

Factors Affecting Care and Maintenance of Complete Denture Prosthesis (CDP)-A Literature Review

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Abstract

Background: The prevalence of edentulism which is a major public health concern globally relating to extensive loss of teeth had reduced. For Edentulous Patients (EDPs), Complete Denture Prosthesis (CDP) therapy is a known mode of treatment to improve the overall health and the Oral Health Related-Quality of Life (OHRQoL) with appropriate care and maintenance for its longevity.

Aim: This literature review had been conducted containing the aim to gather the proficiency and ideas related to the factors that affect the care and maintenance of CDP and how it benefits the EDPs related to good CDP care practices.

Methods: Numerous electronic databases which included Scopus, Embase, Google Scholar and Open Grey literature in English language was used to search for the articles from January 1st 2005 to October 1st 2021 on factors that influenced care and maintenance of CDP. Associated article titles were chosen which was narrowed down to abstract of interested articles and the final 20 preferred full articles were reviewed. The selected articles in this study was analyzed using thematic analysis and their themes were grouped accordingly.

Results: Five themes were thematically identified as factors affecting care and maintenance of CDP: social and cultural factors, economic and demographical factors, policy related factors, physical factors and health service related factors. All articles reviewed demonstrated that every factor is highly essential when it comes to taking appropriate care and maintenance of CDP for EDPs.

Conclusion: The current evidence suggests that social, cultural, economical, demographical, policy, physical and health service related factors all significantly constitute towards effective care and maintenance of CDP for EDPs. Furthermore, the results derived from this research is essential in the development of effective post-operative guidelines for appropriate care and maintenance of CDP.

Keywords: Edentulous patients, Care and maintenance, Complete dentures prosthesis, Determinants

1. Introduction

Over the last decade, edentulism has declined globally which is mainly due to the trend in high income countries where more people are taking care of their teeth (Frencken et al., 2017; Rozier, White, & Slade, 2017; Peres et al., 2019; Kailembo, Preet, & Williams, 2017). On the other hand, it had been seen that there is an opposite trend in Low and Middle Income Countries (LMICs) whereby the rate of edentulism is increasing (Kailembo, Preet, & Williams, 2017). In Edentulous Patients (EDPs), a Complete Denture Prosthesis (CDP) is utilized to restore the oral tissues as much as possible to maintain the anatomy (Goiato et al., 2011). Nonetheless, appropriate consideration needs to be provisioned for quality oral health care particularly uses of CDPs which indicated poor oral health if not given the recommended care (Nidhi et al., 2014; Bommireddy et al., 2014; Jaiswal et al., 2015; Bommireddy et al., 2016).

There is also a lack of data on denture wearers' cleaning habits. Due to the variation of CDP care and maintenance guidelines, it is extremely difficult for denture wearers to find the most opted solution to clean the CDP (Patel,

Jablonski, R, & Morrow, 2018; Marchini, 2014; Jablonski, Patel, & Morrow, 2018). Since nowadays denture wearers tend to look for guidance on the internet we cannot blame them for being confused, with there being so many different recommendations to choose from (Jablonski, Patel, & Morrow, 2018; Veronez et al., 2014; Partida, 2014; Bishop, Dixon, & Mistry, 2021).

Without proper denture care and maintenance practices, there would be an increased risk of developing a multitude of problems and infections ranging from angular cheilitis, denture stomatitis, burning mouth syndrome to highly superimposed infections (Singh et al., 2014; Kosuru Sr et al., 2017). There is a need to know on the factors that affect the care and maintenance of CDP for its longevity. There are a few previous studies on complete denture wearers (Rabbo et al., 2012; Shinkai et al., 2002; Mousa, Lynch, & Kielbassa, 2020) had been conducted where the complaints based on care and maintenance of dentures were considered. This limited information available in this area of dentistry makes room for further research to be conducted in this area which plays a vital role in the lives of both the EDPs as well as the Dental professionals (DPs) in terms understanding the factors that affect the care and maintenance of CDP of the EDPs in Fiji.

This article aims to produce a narrative review of the literature on this subject and draws conclusions on the factors affecting care and maintenance of CDP for EDPs in Fiji.

2. Methods

Literature search related to the topic was executed by the use of electronic databases Scopus, Embase, Google Scholar and Open Grey literature. These databases were chosen since they had been regularly utilized in previous research. Every study design such as qualitative, quantitative and mix method studies were taken into consideration in the literature search. The search was restricted to studies from 2010 to October 1st 2021. Language restrictions were applied to the research where abstracts or papers were obtained in English. Reference lists of selected articles were checked for papers that may have been missed by chance in the database search after which the references cited in retrieved papers were also examined. However, later the search was extended to January 1st 2005 to October 1st 2021 to allow for more relevant literatures to be reviewed and to appropriately identify the gaps in the knowledge in the literature.

To retrieve relevant articles, keywords (in titles and/or abstracts) such as patient “perceptions”, (“care OR maintenance”), (“barriers OR challenge”), “complete denture”, (“communication OR management”), and percept*, “complete denture prostheses”, “dental professional perception”, (“complete” OR “denture” OR “guideline” OR “insertion” OR “advise”), “edentulous patients”, (“dental professional” OR “dentist” OR “Dental officer” OR dental technician”), (“teamwork” OR recommendations”) were utilized. Searches were performed using “Boolean operators” (“AND”, “OR”, “NOT”) according to syntax rules of different databases (Rethlefsen et al., 2021) to combine keywords and generate more literatures.

3. Results

Comprehensively, 641 article titles related to the topic had emerged in the search whereby 100 articles were highly appropriate to the purpose of the review thus was shortlisted upon excluding the duplicates. A second round of check for duplicates was undertaken and upon further article removal, there was 39 articles left. The abstracts of the 39 articles were thoroughly screened. Abstracts that were not of interest, not in English and those that could not be accessed were further excluded which came down to 25 articles. The 25 articles including the article titles were sent to the primary supervisor to obtain full articles. The final 20 articles were then obtained and analyzed from the list. The significant findings and conclusions from 20 articles were extracted and grouped under themes. The selected articles reviewed in this study was analyzed using the process of thematic analysis and was further grouped according to their respective themes for discussion which were 1) Social and cultural factors, 2) Economic and demographic factors, 3) Policy related factors, 4) Physical factors and 5) Health service related factors which had been explored below respectively.

4. Discussion

4.1 Factors affecting Care and Maintenance of CDP

4.1.1 Social and Cultural Factors

Social factors greatly affect EDPs in understanding that there is a need to look after their CDP. The common known social factors include: reference groups, family, role and status (Perreau, 2014). Firstly, each patient belongs to a group. This is a direct and simple classification. The second group type is a reference group. The reference group influences the self-image of patients and their behavior. The reference group provides some points of comparison to patients about their behavior, lifestyle or habits. Usually there are many smaller reference groups,

which are formed by family, close friends, neighbors, work group or other people that patients associate with. The groups to which a consumer does not belong yet can also influence. These aspirational groups are groups where an individual aspires to belong and wants to be part of in the future (Armstrong et al., 2014; Abbas, 2014) when considering social factors that would affect delivery of effective oral healthcare services.

The type of food and drink consumption also has an effect on complete denture patients when it comes to taking into account the care and maintenance aspect of it. Ideal consideration had been given to consumption of probiotic bacteria which may be associated with improved oral health. Nonetheless, probiotics and its impact on the oral microbiota of CDP patients have not been observed (Sutula et al., 2012). A 4-week consumption of probiotic drink has no overall effect on selected oral parameters in healthy denture wearers despite temporary presence of *Lactobacillus casei* strain Shirota (LcS). A study was conducted by Sutula, J. et al., (2012) to scrutinize the impact on the intake of a commercial probiotic product named Yakult on microbiota of saliva, tongue and prostheses biofilm in healthy CDP wearers. The study was conducted among 8 health complete denture wearing patient who undertook a 7-week trial comprising three phases: baseline; 4-week consumption of one bottle of Yakult per day, each containing a minimum 6.5×10^9 viable cells of LcS; washout period during 4 weeks. The survival rate of microbial and arrangement of saliva, tongue and denture biofilm was evaluated by using various solid measurable media. A modified OHIP-14 questionnaire was utilized in exploring denture cleaning habits of patients and also the effect of the use of dentures for improved well-being before and after study. The study showed that LcS had colonised the denture surface and the oral cavity temporarily. No major changes were seen in the success rate of *Streptococcus mutans*, acidogenic microorganisms, total anaerobic species and Gram-negative obligate anaerobes along the respective phases of this study. In addition, that had been no major impact of LcS on occurrence and success rates of *Candida*. CDP patients had an exceptional general knowledge of CDP hygiene and it was also highlighted that the responses made to OHIP-14 questionnaires had also shown improvement upon completion of the study (Sutula et al., 2012; Gera, Cattaneo, & Cornelis, 2020).

4.1.2 Economical and Demographical Factors

Economic factors are more related towards the financial acceptance a patient has and the willingness of the patient to invest in for their CDP (Berwick, 2020). The awareness level of dental information was low among complete and removable denture patients and this was associated with a low level of education and lack of accurate information. A study was conducted by Basnyat. S. K.C. et al., between June 2018 to September 2018 to assess awareness, expectation and source of information about dental implant among complete and removable partial denture wearers and to find association between them who visited Dental Outpatient Department of Dhulikhel Hospital for dental implant. The study was conducted among 300 patients where a questionnaire consisting of 6 close-ended questions was used to assess the level of knowledge and awareness. Chi-square test was used to study the association between demographic variables and awareness among patients. The study revealed differences in age ($p=0.001$), education level ($p=0.03$) and occupation ($p=0.004$) in awareness of dental implant and no significant difference in gender ($p=0.567$), when compared between complete and removable partial denture wearers. Due to lack of awareness, lower educational status and advanced age the patients responded that they “did not know” as answer to almost all the questions (Basnyat et al., 2020). Therefore, having no idea about the treatment is not going to boost the zeal of EDPs to undergo complete denture treatment (Ahuja, 2020).

Demographic factors also play thoroughly in understanding the need for complete dentures for EDPs. The use of conventional complete dentures brings negative impacts in the OHRQoL of elderly patients, mainly in case of lower prostheses that required reparation or substitution, with a removable total denture as antagonist. As study was conducted by Perea C. et al., (2013) to look into the differences on the effect of OHRQoL among CDP patients based on socio-demographics, factors related to dental prosthetics and oral status. The research was conducted among 51 patients of age range from 50-90 years who had undergone treatment with at least one complete denture at the Department of Buccofacial Prostheses of the Complutense University in Madrid. The participants answered the OHIP-14 questionnaire and the additive scoring method was used to gather variables related to prosthetics and socio-demographic. Oral conditions of patients were assessed upon undergoing clinical examination. The data was analyzed using descriptive probes and Chi-Square tests. The study showed that the predominant participants' profile was that of a man with a mean age of 69 years wearing complete dentures in both the maxilla and the mandible. The prevalence of impact was 23.5%, showing an average score of 19 ± 9.8 . The most affected domains were functional limitation and physical pain followed by physical disability. Minor impacts were recorded for the psychological and social subscales such as psychological discomfort, psychological disability, social disability and handicap. The prosthesis' location significantly influenced the overall patient satisfaction, the lower dentures being the less comfortable. Having a complete removable denture as antagonist significantly hampered the patient satisfaction. Patients without prosthetic stomatitis and those who need repairing or changing their prostheses,

recorded significantly higher OHIP-14 total scores (Perea et al., 2013; Ahmad, Mazhar, & Muhammad, 2013).

4.1.3 Policy Related Factors

Policy factors affect immensely as Fiji to date does not have a policy guideline developed on how CDP can be taken care of and maintained. Due to the recent increase in the elderly population, there is a sheer need to consider this group for an improved QoL. One of the prime factors that affect the QoL of the elderly population is Oral health especially when developing oral health policies. Presently, there is a moderate OHRQoL in the elderly patients, who have oro-dental problems. A study was conducted by Motallebnejad M. et al., (2015) to assess the aged population and the impact of oral health on QoL in Babol, Iran. The research was conducted by the use of sampling technique known as multi-stage cluster among 300 aged patients of age 65 years and over. The Persian version of OHIP-14 questionnaire was used to assess the OHRQoL. Data collection was conducted using oral examinations and interview where details based on gender, age, occupation, education, the date of the last dental visit, use of prosthetic appliances, and dental treatment needs, including the periodontal, prosthetic, and surgical needs, were recorded. Mann-Whitney and Kruskal-Wallis tests on SPSS was used to analyze the data. The study showed that no major impact was identified in OHIP-14 scores related to gender, involving least scores based on academic education. Participant with prosthetic appliances showed lesser scores in the OHIP-14 as to the ones without prosthetic appliances. Patients who were edentulous showed higher OHIP scores than the dentate patients. No correlation between age and OHIP-14 scores were highlighted (Motallebnejad et al., 2015). Such outcomes are vital contributors to the development of effective prosthetic oral health policy for the people of Fiji (Watt et al., 2019; Al Deeb et al., 2020; Listl, 2019).

4.1.4 Physical Factors

Physical factors such as the way patients and DPs live also affects their understanding on the care and maintenance of CDP. There needs to be effective denture cleaning habits adapted by the patients. Majority complete denture patients maintain their denture hygiene in good condition yet it is vital for these patients to be given proper post-insertion guidelines regarding maintenance of denture hygiene. Major origin of cleaning prostheses had been by the use of brush and water which most patients perform regularly. A study was conducted by Jandial, S., (2017) to find out the rate of CDP hygiene in patients where 146 geriatric patients were assessed on CDP hygiene habits by the use of self-administered structure proforma to identify the CDP wearing habits, practices of CDP cleaning, storing and denture wearing habits at night. Analysis of data was performed by the use of SPSS Version 16.0 at p value <0.05. The research showed that 41% geriatric patients cleaned their dentures daily while, 46.7% had been cleaning it weekly together with 12.3% of patients who had rarely cleaned the dentures. Majority patients' clean dentures using brush and water (46.1%) followed by use of water only (29.8%). 45% of patients wear CDPs in the day while 36.4% had utilized it during mastication of food. Upon examining, it was concluded that CDP condition was good in 52.7% patients, while 30.1% was fair and 17.2% was poor. Furthermore, the Pearson Correlation had highlighted positive correlation on the rate of cleaning and condition of CDPs (Jandial, 2017; Mahboubi et al., 2020; Sharma et al., 2020).

4.1.5 Health Service Related Factors

The effectiveness of delivery of oral healthcare services is also considered an important factor related to the provision of efficient care and maintenance of CDP. Measuring dental clinic service quality is a major factor in improving prosthetic oral healthcare for the EDPs in Fiji. The quality provided plays an important role in patient satisfaction and perception towards their CDP. A study was conducted by Bahadori, M. et al., (2015) to identify factors affecting dental service quality from the patients' viewpoint. A cross-sectional, descriptive-analytical study was conducted among 385 patients from two work shifts using stratified sampling proportional to size and simple random sampling methods in a dental clinic in Tehran between January and June 2014. A self-administered questionnaire was designed for the study based on the Parasuraman and Zeithaml's model of service quality which consisted of two parts which are the patients' demographic characteristics and a 30-item questionnaire to measure the five dimensions of the service quality. The data was analyzed using SPSS 21.0 and Amos 18.0 through some descriptive statistics like the mean, standard deviation, as well as analytical methods, including confirmatory factor. The study showed that the correlation coefficients for all dimensions were higher than 0.5. In this model, assurance (regression weight=0.99) and tangibility (regression weight=0.86) had, respectively, the highest and lowest effects on dental service quality (Bahadori et al., 2015). Therefore, it can be understood that delivery of oral healthcare service does have an impact on these EDPs when it comes to their CDP (Zaitsu, Saito & Kawaguchi, 2018; Bukleta et al., 2019; Mastilovic et al., 2021).

5. Conclusion

The current literature highlights on the factors affecting care and maintenance of CDP to improve the longevity of CDPs and its utilization. Social and cultural factors related to care and maintenance of CDP can be attained by being in a like-minded reference group to improve lifestyle and eating patterns. Economical and demographical factors towards CDP care and maintenance can be achieved through standardizing treatment costs for complete dentures and establishing more dental prosthetic clinics to provide CDP treatment to every EDP in Fiji. Policy related factors towards CDP can be made more efficient by having periodic review of CDP care and maintenance guidelines in Fiji. Physical factors can be maximized by effective engagement of both dental professionals and the patients towards undergoing a thorough practice on denture care. Finally, Health service related factors can be improved by utilizing quality CDP fabrication materials and decentralizing Dental prosthetic clinics to cater a wider range of population for its effectiveness.

Ethical Approval

Not Applicable

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Author Contribution

MN and MM planned and designed the study. The study was supervised by MM. MN collected abstracts and both authors contributed to the abstract screening and extracting the data with the drafting and revising of the paper and gave final approval of the revision to be published, and agree to be accountable for all aspects of the work.

Competing Interests Statement

The authors declare that there are no competing or potential conflicts of interest.

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