PROSTHETIC STATUS AND NEEDS IN PATIENTS VISITING DENTAL TEACHING HOSPITALS OF PESHAWAR.

ABSTRACT... Objectives: The study aimed to collect the data regarding prosthetic status and need. Study Design: Cross sectional study. Setting: Three Teaching Dental Hospitals of Peshawar. Period: October to December 2017. Materials and Methods: Participants were given a pre-structured questionnaire which was designed to collect information regarding prosthetic need and prosthetic status. It consisted of two parts—the first part recorded data on socio-demographic factors (age, gender, educational level, socioeconomic status), while the second recorded the prosthetic status and need. Results: A total of 600 subjects were included comprising of 310 (51.6%) males and 290 (48.3%) females. The age ranged from 15 to 88 years with mean age 35 years. A total of 199 (33.1%) respondents were uneducated and 400 were educated. Out of 400, 63 (10.5%) had primary education, 167 (27.8%) had secondary education, 91 (15.1%) were graduates and 79 (13.1%) had a post-graduation. There was significance difference found between age, education, socioeconomic status and prosthetic status. (p=0.000, 0.000, 0.004). There was no significance difference in prosthetic status between genders. There was significance difference found between education, socioeconomic status and prosthetic need (P value is 0.000, 0.012). There was no statistical significance found with respect to gender and prosthetic need. Conclusion: Hence, it can be concluded that most of the prosthetic needs of the studied population were unmet with prosthetic needs being approximately two fold greater than the prosthetic status.

Key words: Needs, Prosthodontics, Prosthetic Status.

INTRODUCTION
Oral health is an integral part of general health and awareness about oral health plays a significant role in determining the dental health of a person. With increasing age, changes appear in the oral cavity partly due to normal wear and tear and also, due to certain diseases that become common as age advances.

Tooth loss is shown to be an important deterrent to oral health and has proven to adversely affect the dietary intake and nutritional status of individuals, hence, leading to a compromise in general health and substantially reducing the quality of life. The major reason for tooth loss has been attributed to poor oral health, periodontal disease and dental caries. Oral diseases alone do not contribute to tooth mortality but a variety of non-disease indicators also play a role. These include socio-demographic and socioeconomic factors, education, dental attitudes and dental utilization behaviors. Moreover, psychosocial factors as well as age, gender, lifestyle (dietary habit, smoking, alcohol intake, etc.) and oral health behavior may modify the progression of oral diseases/disorders.

Various studies in the past have revealed that socioeconomic status and education level have a strong association with oral health. Dental health has improved considerably over the past century, being considerably better among the people belonging to high socioeconomic status. Findings from recent studies show that people with low and very low incomes are 5 times more likely to have a poor oral health status compared...
to those with high incomes.\textsuperscript{7} In addition, a higher level of education is commonly related to better oral health and quality of life.\textsuperscript{7} Higher level of education also ensures the possibility to attain and understand information regarding oral health.\textsuperscript{7}

Dental prosthesis has the ability to reduce and in many cases eliminate the deficits attributed to lost teeth.\textsuperscript{3} Prosthodontic rehabilitation is very important in patients with post endodontic therapy and who are completely or partially edentulous, because it improves their chewing ability, digestion, aesthetics, and as a result, their quality of life.\textsuperscript{8,9,10}

In order to promote oral health of a population, it is imperative to know their prosthetic status and needs.\textsuperscript{11,12,13,14,15,16} However, there is a major discrepancy between prosthetic need and their fulfillment via treatment. This issue needs to be addressed and calls for a thorough assessment of the current prosthetic status and a proper healthcare plan accordingly. From the extensive literature review it was found that there is limited data available regarding prosthetic status and needs of the population of Peshawar region.\textsuperscript{8} Hence, it is essential to collect baseline data for policy formulation, planning, monitoring and to evaluate oral health services.\textsuperscript{17} Therefore, the present study was aimed to collect the base line data regarding prosthetic status and need and their relation to age, gender, socioeconomic status and educational level, which helps dentists as well as policy makers to address this issue.

\textbf{MATERIALS AND METHODS}

This cross sectional study was conducted in October to December, 2017 and included patients reporting to three teaching dental hospitals of Peshawar i.e. Peshawar Dental Hospital, Sardar Begum Dental Hospital & Khyber College of Dentistry. The study was conducted to find out a relationship between the prosthetic status and prosthetic need and compared that with age, gender, socioeconomic status and educational level of patients reporting to the aforementioned dental teaching hospitals of Peshawar. The inclusion criteria were based on two factors i.e. age and permanent dentition. Patients aged 15 years or above with permanent dentition were considered for the study. Subjects were informed thoroughly after which their verbal consent was obtained.

Participants were given a pre-structured questionnaire which was designed to collect information regarding prosthetic need and prosthetic status. It consisted of two parts—the first part recorded data on socio-demographic factors (age, gender, educational level, socioeconomic status), while the second part contained a section of the World Health Organization(WHO) oral health assessment form (1997) to record the prosthetic status and need.

Socioeconomic status was determined using minimum wages that vary according to each class in this society. The lower, middle, and high classes were divided using the minimum income earned by an individual per month. These were as follows:

- 0-15,000 (Lowsocioeconomic status)
- 15,000-50,000 (Middle socioeconomic status)
- 50,000 and above (High socioeconomic status)

The level of education attained by each patient was found out by inquiring how many years they spent in an educational institute and was classified into four groups:

- Uneducated (spending no time in an educational institute),
- Primary (up to fifth grade),
- Secondary (up to twelfth grade),
- Graduate (holding a bachelor’s degree) and Post graduate (holding university degree).

The data regarding their oral health status was obtained through verbal interviews and direct intra-oral examination of the study subjects. The following criteria were used during examination.

\textbf{Prosthetic Status}

0 – No prosthesis
1 – Fixed Partial Denture
2 – More than one Fixed Partial Denture
3 – Partial denture
4 – Both Fixed Partial Denture and partial denture(s)  
5 – Full removable denture  
9 – Not recorded  

**Prosthetic Status**  
0 – No prosthesis needed  
1 – Need for one-unit prosthesis  
2 - Need for multi-unit prosthesis  
3 - Need for combination of one-and/or multi-unit prosthesis  
4 - Need for full prosthesis (replacement of all teeth)  
9 – Not recorded  

Intra oral examination was conducted by various examiners trained by the principal investigator. The examination was conducted on a dental chair with the help of sterile examination instruments.  

The data was analyzed using SPSS version 23.  

**RESULTS**  
In the present study, a total of 600 subjects were included comprising of 310 (51.6%) males and 290 (48.3%) females (ratio of 1.07:1). The age ranged from 15 to 88 years with mean age 35 years. (Table-I)  

<table>
<thead>
<tr>
<th>Age Range (Years)</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>11-20</td>
<td>53 (8.8%)</td>
</tr>
<tr>
<td>21-30</td>
<td>213 (35.5%)</td>
</tr>
<tr>
<td>31-40</td>
<td>156 (26%)</td>
</tr>
<tr>
<td>41-50</td>
<td>98 (16.3%)</td>
</tr>
<tr>
<td>51-60</td>
<td>56 (9.3%)</td>
</tr>
<tr>
<td>61-70</td>
<td>16 (2.7%)</td>
</tr>
<tr>
<td>71-80</td>
<td>5 (0.8%)</td>
</tr>
<tr>
<td>81-90</td>
<td>3 (0.5%)</td>
</tr>
</tbody>
</table>

**Table-I. Age wise distribution of respondents**  

A total of 199 (33.1%) respondents were uneducated and 400 were educated. Out of 400, 63 (10.5%) had primary education, 167 (27.8%) had secondary education, 91 (15.1%) were graduates and 79 (13.1%) had a post-graduation (Table-II).  

According to socioeconomic status 325 (54.2%) participants belonged to lower socioeconomic class whereas 230 (38.3%) individuals belonged to middle socioeconomic class and 45 (7.5%) participants belonged to high socioeconomic class (Table-III).  

<table>
<thead>
<tr>
<th>Socioeconomic Status</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low socioeconomic status</td>
<td>325 (54.2%)</td>
</tr>
<tr>
<td>Middle socioeconomic status</td>
<td>230 (38.3%)</td>
</tr>
<tr>
<td>High socioeconomic status</td>
<td>45 (7.5%)</td>
</tr>
</tbody>
</table>

**Table-III. Socioeconomic status of the respondents**  

Demographic wise Prosthetic Status of the participants  

**Age**  
94% of the participants aged between 11-20 years had no prosthesis. Fixed partial denture was common in 10.3% individuals aged 31-40 years and more than one fixed partial denture was common in 20% individuals aged 71-80 years. Removable partial denture was common in 18.8% persons aged 61-70 years, whereas both fixed and removable partial dentures were common in 33.3% people aged 81-88 years. Complete denture was common in 6.3% people in the age range 61-70 years. There was significance difference found between age and prosthetic status. (p=0.000).  

**Gender**  
In the current study sample, individuals having no prosthesis were common having a gender distribution of 236 (39.3%) male and 230 (38.3%) females (Figure-1). Whereas the number of males with prosthesis 23.9% was slightly higher than females 20.7%. There was no significance difference in prosthetic status between genders.
Individuals having no prosthesis were common in the graduate group (83.7%). Fixed partial denture was common in 12.7% individuals with primary education. Moreover, 27.8% participants with postgraduate degree had more than one fixed partial denture. Participants with no education had more cases of removable partial denture (4%) and both removable and fixed partial denture (1.5%) than other groups. Whereas complete denture was common in only 1.8% subjects with secondary education (Table-IV). There was significance difference found between level of education and prosthetic status. (p=0.000).

### Socioeconomic Status

Individuals belonging to the lower class had more cases of no prosthesis (82.5%). Individuals belonging to middle class had more cases of more than one fixed partial dentures (15.7%), removable partial dentures (2.6%) and complete dentures (1.7%). Individuals belonging to upper class had more cases of fixed partial dentures (15.6%) and both fixed and removable partial dentures (2.2%) as shown in Table 5. Significant difference was found between socioeconomic and prosthetic status (p=0.004).

<table>
<thead>
<tr>
<th></th>
<th>No Prosthesis</th>
<th>Fixed Partial Denture</th>
<th>More than one Fixed Partial Denture</th>
<th>Removable Partial Denture</th>
<th>Both FPD(s) and RPD(s)</th>
<th>Complete Denture</th>
<th>Not Recorded</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uneducated</td>
<td>159(80%)</td>
<td>13(6.5%)</td>
<td>15(7.5%)</td>
<td>8(4%)*</td>
<td>3(1.5%)*</td>
<td>1(0.5%)</td>
<td>0</td>
<td>199</td>
</tr>
<tr>
<td>Primary</td>
<td>48(76.2%)</td>
<td>8(12.7%)*</td>
<td>7(11.1%)</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>63</td>
</tr>
<tr>
<td>Secondary</td>
<td>133(79.6%)</td>
<td>13(7.8%)</td>
<td>14(8.4%)</td>
<td>2(1.2%)</td>
<td>2(1.2%)</td>
<td>3(1.8%)*</td>
<td>0</td>
<td>167</td>
</tr>
<tr>
<td>Graduate</td>
<td>77(83.7%)*</td>
<td>10(10.9%)</td>
<td>3(3.2%)</td>
<td>1(1.1%)</td>
<td>0</td>
<td>1(1.1%)</td>
<td>0</td>
<td>92</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>49(62%)</td>
<td>4(5%)</td>
<td>22(27.8%)*</td>
<td>2(2.5%)</td>
<td>1(1.2%)</td>
<td>0</td>
<td>1(1.2%)</td>
<td>79</td>
</tr>
<tr>
<td>Total</td>
<td>466(77.7%)</td>
<td>48(8%)</td>
<td>61(10.2%)</td>
<td>13(2.2%)</td>
<td>6(1%)</td>
<td>5(0.8%)</td>
<td>1(0.1%)</td>
<td></td>
</tr>
</tbody>
</table>

Table-IV. Education level and prosthetic status of respondents

<table>
<thead>
<tr>
<th></th>
<th>No Prosthesis</th>
<th>Fixed Partial Denture</th>
<th>More than one Fixed Partial Denture</th>
<th>Removable Partial Denture</th>
<th>Both FPD(s) and RPD(s)</th>
<th>Complete Denture</th>
<th>Not Recorded</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower socioeconomic class</td>
<td>268 (82.5%)*</td>
<td>28 (8.62%)</td>
<td>20 (6.2%)</td>
<td>7 (2.2%)</td>
<td>1 (0.3%)</td>
<td>1 (0.3%)</td>
<td>0</td>
<td>325</td>
</tr>
<tr>
<td>Middle socioeconomic class</td>
<td>166 (72.2%)</td>
<td>13 (5.6%)</td>
<td>36 (15.7%)*</td>
<td>6 (2.6%)*</td>
<td>4 (1.7%)*</td>
<td>4 (1.7%)*</td>
<td>1 (0.4%)</td>
<td>230</td>
</tr>
<tr>
<td>Upper socioeconomic class</td>
<td>32 (71.1%)</td>
<td>7 (15.6%)*</td>
<td>5 (11.1%)</td>
<td>0</td>
<td>1 (2.2%)*</td>
<td>0</td>
<td>0</td>
<td>45</td>
</tr>
<tr>
<td>Total</td>
<td>466 (77.7%)</td>
<td>48 (8%)</td>
<td>61 (10.2%)</td>
<td>13 (2.2%)</td>
<td>6 (1%)</td>
<td>5 (0.8%)</td>
<td>1 (0.2%)</td>
<td></td>
</tr>
</tbody>
</table>

Table-V. Socioeconomic status and prosthetic status of respondents
Demographic wise prosthetic need of the participant

**Age**
Majority of the participants in the age group 15-20 years did not need any prosthesis 77.3%. On average, one-unit prosthesis was required in 20.5% of participants aged 31-40 years. Multitunit fixed prosthesis was required in 30.4% individuals aged 51-60 years. Those requiring a combination of one and multi-unit prosthesis (37.5%) were aged 61-70 years. Whereas complete denture was required in 66.7% individuals aged 81-90 years.

**Gender**
In the current study, 51% of males and 43.9% females did not need any prosthesis, whereas 49% males and 56.1% females needed prosthesis of some kind. There was no statistical significance found with respect to gender and prosthetic need (Figure-2).

**Education**
In the uneducated group 41 (20.6%) people required a multiunit prosthesis, 39 (19.6%) people required a combination of single and multiunit prosthesis whereas 16 (9.5%) people required complete denture. No prosthesis 87 (52%) and single unit prosthesis 29 (17.3%) were common in subjects with secondary education as shown in Table 6. Significant difference was found between level of education and prosthetic need (P value is 0.000).

**Socioeconomic Status**
The study revealed that need for no prosthesis was highest in the upper socioeconomic group 62.3%. One-unit prosthesis was required more in low socioeconomic group 16.9%. In middle socioeconomic class 21.7% need for multi-unit, 22.1% needed combination of one and multi-unit prosthesis, and 4.8% needed full prosthesis, was highest in middle class individuals as presented in Table-VII. There was significance difference found between socioeconomic status and prosthetic need (P value is 0.012).

**DISCUSSION**
Studies related to assessment of prosthetic status and prosthetic needs in dental teaching institutions are rarely conducted in Pakistan. There is no documented data available for the prosthetic status and needs therefore, an attempt was made to assess the prosthetic status and need of the patients. Results of this study showed that majority of participants below 20 years of age were dentate.

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**Table-VI. Education level and prosthetic need of respondents**

<table>
<thead>
<tr>
<th></th>
<th>No Prosthesis Needed</th>
<th>Need for One-unit Prosthesis</th>
<th>Need for Multi-unit Prosthesis</th>
<th>Need for a Combination of One and/or Multi-unit Prosthesis</th>
<th>Need for Full Prosthesis</th>
<th>Not Recorded</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uneducated</td>
<td>77 (38.7%)</td>
<td>26 (13%)</td>
<td>41 (20.6%)</td>
<td>39 (19.6%)</td>
<td>16 (8%)</td>
<td>0</td>
<td>199</td>
</tr>
<tr>
<td>Primary</td>
<td>32 (50.8%)</td>
<td>11 (17.5%)*</td>
<td>10 (15.9%)</td>
<td>10 (15.9%)</td>
<td>0</td>
<td>0</td>
<td>63</td>
</tr>
<tr>
<td>Secondary</td>
<td>87 (52.1%)</td>
<td>29 (17.4%)</td>
<td>27 (16.2%)</td>
<td>20 (12%)</td>
<td>3 (1.8%)</td>
<td>1 (0.6%)</td>
<td>167</td>
</tr>
<tr>
<td>Graduate</td>
<td>53 (57.6%)*</td>
<td>15 (16.3%)</td>
<td>19 (20.7%)*</td>
<td>3 (3.3%)</td>
<td>2 (2.2%)</td>
<td>0</td>
<td>92</td>
</tr>
<tr>
<td>Postgraduate</td>
<td>30 (38%)</td>
<td>9 (11.4%)</td>
<td>10 (12.7%)</td>
<td>28 (35.4%)*</td>
<td>2 (2.5%)</td>
<td>0</td>
<td>79</td>
</tr>
<tr>
<td>Total</td>
<td>279 (46.5%)</td>
<td>90 (15%)</td>
<td>107 (17.8%)</td>
<td>100 (16.7%)</td>
<td>23 (3.8%)</td>
<td>1 (0.2%)</td>
<td>600</td>
</tr>
</tbody>
</table>
Middle age group showed various degrees of partial edentulousness gradually being replaced by complete edentulousness with increasing age. It is evident from the collected data that with the advancement of age, requirement of more prostheses was noted in this study which is similar to other studies by George et al., and Hamasha et al. i.e need for multiunit prosthesis were more for middle age group while full removable denture was the requirement of individual above 50 years. Higher need may be attributed to tooth loss associated with an increase in age. This is in accordance with trends reported in studies conducted by Angelillo et al., Crabb, Hobdell et al., Liss et al. and Varelzides et al., Prateek et al. There were fewer participants in above fifty years’ age group which may be due to a lower priority given to dental health services as compared to medical services by geriatric individuals. Current study revealed that majority (77.7%) of total population examined did not have any prosthesis. Our results are in agreement with study done by Soh et al., while studies by Choudhury, Nerby and Hedge showed that a total of 88% of population didn’t have any prosthesis i.e more population without prosthesis than our study. This low proportion of participants with prosthesis may be due to lack of awareness, financial difficulties and may be associated with limited mobility in old age.

In contrast, studies by Hawkins et al. (1998) reported 80% of subjects wore at least one denture and Angelillo et al. (1990) reported 44.3% of the edentulous patients wore complete dentures. Cardoso et al. reported higher use of upper (79.2%) and lower (37.1%) total prostheses among the elderly people of Manaus city as a result of higher utilization of dental services by them. This difference is due uneducated population and low socioeconomic status as evident from our study.

The prosthetic status was slightly better in males 23.9% than in females 20.7% which is similar to a study by Shenoy and Hedge. This may be attributed to females’ dependency on male members of the families to provide access to treatment facilities. Also, according to our study the proportion of uneducated females (48.3%) was higher compared to males (19%). Hence, a lower level of education and employment could be possible reasons for females having less prostheses than males. There was no statistical difference between genders regarding the prosthetic status and need which is in accordance with the findings of Merse et al., Shroff and Mulay, and Master.

A higher percentage of respondents in the upper socioeconomic group had prosthesis of some kind, compared to those in the lower socioeconomic groups. The social pressure of maintaining esthetics and function in upper class may influence people to replace their missing teeth. Additionally, attitude and awareness towards dental care, and cost of dental treatment might also contribute significantly to prosthetic status in a person. Less percentage (38%)
subjects in the upper socio-economic categories needed prosthesis of some kind, compared to those in the lower socio-economic categories 50%. This shows better attitude and awareness toward dental care among subjects in the upper socio-economic categories. These findings are supported by other similar studies.\textsuperscript{38,39,40} 53.3% of the subjects were in need of either fixed, removable or combined prosthodontic treatment, and there was no statistically significant difference among genders. Prosthetic needs in the present study were found to be lower than findings by Mann J et al.\textsuperscript{34} (1985) 76% in Israel and 72% by Shah et al\textsuperscript{2} in India. Even lower findings were reported by Miyazaki et al\textsuperscript{35} in Japan where prosthetic need was 36%. Prosthetic needs of our study population were high. This is similar to an article by Choudhury et al\textsuperscript{37} who reported 67.49% and 64.31% prosthetic need for upper and lower arches respectively. Other studies have shown the prosthetic needs of the study subjects in the range of 51.5% to 59.7 % which is similar to our results (Hongalet al\textsuperscript{37} Nadgere et al\textsuperscript{11}).

Differences in prosthetic treatment need between genders have been reported by Palmqvist\textsuperscript{32} and Shah\textsuperscript{2} where males showed a higher degree of prosthodontic need. In the current study, the need for one-unit and multi-unit prostheses was higher in males. Whereas the need for a combination of one and multi-unit, and full prosthesis was higher in females. Our study reported a higher overall need for multiunit prosthesis which is similar to study by Shenoy and Hegde\textsuperscript{28} (2010) in Mangalore where the need for multi-unit prostheses was more than the need for one-unit prostheses. Different results were reported by Goel P et al\textsuperscript{36} and Christensen J. Also, Hongalet al\textsuperscript{37} reported that need for one unit prostheses exceeded 21.75% that of multi-unit prostheses.

Hence, it can be concluded that most of the prosthetic needs of the studied population were unmet with prosthetic needs (53.3%) being approximately two fold greater than the prosthetic status (22.2%). Factors such as lack of awareness, social pressure and attitude to maintain good and healthy teeth may result in the lack of dental service utilization in low class individuals (Chandra Shekar\textsuperscript{14}, 2010). This emphasizes that even if cost barrier is removed, these individuals will not avail dental facilities.

**REFERENCES**


AUTHORSHIP AND CONTRIBUTION DECLARATION

<table>
<thead>
<tr>
<th>Sr. #</th>
<th>Author(s) Full Name</th>
<th>Contribution to the paper</th>
<th>Author(s) Signature</th>
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<tr>
<td>1</td>
<td>Aamir Hameed</td>
<td>Principal investigator.</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Sarah Ihsan</td>
<td>Data collection, Paper writing.</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Muhammad Raza</td>
<td>Objective setting, research designing and drafting.</td>
<td></td>
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<tr>
<td>4</td>
<td>Muhammad Irshad</td>
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<td>5</td>
<td>Zia ur Rehman Khalil</td>
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