

# Economic Analysis of the Latent Factors Related to the Nursing Shortage

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## Abstract

The aim of the study was, to economically analyze o the latent factors related to nursing shortage at Cairo University Hospitals. **Research design:** A descriptive, methodological design was utilized. **Research Questions:** 1) Is the economic analysis of nursing shortage related to the actual auditing records of nursing data at Cairo University Hospitals (2011-2015). 2) What are the contributing factors leading to the nursing shortage at Cairo University Hospitals. 3) What are the economic recommendations for the present concerns related to nursing shortage. **Tools of data collection:** The researchers used auditing records related to nursing staff at mentioned area (2011-2015) and Questionnaire. Random sample of (N= 179). Cronbach's Alpha was 0.885. The finding revealed that nurses supply, mostly from Secondary School (84%). A critical demand for more nurses 30%-40% in certain units due to high work load. Most of the nurses were not satisfied about monitory compensation, participation in decision making and inadequate supplies.

**Keywords:** Economic analysis, Supply and demand, direct care hours, nursing shortage

## 1. Introduction

Nowadays, demand for nurses is greater than ever, the impact of the global nursing shortage is clear, nurses are stressed out and more likely to be dissatisfied with their jobs resulting of negative effects of the productivity and quality of nursing care (Aiken, Clarke, & Sloane, 2002). As such, the economic analysis is the only gate to find proper solution for this chronic problem, to concentrate the efforts of nurses motivation, gain autonomy, participate in decision making, staff development, fairly rewarded, flexibility in changing working assignment that are effectively satisfy nurses in different roles: Effective skill- mix, clarity of roles, utilize maximum skills, recruit and retain qualified nurses on the broader supply/demand planning framework (O'Connor et al., 2012).

While the supply of assistant nurses in Egypt were 2.70 per 1000 population, the baccalaureate nurses, were low 0.26 per 1000 population (WHO, 2006). Demand for nurses in developed countries expected to reduce the supply and stock of nursing staff in developing countries, shortages are likely to continue and even increase in the future. Action should be taken to raise the supply of Egyptian Nurses to meet the current demand. Nursing as profession challenging with increased acuity of patient, shortage of qualified nurses, limited resources and increased demand on the service (Elsayed, Sleem, & Elsayed, 2012). Generally, when the supply of nurses are inadequate to provide or maintain the required of Nursing Care, it could be defined as Nursing Shortage (Oulton, 2006; Toh et al., 2012). Adequate staffing ratios would improve the working environment which, would in turn retain good staff and increase the public satisfaction about the nursing profession.

Furthermore, Egyptian Nursing Syndicate Deputy stated that many hospitals in Egypt suffer from an inadequate nurses, the recent number of Nurses in Egypt (250,000 in 2014), the health care facilities in the country still needs additional supply between 30,000-40,000 of New Nurses to meet the increased demand of patient care (International Nursing Day, 2014). The chairman of the Egyptian Nursing Syndicate, requested governmental support to compensate nurses for illnesses, provide official positions for temporary nursing staff, and monetary compensation for night shift. Moreover, Egyptian nurses voiced out, in spite of the Latest salary adjustment and slight increase of nurses supply, nurses on duty still suffering from inadequate staff, and humiliation of nursing profession (International Nursing Day, 2014).

The total numbers of nurses registered in the nursing Syndicate in Egypt (2009-2010) approximately 238,000 nurses. Baccalaureate nursing graduates (1.10%), Technical Institute of Nursing (0.50%) and Secondary Technical Diploma school (98.40%). Types of nurses education in Egypt: (1) The under graduate nursing diploma after preparatory school - three years study, (2) undergraduate nursing diploma from technical institute - two years study and (3) Baccalaureate university education - four years study and one year internship. The Ministry of Higher Education is working on refining nursing syllabus and decreasing the level of education from three to two years; making a new nursing technical syllabus for practicing nurse (Egypt nursing profile, 2012).

Egyptian Population are: 81, 121, 000 (United Nations -New York, 2012). Nurse to population ratio in Egypt was about (1.3) nurses per 1000 population. While in Qatar (6.17) nurses per 1,000 population and in Jordan (3.3) nurses per 1,000 population. Furthermore the data from Organization of Economic Co-operation and Development (OECD), (2013), countries revealed that the nurse to population ratio in the United Kingdom was about (8.2) nurses per 1,000 population, slightly below the OECD average of (9.1) nurses per 1,000 population. According to the report from OECD, there were (16.6) nurses for 1,000 persons in Switzerland, (10.1) nurses for 1,000 persons in Australia, (8.8) nurses for 1,000 persons in the OECD countries, (8.6) nurses for 1,000 persons in UK, and only (1.7) nurses for 1,000 persons in Turkey (OECD, 2013).

Egypt, Yemen and Afghanistan, currently have the majority of nurses graduate are from secondary school, while all nurses in other countries have minimum of 2 years post-secondary education (OECD, 2014). The majority of nurses in Egypt (almost 90%) are secondary school nursing education and reflected to be deficient quality of nurse education internationally and by the region's standard; and certainly a severe, serious shortage of qualified nurses who have at least 2 years of post-high school education. Therefore, the shortage of qualified nurses in the Egyptian market in general is considered the highest due to poor funding for nursing university education. If the graduate from high school nursing in Egypt, will not be considered as nurses and the title of nurses is controlled only by the nurse' education who have at least 2 years of post-secondary/ high school education, then the ratio of (Egypt) drops to (0.18) nurses per 1000 population, which is an extremely low and poor ratio (El-Karmalawy, 2010).

### *1.1 Significance of the Study*

The improvement of health care deeply relied on supply and demand factors of nurses. From the previous illustrated studies at Cairo University Hospitals, few studies handled the current topic. Therefore this study will be an opportunity to assess the latent reasons for shortage by examining the current supply, workload, nurse to patients ratio, nursing productivity, and related economic analysis.

### *1.2 Aim of the Study*

The current study aimed to economically analyze the latent factors related to nursing shortage at Cairo University Hospitals.

### *1.3 Research Questions*

To accomplish the goal of the research the following enquiries were voiced:

- 1- Is the economic analysis of nursing shortage related to the actual auditing records of nursing data at Cairo University Hospitals (2011-2015)?
- 2- What are the contributing factors leading to the nursing shortage at Cairo university hospitals?
- 3- What are the economic recommendations for the present concerns related to nursing shortage?

Theoretical Frame Work: Donabedian (1988) described three components of quality for the purpose of measurement which termed structure, process and outcome.

## **2. Subjects and Methods**

### *2.1 Study Design*

Descriptive, Methodological design was utilized in this study.

### *2.2 Sample*

Study was divided into two parts; analytic part included the economic analysis of auditing records – Cairo University Hospitals. The second part was the contributing factors of nursing shortage questionnaire, (N=179) nurses were randomly selected.

### *2.3 Setting*

Al-Manial university hospitals is affiliated to Cairo university hospitals providing health care to all admitted

patients from Egypt including upper & lower Egypt. The grand total number of beds in Al-Manial university hospitals are: 1391 beds located in the first, second and third floor with all medical specialties. Total number of beds in Al-Manial Bahary are (676) beds. Total number of nurses in Al-Manial Bahry are (189) nurses. Total number of beds in Kebly: (692) beds and the total number of nurses in Kebly are (325) nurses. The grand total number of beds are 1391 including 23 ICUs bed Occupancy rate 104%. Nurses in all areas are: 454 nurses. Al-Manial university hospital divided into Three (3) areas: Al - Manial Bahry hospital, Al-Manial Kebly hospital and Operating theater (serving both areas).

The study was conducted at AL- Manial university hospitals at AL- Manial Bahary and El-Manial kebly, inpatient general medical and surgical units, intensive care units (ICU) and all specialties. This hospital is staffed with different categories of nurses (Baccalaureate, technical and diploma).

#### *2.4 Tools of Data Collection*

1-Computing data from auditing records including items related to nursing staffing and occupancy rate at Cairo University Hospitals (Nursing Administration, Statistical Medical Record Department and daily record of nursing staff sheet at Al- Manial Bahry and Kebly) (2011-2015).

2- Contributing factors of nursing shortage questionnaire adopted from (Gharib & Abdulwahab, 2013) consisted of two parts:

First part: Included the demographic data of the respondents such as: qualifications, gender, age, years of experience in nursing and years of experience.

Second part: Consisted of the items related to the following components of contributing factors related to nursing shortage included (30) items under four dimensions: (1) Staff benefits consisted of seven items, (2) Work environment consisted of nine items, (3) Communication consisted of four items, (4) Staff recognition consisted of ten items.

#### *2.5 Scoring System*

Five point likert scale was used to determine the degree of importance of the items in relation to the contributing factors of nursing shortage, (a) five indicates strongly agree, (b) four indicates agree, (c) three indicates neutral, (d) two indicates disagree and (e) one indicates strongly disagree (5 Likert scale).

Compute  $(100 \times \text{Mean} / \text{Max Response}) = \text{Mean} \times 20$ . The mean was computed for each item in both scales to give relative importance for each item.

#### **Content validity and reliability**

Tools had been translated into Arabic, necessary modification was done, content validity were established by an experts consisting of 2 professors of psychiatric nursing, 3 professors of nursing administration, Professor from Medical surgical nursing & Deputy director of institute (Medical). The reliability was high using all the 30 items of contributing factors related to nursing shortage. Cronbachs' alpha was 0.885.

#### *2.6 Pilot Study*

A pilot study was carried out on the questionnaire for 10% of staff nurses in the designated areas of this study to test the applicability and clarity of the questions of the study tools, estimated the time needed to complete the questionnaire, and to add or omit questions. According to the result of pilot study few modifications were done. The time of the study to answer the sheet was estimated as 20 to 25 minutes.

#### *2.7 Ethical Consideration*

The official permission obtained from hospital administration to conduct the study. Each participant was explained about the aim of the study, its benefits and has the right to withdraw at any time without penalty. Verbal consent obtained from the participants. Confidentiality are assured through giving code number for the data and no name required to mention on the questionnaire.

#### *2.8 Procedure*

Official permission was received from the General Medical Director and General Nursing Director of Al-Manial -Bahry & Kebly hospitals to carry out this study, after explanation of the aim of the study.

Procedures:

Primary phase: An official letter was approved to carry out the current study, Auditing data was collected and questionnaire was adopted. Nurses were interviewed personally by the investigators to explain the aim of the study and finally verbal consent was received.

Implementation phase: Data were collected from September until November, 2016. The researcher visited the selected areas on daily basis during break time and weekends. Each participant consumed 15-20 minutes to complete the questionnaire. The auditing data for economic analysis was received from the statistical center at Cairo University Hospitals and carefully analyzed.

2.9 Statistical Design

Descriptive and inferential statistics carried out for part (B). Cronbach's Alpha was used to determine reliability. Descriptive statistics such as frequency, mean, and standard deviation were utilized in analyzing the data presented in this study. Relative statistical tests of significance, correlation coefficient were used to identify the correlations among study variables. These tests were used to identify the significance of correlations among the study variables Spearman's rho Correlations.

3. Data Analysis

3.1 Part A

Table (1.1). Percentage distribution of nursing categories at Cairo University Hospitals (2011-2015)

Year	Faculty of Nursing	Percentage	3years nursing school	Percentage
2011	145	5.4	2339	87.43
2012	148	5.3	2344	84.32
2013	153	5.65	2285	84.35
2014	154	5.40	2350	82.46
2015	155	5.40	2362	82.39

Adopted from Cairo University Hospitals, Main management department (statistics and medical record)

Table (1.2). Percentage distribution of nursing categories at Cairo University Hospitals (2011-2015)

Year	Labor & delivery/ ass. nurses	Percentage	Nursing Institute	Percentage	Total
2011	72	2.69	119	4.45	2675
2012	108	3.88	180	3.88	2780
2013	94	3.47	177	6.53	2709
2014	83	2.9	263	9.23	2850
2015	38	1.33	312	10.88	2867

Adopted from Cairo University Hospitals, Main management department (statistics and medical record)

Table (2). Percentage distribution of Gender (female and male) graduate from three years nursing school diploma at Cairo University Hospitals (2011-2013)

Year	Female	Percentage	Male	Percentage	Total	Percentage
2011	2069	88.46	270	11.54	2339	33.4
2012	2070	88.31	274	11.69	2344	33.6
2013	2039	89.23	246	10.77	2285	33.0

Adopted from Cairo University Hospitals, Main management department (statistics and medical record). All data was obtained from Authors' calculations

Table (3). Percentage distribution of Occupancy rate in general wards at Al- Manial Bahry and Al - Manial Kebly (2011-2015)-Cairo University Hospitals

Year	Number of beds in Al-Manial Bahry (general units)	Occupancy rate in Al-Manial Bahry (general units)	Number of beds Al-Manial Kebly	Occupancy rate in Al-Manial Kebly (general units)
2011	709	107%	773	87%
2012	724	102%	724	102%
2013	760	87%	768	81%
2014	719	110%	753	98%
2015	676	110%	692	100%

Adopted from Cairo University Hospitals, Main management department (statistics and medical record)

Table (4.1). Percentage distribution of general unit capacity, occupancy rate, the current supply and demand of nurses. Using staffing demand formula

Inpatient Wards	Number of beds in each unit	Occupancy rate Percentage	Current nurses Supply	Actual number	Reasons	Demand-minimum standard	Percentage
Unit 6 (internal medicine)	24	68	11	11-3 (a)	Light work (a)	18	-38.89
Unit 19 (internal medicine)	44	115	15	15-1 (a)	Light work(a)	34	-55.88
Unit 28A (Surgery)	31	114	12	12-1 (a)	Light work(a)	25	-52
Unit 28B (Surgery)	30	114	13	13		24	-45.83
Unit 29A (surgery)	33	133	13	13-1 (b)	Sick leave(b)	26	-50
Unit 29B (Surgery)	34	133	9	9-1 (b)	Sick leave (b)	27	-66.67

All data was obtained from Authors' calculations

Table (4.2). Percentage distribution of general unit capacity, occupancy rate, the current supply and demand of nurses according to the previous staffing demand formula

Inpatient Wards	Number of beds in each unit	Occupancy rate Percentage	Current nurses Supply	Actual number	Reasons	Demand-minimum standard	Percentage
Unit 30A(Surgery)	26	51	11	11-1 (b)	Sick leave (b)	21	-47.62
Unit 30B(Surgery)	25	51	10	10-1(a)	Light work (a)	20	-50
Unit 31(internal medicine)	44	75	15	15-3 (a)	Light work (a)	34	-55.88
Unit 25A(Surgery)	27	122	11			21	-47.62
Unit 25B(Surgery)	28	122	9			22	-59.10
Unit 27A(surgery)	24	181	10			18	-44.44
Unit 27B(surgery)	26	181	9			21	-57.14
Total	428	107.6	198	185			

All data was obtained from Authors' calculations

N.B: a =Light work b =Sick leave c =absent

Table (5). Percentage distribution of ICUs; capacity, occupancy rate, the current supply and demand of nurses according to the previous staffing demand formula

Inpatient ICUs	Number of beds in each unit	Occupancy rate percent	Current nurses Supply	Actual number	Reasons	Demand-minimum standard	percent
MICU- 23	16	93	24	24-1 (c)	Absent (c)	42	-43
ICU -2	8	65	10			14	-29
ICU-3	8	103	16			22	-25

(Source: Personal contact with nursing administration department at Cairo university hospitals, 2016) and the staffing demand formula (adapted by researchers). All data was obtained from Authors' calculations.

## 3.2 Part B

## 3.2.1 Dimensions of Items

Table (6.1). Percentage distribution of the study sample according to: Staff benefits (N=179).

Items No.	Items of the study sample	Mean	Std. Deviation	RI(d)	Rank
1	My salary is a reflection of the work I do	1.49	0.09	29.8	7
2	My supervisor is concerned about my well being	2.48	0.94	49.6	5
3	I am satisfied with the vacation eligibility	3.08	1.16	61.6	2
4	The work schedule is planned in advance	3.95	1.15	79	1
5	No frequent changes in my work schedule	2.61	1.04	52.2	4
6	I am satisfied with the hospital compensations	2.20	0.97	44	6
7	I have enough time to finish my work	2.78	1.10	55.6	3
<b>Staff benefits</b>		2.656	.62886	53.12	

(d) RI = Compute (100 x Mean/Max Response = Mean x20 = relative importance percentage

Table (6.2). Percentage distribution of the study sample according to: Work environment (N=179).

Items No.	Items of the study sample	Mean	Std. Deviation	RI(d)	Rank
8	My patients are cooperative, they understand my work conditions	2.87	1.23	57.4	5
9	I am satisfied about the job security provided to me	3.30	1.33	66	3
10	I have enough support from my supervisor	2.72	1.13	54.4	6
11	The nursing supervisor is visible in the unit	3.49	1.07	69.8	2
12	Adequate amount of supplies are available for patient care	2.48	1.22	49.6	8
13	Hospital administration is keen to provide training for new staff	3.23	1.31	64.6	4
14	Hospital administration is keen to train the staff to operate new equipment	2.68	1.29	53.6	7
15	I am not intended to leave the hospital	3.23	1.33	49.6	9
16	I receive enough feedback from my supervisor on how well I am doing	3.52	1.153	70.4	1
<b>Work environment</b>		3.057	.7238	61.4	

Table (6.3). Percentage distribution of the study sample according to: Staff Communication (N=179).

Items No.	Items of the study sample	Mean	Std. Deviation	RI(d)	Rank
17	I have good working relationship with my colleagues.	4.06	1.00	81.2	1
18	There is a clear channel of communication at the work place	3.18	1.17	63.6	3
19	I have clear communication with patients	4.03	0.96	80.6	2
20	There is an atmosphere of co-operation between unit staff & hospital administration	2.66	1.32	53.2	4
<b>Communication</b>		3.483	0.82	69.66	

Table (6.4). Percentage distribution of the study sample according to: Staff recognition (N=179)

Items No.	Items of the study sample	Mean	Std. Deviation	RI(d)	Rank
21	Hospital administration is extremely fair in giving merit increase for all nurses.	1.73	1.15	34.6	8
22	I am entrusted with great responsibility in my work	3.91	1.10	78.2	1
23	I receive recognition for tasks well done	2.58	1.31	51.6	7
24	Hospital administration does involve staff in decision making	1.73	1.11	34.6	8
25	I can depend on my colleagues for support	3.28	1.13	65.6	2
26	My patients appreciate what I do for them	2.92	1.28	58.4	6
27	Doctors appreciate my work	2.92	1.28	58.4	6
28	I have sufficient opportunity to develop in my work (Nurses education)	3.25	1.17	65	3
29	There is a personal growth in my work (promotion)	3.00	1.20	60	5
30	I am satisfied with the delegated tasks assigned to me by the head nurse	3.07	1.43	61.4	4
<b>Staff recognition</b>		2.82	0.75	56.4	

## 4. Discussion

### 4.1 Part A

In Egypt the situation is very serious in providing adequate supply of nurses while the increased demand persist or critically increased. Action is badly needed by high authority people to raise the supply of qualified Egyptian nurses to meet the minimum current demand. Table (1.1&2.2) presented that the secondary level school had the highest supply of manpower at Cairo University Hospitals (87.43%) on year 2011-2015, statistics, This result is congruent with Sakr, 2006; El-Karmalawy, 2010 who stated that the supply of nurses from different categories of education and registered in the nursing Syndicate in Egypt (2009-2010) approximately 238,000 nurses - Secondary Technical Diploma school (98.40%). while the supply of nurses from technical institute were the least on the year 2011 (4.45%), increased on 2015 (10.88%) due to the awareness of the public of the newly opened institute. while the supply from Faculty of Nursing were (5.4%) this result confirmed that the supply of Bachelor Science of Nursing BSN or Baccalaureate degree nurses was not adequate to cover the severely demand of work. The Bureau of Labor and Statistics (2012), anticipated a nationwide BSN or baccalaureate degree of RN job vacancy of 1.2 million nurses after eight years. This prediction pointed out that nurse staffing will continue to become a major issue for all hospitals in all over the country.

While the assistant nurses were the least percentage (1.33%) on the year 2015, previously was (3.88%) as reflected in the same table and the number decreased yearly, may be due to the closing of assistant nurses schools-midwife (preparatory nurses school) to raise the level and quality of education in Egypt. Unfortunately this action forced the high authority people to supply of unlicensed nursing assistant personal as a replacement. Additionally the high demand for unlicensed nursing assistant due to the inadequate supply of nurses. A key issue in such assignment of tasks is a clear understanding of what constitutes professional nursing and which activities can be performed safely and appropriately by non-nurses under the supervision of registered nurses. Again the increase of BSN supply is badly needed in Egypt to supervise the secondary school nurses (manpower). Units with inadequate assistive personnel perceived lower staffing adequacy (Kalisch et al., 2011).

Table (2.0) reflected that the highest percentage of nurses were female (88.46%) on the year 2011 and (89.23%) on the year 2013. while the male nurses were (11.54%) on the year 2011 and (10.77%) on the year 2013. This data presented the gradual decrease of the supply of male nurses in spite of the demand of their service which grow more severe. Indeed the search for way out of nursing shortages has to emphasis on economic solution, most of male Nurses at Cairo University Hospitals are doing dual employment in private hospitals to support their families. The stigma related to nursing profession is reduced but still in the mind of uncivilized people. No statistical record for male nurses after the year 2013, this major problem of no data is making an obstruction for researchers to find solution. Additionally, there is no data about the economic risk as a result of nursing shortage in nursing administration department -Kasr Al- Ainy hospital e.g. Patient falls, pressure ulcer, hospital acquired infection etc. The American Nurses Association (ANA, 2014) well-defined Staff - Mix as the relation of Bachelor science of nursing (BSN) to the care hours of total nursing categories including certified practical nurses.

Table (3.0) reflected the variation of the Occupancy Rate at Al- Manial Bahry between 87% (year, 2013) and 110% (year, 2015) and the average occupancy rate for all units were more than the capacity of any unit (110%). While the occupancy rate in Al- Manial Kebly was 98% (year, 2014) and 100% (year, 2015). Cignarale and Proaño (2013) found that as an increase of the demand for patients admission were more than the number of hospital beds in the hospital, resulted on over census, or high occupancy rate, so bed assignment was needed to resolve the current problem of high occupancy rate. Hence this was a major problem for staffing, the head nurse or the charge nurse must be involved with admission department to make decision whether the assigned nurses can cope with additional admissions or do some internal movements to discharge more stable patients. The head nurse of the unit with the support of hospital administration can decide for no more admission or to suggest closing of some beds if the unit has inadequate staff, as stated by Mageshwari & Kanaga (2012) bed assignments primarily relying on the judgment of experienced head nurses and staffing situation.

Table (4.1&4.2) revealed that the occupancy rate exceeding the capacity in most of the units like unit 27 A and B (181%), followed by 29B (133%), unit 25A and B (122%), unit 31 (75%) and the least were 30 A and B (51%). The actual number of nurses were decreasing due to staff sickness, and light work for old staff. This was a complicated issue and need to be addressed to hospital administration because of high cost for replacement and unsafe practice. Moreover the finding in Table (4.1&4.2) revealed that the actual number of nurses at Cairo University Hospitals were further decreasing in some units due to staff sickness, absenteeism and light work for old staff, additionally the demand for nurses due to high occupancy rate (applied the staffing demand formula's previously mentioned with the required information. The result revealed that the current supply of nurses as seen

in Table (4.1&4.2) was not safe for patient care and the demand to replace the shortage (-40-50%) of the current nurses supply. Demand for nurses were in unit 6 was (-38.89%) while the maximum demand were in unit 19 (-55.88%). With the current study the inadequate nursing staff is not supported by any mean as stated by the Ministry of Employment and the Economy (2013) that the adequacy of nurses is the highest priority.

Many studies ascertain that the high nurse to patients ratio prevents incidents and risk of patient safety e.g. fall, infection, additionally the feeling of burnout of nurses (Aiken et al., 2002; Liu et al., 2012). Staffing of nursing department is simply calculated as total NURSING CARE HOURS PER PATIENT DAY (ANA, 2014).

The result of the computed staffing of ICUs Table (5) revealed that the actual number of staff, and the nursing hours per patient per day NHPPD were critically dangerous and not safe for patient care as seen in the following results: According to the nurses' schedule 4 nurses are left in ICU to take care of 16 patients (12 hours duty on days):

NHPPD= (4x12) divided by 16 = 3 full time nurses from secondary school nursing diploma and one nursing assistant. With the level of nurses qualification. They are considered assistant nurses and need close supervision for their practice.

The following Formula was used for Calculating Demand for nurses in- inpatient departments after computing (HPPD). Calculating Demand for nurses in- inpatient departments:

$$\frac{(\text{Daily hours of nursing care} \times \text{average daily census}) \times (\text{days per years})}{(\text{Days per year} - \text{expected off duty days per year}) \times (\text{daily duty hours})} = \text{full time Equivalent nurses}$$

The result revealed that Cairo University Hospitals were not in compliance with the minimum standard of staffing ratios. Proposal, would require 30%-40% an increase of nurses supply in certain units as a minimum for this current budget to increase nurse to- patient' ratio. Hence the supply of nurses at Cairo University Hospitals were mostly secondary school nursing graduate reflecting the lack of nurse education, nurse skills, and nurse knowledge, as a major obstruction of young persons to seek out nursing education, by improving this situation, nurse retention and satisfaction certainly will occur (Tervo-Heikkinen et al., 2008).

#### 4.2 Part B

In the current study (Part A), the economic analysis of the auditing data answered the first research question. While Table (6.1) in current study presented that both monetary compensation (44%) and the salary (29.8%) of the nurses were the least relative importance. This result was in congruent with (Aiken et al., 2013) who reported that the level of nurses dissatisfaction with their job was wages, ranged from 22–60% and in agreement with the result in China Liu et al. (2012a); Zhang et al. (2013) who reported high levels of nurses job dissatisfaction (45–54%). This finding of the current study is inconsistent with (Fung-kam, 1998) who found, salary was valued as the least satisfactory in developed countries like USA, Ireland and Australia. The current study had the highest relative importance of nurses agreement (79%), about the work schedule planned in advance this result is supported with Butler et al. (2009) who found that a positive relationship between non -rigid schedules in performing tasks and the job satisfaction of nurses.

Table (6.2) presented (70.4%) nurses receive feedback from the supervisor in relation to staff performance, was the highest rank of relative importance, This result is congruent with Masroor & Fakiry (2009) who found, the respondents appear to have moderate agreement with their supervisor, with the respect to the feedback they receive about the job performance. Kumar (2011) reported that the performance appraisal is an important technique for improving the performance of an organization, it helps employees to improve their performance by giving specific feedback about the need for development, and helps employees to continue to excel by giving positive reinforcement that can motivate them. While in the same Table (6.2) the nursing supervisor is visible in the unit (69.8%), Huseman's (2009) who found the visibility of the supervisor in the unit has a great support to the nurses. Table (6.2) presented that (49.6%) of nurses had no intention to leave the hospital. The staff nurses with secondary school nursing diploma at Cairo University Hospitals may had no opportunity to join the work in private hospitals due to their qualification or because of the job stability and security. This result of the present study in agreement with other studies done in Governmental Hospitals by Hassan (1999); Amer & Fekry (2011), who reported that the majority of nurses at Alexandria Main hospital and Cairo university hospital respectively, they remain in the organization because they need to. Regarding the availability of supplies for patient care (49.6%), it could be that nursing manager was not actively participated in the hospital budget or not keen to request enough supplies for patient care. This result is similar with Pillay (2008) who presented that the participants were dissatisfied with the resources. The input of supplies and equipment's costs can be controlled by the wise storage and use of supplies and equipment. One method is to compare the cost and features of

roughly equivalent supplies and equipment, selecting products that have the desired qualities at the lowest cost. Nurse managers in a need to receive monthly reports that note variances between actual charges received and items charged to the unit's supply, discrepancies should be investigated and corrected.

Table (6.3) presented that the highest relative importance was the good working relationship with colleagues (81.2%). The current study clarified that nurses were satisfied about the working relationship with colleagues. This findings indicate that nurse's perceived level of satisfaction with co-workers and patient communication. The findings are in agreement with Masroor and Fakir (2009) and also in consistent with Shader et al. (2001), who pointed out that colleagues cooperation in performing tasks, will certainly improve the moral at work and creating positive and harmonious environment for improving staff retention. While, the clear communication with patients was (80.6%) it could be due to the long service of the nurses which positively effect on nurses communication. This result is congruent with Kekana et al. (2007), who found the social aspects of the job was a strong predictor of job satisfaction. The least relative importance was the atmosphere of co-operation between unit staff & hospital administration (53.2%). Many researchers presented the benefits of close interpersonal communication and concluded that an employee perceives job achievement by the support coworker's friendly attitude and behavior (Laschinger &Manojlovich, 2007). Furthermore nurses may find difficulty to be retained in the job not only in relation to patient care but in their relationships with the physicians, and peers who impact the job. This result of the current study differs from the result of Rahmani (2007) who reported that half of the employees in Indonesia had poor relationships with their coworkers. Nursing administration need to encourage nurses for positive communication and cooperation at work. Thus, certainly promotion of the teamwork will build a trust within the nursing team and may result of positive outcomes of patient care. Therefore the heavy workload, permanent night duty and poor interpersonal communication certainly lead to job dissatisfaction (Lu et al., 2005).

Table (6.4) Clarified that the good working relationship with colleagues and feeling of trust at work were the highest relative importance of nurses agreement (78.2%) nurses were happy with their additional responsibilities of delegated tasks assigned to them. Followed by colleagues support (65.6%), while the least relative importance were the fairness in giving the merit increase and involvement of nurses in decision making both were (34.6%). This result in agreement with Ayers (2005) who found that most of the participants were not satisfied due to lack of staff involvement in decision-making. Nursing profession is rewarding when the nurse have the chance to voice out all concerns related to the nursing tasks in the workplace and feel satisfaction like other health professionals in making decision and receiving recognition for accomplishments. The current result was similar to a study by Gigantesco et al. (2003) in Rome, who found few staff participated in decision making. Analysis of the different items under different dimensions of the contributing factors for nursing shortage reflected that hospital compensation, merit increase, nurses participation in decision making, and availability of supplies in the unit, were not meeting the expectations of the staff nurses.

In summary creating appreciation policy can promote nurses morale as a credit for nurses' participation in best practice and decision making. Thus will facilitate the sense of work participation and promote healthy environment among nurses. Further, top management team should revise the monetary compensation policy for nurses who accepted more responsibilities. All arrangements will certainly increase staff retention at Cairo University hospitals. To enhance staff motivation "something is given and something is returned" (Cropanzano and Mitchell 2005). The key to motivating hospital' nurses is to listen to the nurses to know what motivate them and establish a motivation program based on those needs. Based on the findings recommendation and suggestions for hospital managers are presented.

## 5. Recommendations

In general, specifically in Egypt, the shortage of nurses can be solved by changing the staff attitude towards the nursing profession, recruit nurses who are willing to help patients under difficult circumstances or situations. The policy makers under the hospital administration to find solution to stop the following habits of abuse: Dual practice, absenteeism, doing non-nursing job etc. more researches are required in such field. The following recommendations are proposed:

1. Monetary compensation for extended hours and overtime pay are required to be revised by high authority people.
2. Nurses satisfaction survey to be done regularly
3. Bed assignment to avoid high occupancy rate, which create work overload for nurses and may jeopardize patient care.

4. The policy for incentives should be revised and fairly implemented all over the place based on the performance evaluation.
5. In-service education about time management are required for maximum utilization of nurses time.
6. Nurses who are graduated from secondary school diploma should be supervised.
7. Promote the nursing profession for male nurses.
8. Nursing administrators to motivate nurses to focus on a specific field of clinical specialty in nursing practice, as potential for promotion e.g. some nurses at Cairo University Hospitals taking their work time to join a study in non-nursing field this ended in changing their career and stock loss.
9. Promotes staff development in nursing field. Staff who are granted light work and included in the numbers, creating more load on the rest of the nurses, urgent solution for this inherited problem.
10. Float policy, over time policy, monetary compensation policy are required to be made and implemented in the place.
11. To improve the supply and availability of qualified nurses. In the past, nursing shortages have been “solved” by having “more nurses” the emphasis needs to be shifted to having “more effective nursing”
12. Bed assignment is needed to avoid high occupancy rate and the demand for nurses. Establish transparent data and information about the economic risk as a result of nursing shortage in Kasr Al- Ainy hospital e.g. no available data about: Patient falls, pressure ulcer, hospital acquired infection ect.

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**Appendix**

**Nursing Questionnaire**

Kindly help us in completing this questionnaire to achieve our goal. Anonymity of the information given will be used for research study. The information collected will be held in complete confidentiality.

Code no.....

Please tick the appropriate box:

Gender: Male

Female

Marital status:

Married

Single

Level of education:

Nursing secondary school diploma

Nursing institute diploma

Baccalaureate of nursing

Experience:

Less than 5 years  5-<10years  10-<15 years  15-<20 years  20 years and more

Kindly decide how you feel about the aspect of your job satisfaction described by the statement and tick the appropriate box as a reflection of your degree of satisfaction.

Serial No.	Staff benefits	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
1	My salary is a reflection of the work I do					
2	My supervisor is concerned about my well being					
3	I am satisfied with the vacation eligibility					
4	The work schedule is planned in advance					
5	No frequent changes in my work schedule					
6	I am satisfied with the hospital compensations					
7	I have enough time to finish my work					
	Work environment	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
8	My patients are cooperative, they understand my work conditions					
9	I am satisfied about the security of my job provided to me					
10	I have enough support from my supervisor					
11	The nursing supervisor is visible in the unit					
12	Adequate amount of supplies are available for patient care					
13	Hospital administration is keen to provide training for new staff					

14	Hospital administration is keen to train the staff to operate new equipment					
15	I am not intended to leave the hospital					
16	I receive enough feedback from my supervisor on how well I am doing					
	Communication	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
17	I have good working relationship with my colleagues.					
18	There is a clear channel of communication at the work place					
19	I have clear communication with patients					
20	There is an atmosphere of co-operation between unit staff & hospital administration					
	Staff recognition	Strongly agree	Agree	Uncertain	Disagree	Strongly disagree
21	Hospital administration is extremely fair in giving merit increase for all nurses.					
22	I am entrusted with great responsibility in my work					
23	I receive recognition for tasks well done					
24	Hospital administration does involve staff in decision making					
25	I can depend on my colleagues for support					
26	My patients appreciate what I do for them					
27	Doctors appreciate my work					
28	I have sufficient opportunity to develop in my work (Nurses education)					
29	There is a personal growth in my work (promotion)					
30	I am satisfied with the delegated tasks assigned to me by the head nurse					

Thank you for your assistance in this research project.

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