

RESEARCH ARTICLE

PREVALENCE OF PROSTHODONTICS AND ASSOCIATED COMPLICATIONS: A CROSS-SECTIONAL STUDY

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Abstract

..... Statement of problem: Prosthodontics has received significant attention both in research and practice. However, limited research examines its prevalence and how effective it is.

Purpose: The purpose of this clinical study is to examine the prevalence of prosthodontics and its associated complications

Material and methods: A sample of 1005 individuals derived from the general Saudi Arabia was used in this study. Data was collected using a questionnaire. The data collected was analyzed using SPSS.

Results: There is a generally low prevalence of prosthodontics in Saudi Arabia. The common type of prosthodontics used is the fixed prosthodontics. Majority of those who have done prosthodontics didn't suffer any associated complications. However, for those who depicted complications, the common one was caries. Other complications include root fracture and porcelain veneer fracture.

Conclusion: Prosthodontics is not widely used. On the other hand, it is not 100% effective in treating oral health problems.

Clinical implications: There is need to develop better ways of dealing with poor oral health and patients need to be examined well to

determine the underlying risk factors before prosthodontics is carried out.

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Introduction:-

Poor oral health continues to be a problem among many nations even though in general there is reduced prevalence of oral conditions. The most common oral health condition is tooth loss. Tooth loss is a particularly common phenomenon among the aging individuals. Tooth loss and poor oral health in general negatively affects one's quality of life at the psychological, social, and biological levels¹. It is for this reason that oral health management has become crucial. One of the oral health care practices that has received significant attention in research and practice is prosthodontics. The widely used definition of prosthodontics is it is a branch of dentistry that pertains to the restoration and maintenance of a patient's oral function, appearance, comfort and health through replacement of contiguous tissues and missing teeth with artificial substitutes². As a practice, prosthodontics has evolved significantly over time and the current prosthodontic practice is a result of many years of clinical practice. Academically, prosthodontics is among the main components of the dental school curricula.

Significant research has been carried out on the status of prosthodontics with regard to its use and its associated complications. For example, a study that was carried out across 8 regions in Macedonia and which involved a sample of 432 individuals aged over 65 years, it was found that only 6 percent of participants did not have any prosthetic appliance. On the other hand, 28.7 percent of participants had partial dentures, 9.5 percent of them had two or more bridges, and 10.7 percent of the participants had both bridges and partial dentures³. It implies that the prosthodontic practice is considerably prevalent in Macedonia.

On the other hand, in a study which involved a search of publications covering the last 50 years, it was found that that the most common complications associated with prosthodontics are crown fracture, loss of retention, need for endodontic treatment, post loosening, root fracture, caries, porcelain veneer fracture, prosthesis debonding, and tooth discoloration⁴. However, the prevalence of complications varied with the prosthodontic practice used. For example, the lowest complication incidence was observed in all-ceramic crowns. On the other hand, resign-bonded prostheses and conventional fixed partial dentures had comparable complication incidences. The purpose of this clinical study was to examine the prevalence of prosthodontics and its associated complications.

Materials and Methods:-

In this study,a sample of 1005 individuals were used. The study was based on Saudi Arabia, with the study population being the Saudis. This is a cross-sectional study in that the sense that it cut across the whole Saudi population and was carried out in a specific time, that is, between 29/7/2020 and 17/11/2020. The study also cut across all ages. The inclusion criterion was the general population. In other words, one qualified to be involved in the study if they were part of the general Saudi population. It is for this reason that the 1005 individuals also comprised of those who had not undergone prosthodontics. The involvement of individuals who had not undergone prosthodontics was key to determining the prevalence of the practice.

Informed consent was obtained from all participants before they could take part in the study. This was to ensure that the participants understood what the study entailed, the possible dangers involved, and that they were participating in the study in their own freewill⁵. The data was collected using a questionnaire. The questionnaire focused identifying those who had not undergone prosthodontics and, for those that had undergone, which type they used.

The data collected included one's gender, age, whether one has ever done prosthodontics, the type of prosthodontics they did, whether those who did prosthodontics were satisfied with the quality of their life, and the complications they suffer from⁴. All this data was obtained from the questionnaire filled by participants. As such, no test was carried out on the participants. Lack of tests was aimed to avoid harming the participants in any way.

The data collected was analyzed using SPSS. The SPSS software was used to examine the prevalence of prosthodontics use in the Saudi population and the prevalence of different types of complications⁶. To determine the prevalence of prosthodontics, frequencies of the collected data were obtained.

Results:-

As indicated, a total of 1005 participants were enrolled for the study.

Demographics:

Demographically, 606 of the participants were male while the remaining 399 were female. As such, the male participants were majority (60.6%). With respect to age of participants, those above 50 years were a slight majority (19%) followed by those aged between 26-30 years (15.7%). However, all individuals from 19 years to those aged over 50 years were well represented in the study sample. In terms of nationality, majority of participants (90.3%) were Saudis with the remaining 9.7% comprising of non-Saudis. As such, the study population was highly homogenous. This is given considering that the study was focused on Saudi Arabia.

Prevalence of prosthodontics:

On being asked whether they have done prosthodontics, 32.8% of the participants indicated that they have done it. The remaining 67.2% indicated that they have not done prosthodontics. Based on the sample used, it shows that prosthodontics is not prevalent. With regard to the type of prosthodontics used, majority of those who stated that they have done prosthodontics revealed they have used the fixed prosthodontics (309) with only 21 participants stating that they have used the removable prosthodontics. On the specific types of prosthodontics, majority of those that had done prosthodontics (12.7%) indicated that they had used dental crowns. This was followed by dental bridges (6.2%). Other types of prosthodontics evident from the results include dental inlay, dental outlay, and veneer.

Associated complications:

When asked to indicate the complications they experienced as a result of prosthodontics, majority of those who had prosthodontics (116) indicated that they had no complication. 72 of this group, however, indicated that they suffered from caries. Other complications that were highlighted by participants as a result of engaging in prosthodontics are root fracture and porcelain veneer fracture. A summary of the complications associated with prosthodontics and their prevalence is found in the appendices.

Discussion:-

Prevalence of prosthodontics:

The results of this clinical research show that while prosthodontics, as a practice, is crucial in oral health management, it is not prevalent in Saudi Arabia. There are a number of possible reasons for low prevalence level, one of them being good oral health among Saudis.In this clinical research, the focus was the general population as opposed to individuals who suffer from poor oral health and particularly teeth loss. With majority of the participants indicating that they had done prosthodontics, it is highly possible that they have not been compelled to because of generally good oral health enjoyed by majority of Saudis. However, research studies show that this is unlikely the case as oral health among the Saudis has been found to be considerably poor. For example, in their study, Alzahrani et al⁷ established that oral health was generally poor among Saudi adolescent students aged between 12 and 15 years. For instance, there were a high rate of plague (94%), caries (76%), and gingival bleeding (86%) among individuals in this group. In another study, Alkahtani et al⁸ established there was generally poor oral health among adults with hearing impairment in Riyadh City, Saudi Arabia. For example, there was an 82% prevalence of caries among the examined individuals. It can thereby be concluded that it is unlikely that good oral health is the reason for the comparably low prevalence of prosthodontics in Saudi Arabia.

Another possible reason for low prevalence of prosthodontics is low awareness level. It is possible that people in Saudi Arabia are not aware of the prosthodontics and its benefits. This is captured in a study by Azad et al⁹. This study was carried out at the prosthodontic AFID department in Rawalpindi, Pakistan. 137 patients were reviewed to determine whether they were aware of prosthodontic treatment. Out of the 137, 19 of them had low awareness of this treatment, 89 of them had medium level of awareness while 29 of the participants had high level of awareness. If low awareness is taken to mean very little knowledge about the treatment, including lack of knowledge about what its existence and medium awareness to mean knowledge about the existence of this treatment option and what it means but little knowledge about its benefits, then it can be concluded that a significant number of people have limited knowledge about prosthodontics and thereby they do not seek it even though they need it¹⁹. Should this be the case, it would mean that most individuals in Saudi Arabia have not sought prosthodontic treatment because they are not aware of its existence or the benefits it has.

The possibility of low level of awareness as a factor that has contributed to the low level of prevalence of prosthodontics is also alluded in a study by Reddy et al¹⁰. This study involved 467 participants derived from the local Jazan population in the southern region of Saudi Arabia. The focus of the study was to determine the perception and awareness of prosthodontic rehabilitation in the Jazan population. One of the questions the participants were asked was the reasons why they had not replaced missing teeth. 57.36% of the participants indicated that inadequate knowledge was one of the reasons for failure to replace a missing tooth. It implies that the participants were not aware of the teeth replacement options available for them or the health benefits that come with replacing the missing teeth²⁰. It is also possible that these individuals were not aware of the places they seek this treatment from.

Other possible reasons for the low prevalence of prosthodontics include cost and accessibility of health. It is possible that prosthodontic treatment is costly, which discourages people from seeking it. Normally, cost is one of the factors that contribute to poor health among people. With the general cost of healthcare around the world being significantly high, many people, especially low-income individuals, avoid seeking healthcare services as they cannot afford²¹. As such, while people may have knowledge of prosthodontics, its benefits, and the need to carry out it, the prohibitive cost may discourage them. Cost, as one of the factors that contribute to low prevalence of prosthodontics is suggested in a study by Nikolovska et al³. In this study, it was established cost was among the other factors that prevented the elderly in Macedonia from seeking prosthodontic treatment.

Accessibility of healthcare is also among the factors that contribute significantly to whether one seeks certain treatment. While there has been significant improvement in healthcare over time, accessibility remains a challenge. There are many parts of the world where accessibility to healthcare is poor²². This is due to lack of healthcare facilities and poor infrastructure. For instance, in most developing nations and particularly in rural settings, healthcare facilities are few. In addition, they are poorly equipped. Coupled with a poor transport system, healthcare accessibility becomes a particular challenge. As such, most people decide to not to seek the medication. Poor accessibility as a reason for low use of prosthodontics is suggested in the study by Nikolovska et al³.

However, for this study, the low prevalence of the prosthodontics in the study population could also be due to the demographic characteristics of the sample used. In this study, all age groups from 19 years were considered. However, it is important to note that poor oral health, and particularly missing teeth, is significantly restricted to older individuals. It is uncommon to find younger individuals suffering from missing teeth even though other oral health problems such as caries may common. With prosthodontics focused mainly on the replacement of missing teeth, it means that this practice is unlikely to be witnessed among the younger generation. In this study, only 19% of the population comprised of individuals aged over 50 years and the rest of individuals aged 50 years and below, it implies that level of prevalence of prosthodontics where people seek to have their teeth replaced would be significantly low and restricted mainly among the older participants.

Types of prosthodontics done:

The results indicate that for those participants that had sought prosthodontics, they mainly went for the fixed prosthodontics rather than the removable, with 309 of the 330 (93.6%) individuals who indicated that they done prosthodontics opting for the fixed prosthodontics. The main reason for the high prevalence of fixed prosthodontics is the number of missing teeth²³. Normally, people are likely to opt for fixed prosthodontics when there are only a few teeth missing. On the other hand, if many teeth are missing, one is likely to opt for the removable prosthodontics selected by an individual. They include aesthetics, cost, age, indications, and dentist and patient immanent factors. For example, it was established in this study that younger individuals are concerned with their dental appearance. It is for this reason that most individuals aged below had their anterior teeth provided with fixed prosthodontics.

Particular prosthodontics used:

For the participants who used prosthodontics, the common ones identified from the results are dental crowns (127 individuals) followed by dental bridges (62 individuals). Other prosthodontics used includes dental inlay, dental onlay, and veneer. The prevalence of dental crowns has also been noted in previous research. For instance, in their study, Stankiewicz and Wilson¹²show that dental crowns are considerably used in prosthodontics. One of the possible reasons for the prevalence is restoration. One of the characteristics of poor oral health is the weakening of

teeth and loosening of tooth structure. Dental crowns help to restore the tooth structure as well as the teeth strength. With dental crowns playing two roles, this has made them popular²⁴. While structure restoration and aesthetics are the reason for the high prevalence of dental crowns, it is yet to be established why dental bridges are significantly used considering their high rate of failure. For instance, in their study, Fayyad and Al-Rafee¹³ found that there was 35.5% failure of dental bridges.

Associated complications:

From the results, it can be deduced that the most prevalent complication associated with prosthodontics is caries (72 cases) followed by root fracture (49 cases). Considering that 330 of individuals indicated that they had done prosthodontics, if only this group is considered, the prevalence of caries is 21.81%. However, majority of the individuals (116) who admitted to have done prosthodontics indicated that they did not suffer from any complication. The other complication evident from the results is porcelain veneer fracture. These results are in line with previous research which also indicates the presence of these complications. For example, Goodacre et al⁴ also found that carries and root fracture were some of the common complications associated with prosthodontics.

The complications that come with use of prosthodontics show that this treatment is not very effective in dealing with poor oral health. Instead it results in more dental problems. Prosthodontics, in general, has a significant level of failure¹⁷. For example, in a study on partial dental failures, one of the commonly used prosthodontics, it was found that there were significant biological, mechanical, esthetic failures in partial dentures¹⁴. The mechanical failures identified include loss of retention, fracture of bridge, coronal tooth fracture, porcelain fracture, and occlusal wear. The biological failures, on the other hand, include caries, tenderness on bite, sinus opening, and food lodgment among others¹⁸. Lastly, the aesthetic failures include unacceptable color match, and under-contoured or over-contoured margins. The complications, biological, mechanical, and aesthetic, imply that for in some cases, the goal of undergoing prosthodontics is not achieved¹⁵. Rather it creates more oral health problems. For example, while the goal may be to strengthen loosened tooth structure, mechanical failures such as loss of retention achieves the opposite. Such failures make it hard for an individual to operate normally even after treatment.

Clinical implications:

One of the clinical implications of this the results in this study is there is need to develop better ways of dealing with poor oral health. As demonstrated, prosthodontics is not 100% effective as there are a significant number of complications which occur after prosthodontics. Another clinical implication is the there is need to examine a patient in terms of their level of risk of developing complications after prosthodontics¹⁶. From the results it can be found that a significant number of individuals do not suffer from complications. This implies that it is possible that those who suffer from associated complications have underlying risk factors which contribute to the development of these complications. As such, there is need to examine patients well before recommending prosthodontics.

Conclusion:-

Prosthodontics is increasingly used in dentistry to treat poor oral health and particularly deal with missing teeth. Prosthodontics is particularly common among the older individuals because they constantly suffer from teeth loss. However, results in this study show that there is still low prevalence of prosthodontics, particularly in Saudi Arabia. Some of the possible reasons for the low prevalence include lack of awareness about this treatment option, unaffordability, and access to healthcare. With respect to type of prosthodontics used, it was established that the fixed prosthodontics is commonly among the Saudi population. Lastly, it was established that prosthodontics has a number of associated complications which include caries, root fracture, and porcelain veneer fracture. However, the complications are evident in a small proportion of the population. The complications associated with prosthodontics imply that there is need to develop better ways of dealing with poor oral health and particularly teeth loss. It also implies patients should be examined in a better way to determine the underlying risk factors that could contribute to complications when one is subjected to prosthodontics.

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Appendices:

Table:-							
Gender							
		Frequency	Percent	Valid Percent	Cumulative Percent		
Valid	Fema	399	39.7	39.7	39.7		
	Male	606	60.3	60.3	100.0		
	Total	1005	100.0	100.0			

Table 2:-

Age						
		Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	19-25	156	15.5	15.5	15.5	
	26-30	158	15.7	15.7	31.2	
	31-35	153	15.2	15.2	46.5	
	36-40	133	13.2	13.2	59.7	
	41-45	114	11.3	11.3	71.0	
	46-50	95	9.5	9.5	80.5	
	Above	191	19.0	19.0	100.0	
	Total	1005	100.0	100.0		

Table 3:-

Nationality						
		Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	Non-	97	9.7	9.7	9.7	
	Saudi	908	90.3	90.3	100.0	
	Total	1005	100.0	100.0		

Table 4:-

Have_you_ever_done_dental_cosmetic_prosthodontics						
		Frequency	Percent	Valid Percent	Cumulative Percent	
Valid	No	675	67.2	67.2	67.2	
	Yes	330	32.8	32.8	100.0	
	Total	1005	100.0	100.0		

Table 5:-

What_type_of_prosthodontics_you_did						
		Frequency	Percent	Valid Percent	Cumulative	
					Percent	
Valid		675	67.2	67.2	67.2	
	fixed prosthodontics	309	30.7	30.7	97.9	
	Removable Prosthodon	21	2.1	2.1	100.0	
	Total	1005	100.0	100.0		

Table 6:-

Choose_the_specific_type_you_did							
		Frequency	Percent	Valid Percent	Cumulative Percent		
Valid		675	67.2	67.2	67.2		
	Dental bridge	62	6.2	6.2	73.3		
	Dental crowns	127	12.6	12.6	86.0		
	Dental Inlay	24	2.4	2.4	88.4		
	Dental onlay	19	1.9	1.9	90.2		
	I don't know	38	3.8	3.8	94.0		
	Other	22	2.2	2.2	96.2		
	Veneer	38	3.8	3.8	100.0		
	Total	1005	100.0	100.0			

Table 7:-

Please_choose_the_complications_you_suffer_from							
		Frequency	Percent	Valid Percent	Cumulative Percent		
Valid		675	67.2	67.2	67.2		
	Caries.	72	7.2	7.2	74.3		
	Nothing	116	11.5	11.5	85.9		

	other	61	6.1	6.1	91.9
	porcela	32	3.2	3.2	95.1
	Root fr	1	.1	.1	95.2
	root fr	48	4.8	4.8	100.0
	Total	1005	100.0	100.0	