust. Improvement of physician-patient relationship not only calls for reform of medical care system, but more a variety of measures to improve communication between them, which can realize equality of information exchange, strengthen mutual understanding and cultivate mutual trust. A set of honest constraint mechanism should be established within the hospital, which may reinforce communication between doctors and patients, intensify care about patients in terms of feelings and sense, create the brand of the hospital and build up reputation of the doctor per se. Currently, medical complaint has revealed an increasing tendency, which is primarily due to insufficient communication between doctors and patients, incomprehension of family members of the patients, and weak and passive service consciousness of medical practitioners, etc. Given the above issues, we should establish service culture of the hospital, and enable medical practitioners to firmly establish the “patient-centered” service consciousness. Patients should trust their doctors, act in concert with their cure, while doctors should also respect the patients, listen with patience to their complaint, try their best to communicate with patients, consider patients’ feeling in patients’ place, show solicitude for their pain, show sympathy to their difficulties, eliminate their apprehensions, help relieve their psychological pressure, and do their utmost to bring health to patients. The hospital should take the initiative to explore construction of physician-patient communication mechanism, while the doctor should communicate with patients in an effective way about their disease cause, use of medicine and cure condition, so that the patients can

truly “know the inside story”. The doctors should listen to their patients, and show consideration to them, authorize patients with the right to know, right to choose and privacy right, so that mutual trust and support can be established between them. Meanwhile, the hospital should take some effective measures. For instance, they can set up a hotline, open a civilized window for medical care service, open up the first aid green channel, and establish special patient reception department. All medical affairs should be publicized for supervision from social media and the people; transparency of charge on all items should be strengthened; to gain trust from the people with practical action, and win trust and understanding of the society in the hospital and all medical practitioners, so as to gain trust from the patients, improve medical care effect, reduce medical care dispute and promote the harmonious development of the entire society.

2.5 To establish a harmonious relationship between doctors and patients, and to construct a perfect supervision, constraint and incentive mechanism.

Reinforcement of medical ethics construction and guarantee of medical ethics criterion plays a directive role in conduct of medical practitioners, and can enable the extensive medical practitioners to have regulations to abide by and have laws to follow. In order for the criterion to be put into practice, a hospital should also establish perfect supervision constraint and stimulation mechanism, intensify supervision and check, and should be determined to rectify harmful practices that do damage to interests of the people. Firstly, to continue the permanent mechanism construction and implementation according to assignment of higher authorities in handling commercial bribery in medicine purchase and sale, to focus on supervision of key positions and aspects, and to pay attention to report on a legal case and its investigation. Secondly, to organize self-check regularly, which mainly concentrates on the strict management of medical expense, prohibition of irrational charge, strict implementation of the national medicine and medical consumables price policy and medical care service price, strict implementation of hospitalization charge enquiry system and establishment of expense check system. Thirdly, to continue to rectify unhealthy practice in medical care service, to study and correct in time those issues intensely responded by the people, and to handle strictly those people or matters that do great harm to interests of the people. Emphasis should be placed to prevent medical workers from asking for money or definite articles from the service targets, to be determined to eliminate commission by billing, and to call to account and investigate the causes for irrational check of medicine use. To create an honest culture in the hospital, further improve the permanent mechanism construction of medical ethics with a combination of education, system and supervision, to strengthen medical ethics education among medical practitioners, to continue to carry out signing of a liability statement about rejection of kickback in medicine and medical appliance between medical institutions and clinicians, to intensify frequent supervision and check in professional style and to create a perfect medical ethics supervision environment. To establish honest culture in the hospital, build up honest consciousness among the medical staff and to cultivate honest behavior. To implement technical criterion of diagnosis and treatment, to use medicine and check patients reasonably, to cure patients in accordance with their disease, and to prohibit excessive prescription; to standardize behavior of medical care service price, and to continue strict implementation of “daily hospitalization charge enquiry system”; to take the initiative to carry out the system of medical service and price publicity, to let the people see a doctor and pay the medical charge at ease; to make honesty the golden symbol of the image of a hospital, and to transform reputation of the hospital into a substantial competition force.

2.6 To gain satisfaction from the public and to promote sustainable development of a hospital

The new central government pays special attention to livelihood of the people, attaches great importance to construction of a harmonious society and therefore, gains great satisfaction from the people. The primary goal of medical care is necessarily to gain satisfaction of the people. To satisfy increasing demand on medical care and health of the people and to gain their satisfaction is the fundamental target of medical care, the starting point and ultimate goal of medical care, and is the mission of medical care per se. Medical care institutions should constantly improve the medical care quality, continue to enhance their service, and consider satisfaction of the people their first goal. To gain satisfaction of the people is an objective requirement for a hospital to develop itself, and is the foundation of ensuring lasting and healthy development of the hospital.

The General-Secretary Hu Jintao made a clear statement in the 17th National Congress of the CPC that, “health is the foundation of comprehensive development of human being, and is closely related to happiness of every family.” The fundamental goal of the country to develop its medical care industry is to improve health level of its people, to strengthen health quality of its citizens and to promote sustainable development of its economy and society. Ethics construction of the sanitary system can get obvious achievements and promote rapid and perfect development of medical care industry only by carrying out and implementing the scientific outlook on development, strengthening professional ethics education as the basis, comprehensively enhancing professional ethics quality of medical practitioners as the goal, improving the service attitude, increasing service quality and sanitary supervision law enforcement as the focus, and resolving outstanding problems which might do damage to interests of the people.

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