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Association of Oral Hygiene Practices with Dental Caries in Young Adults

Mariam Fatima, Nazli Gul Shujaat, Syeda Lalarukh Saba Shah, Shujaat Hasan Idris

ABSTRACT:

Objectives: To assess the association of dental hygiene practices and dental caries, check its relation and establish factors that can help in reducing the caries.

Study design and setting: A cross sectional study was conducted on 180 young adults who held a degree of bachelor's and 20- 35 years of age from Lahore, Okara and Gujranwala.

Methodology: Ethical approval was sought from the Research and Ethical Review Board of the Dental College. Confidentiality was ensured. Study was conducted over a period of six months. A confidence interval of 95% was established and p value <0.05 was considered significant. The questionnaire consisted of 26 questions related to oral hygiene and status of caries.

The participants were interviewed using a questionnaire about the frequency of brushing, technique used, type of toothbrush, fluoridated toothpastes, use of other aids, consumption of sugary snacks, dental visits, and established caries. The relation was established with the diagnosed caries through frequency charts, correlation and Chi- square test using SPSS version 26.

Results: Of the 180 participants 126 were females (70%) and all the participants were educated and held a bachelor's degree. Dental caries was known to 158 participants (87.87%) and 85(71%) of the people said they brush twice a day. A significant association of the diagnosed caries with the skipping of brushing, status of oral hygiene and visit to the dentist was found as suggested by the p-values 0.042,0.023 and <0.001 respectively.

Conclusion: Healthy oral hygiene practices can reduce the caries.

Key words: dental caries, fluoridated toothpaste, oral hygiene.

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INTRODUCTION:

Oral hygiene practices refer to "the maintenance of a healthy oral cavity with the aid of different methods like brushing, flossing etc".[1] Along with general well- being, keeping track of oral health is really important. Most commonly brushing is used to maintain a healthy oral cavity. It may be accompanied by other aids such as flossing, mouthwashes or home- based means of cleaning teeth. Meticulous oral hygiene maintenance not only helps in prevention of oral diseases like caries and gingivitis but also adds to the quality of life.[2]

Caries, more commonly known as "cavity" to the general population, is the most prevalent oral health problem. It is the breakdown of tooth structure as a result of demineralization caused by acidic release from fermentation of sugars in diet by the microorganisms present in biofilm present in oral cavity.[3] According to a survey "approximately 2.3 billion people have caries", so it is important to establish the factors that help in reduction of caries.[4]

There are a lot of factors that cause caries like plaque or calculus, increased carbohydrates in diet, underlying metabolic diseases (e.g., diabetes), chemotherapy etc. Dental plaque or oral biofilm is the major cause of dental caries. Oral hygiene practices help in removal of the biofilm. Different methods are available worldwide for removal of plaque.[5] Most common is tooth brushing followed by flossing, mouth washes, interdental cleaners, oral irrigators, rubber tip stimulators and tongue cleaners. Along with this there

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are many locally available options or home-based products used for cleaning purposes like miswak, baking soda, charcoal powder etc.

Though not recommended professionally but even these methods have been proven to have some beneficial effects in control of dental plaque and hence caries.[6,7] With brushing the questions like frequency of brushing, techniques of brushing, timings of brushing, use of other mechanical aids, the types of brushes etc. need to be asked to check if there is complete understanding of brushing. People may use different methods to clean the oral cavity depending on the awareness, ease, access, affordability and other factors. Along with all these measures it is also advised to get professional help in the form of scaling and fluoride application so as to achieve best oral hygiene status and the oral health problems, if present; and thus, may be detected and treated earlier.

Self-maintenance of oral hygiene is a more convenient way of reducing the burden of caries. It puts the responsibility on the shoulders of the individuals and reduces the burden on the health care system for provision of services. However, it may only be possible if proper awareness about healthy practices exists. This is the duty of the dental health professionals to ensure communication of evidence-based facts to the general population.[8]

Correlation of dental caries and of oral hygiene habits has long been established. Global studies do prove the benefit acknowledge about maintenance of hygiene possibly led to high DMFT which again ensures higher prevalence of the caries.[9] It is concluded by different surveys that there is still a lack of adequate knowledge about oral hygiene practices among the general masses especially in developing countries like Pakistan. People cannot afford to visit the dentist regularly and also self- maintenance of the hygiene is an issue. There is a need to assess the contributory factors by conducting more dedicated research in developing countries to project real time ground causes. Our study intended to check the awareness among masses, about the oral hygiene practices, help our community in adapting healthy practices and reduce disease burden.

METHODOLOGY:

Study was conducted after Ethical approval was first sought from the Research and Ethical Review Board of the Dental College, LMDC (NO. FD-1017-22). A cross-sectional study was conducted over a period of six months from June 2021 to December 2021, with an online comprehensive questionnaire owing to the COVID-19 epidemic in the young adults aged 20-35 years, included from Lahore, Okara and Gujranwala (convenience sampling). The inclusion criterion was defined as 20- 35 years old young adults with educational level of bachelors and who were willing to participate. The people who did not hold bachelor's degrees or were not willing to participate were excluded. The sample size was calculated to be 200 using the formula $n=SDpq/SE^2$ Convenience sampling (non- probability sampling) was done as it was not possible to reach every person in the COVID time. Online questionnaire was created with the help of google forms. Link was generated and then circulated among the contacts. Out of the 200 selected samples some of the subjects did not respond to the online questionnaire. One eighty subjects finally participated in the study. Confidentiality was ensured. Study was conducted over a period of six months. A confidence interval of 95% was established and p value <0.05 was considered significant. The questionnaire consisted of 26 questions related to oral hygiene and status of caries.

The participants were asked about the frequency of brushing, style of brushing technique used, type of toothbrush, fluoridated toothpastes, use of other aids, consumption of sugary snacks, dental visits, and established caries. SPSS 26 was used to evaluate the data, frequency chart, correlation and chi- square test was used to establish the relation between different variables as per requirement.

RESULTS:

Of the 180 participants 126 were females (70%) and all the participants were educated and held a bachelor's degree. Dental caries were known to 158 participants (87.87%). 85(71%) of the people said they brush twice a day and 78(43%) were brushing once a day. 71(39%) only brushed for at least 2 minutes and 122(67%) used the soft bristle brushes. 18(10%) only replaced their brush when the bristles were completely worn out. Fluoridated toothpastes were used by 102 (56.7%) of the total participants and the remaining were either unaware of the content of the toothpaste or used some other mechanical aids. 16(89%) used mouthwash regularly along with brushing. Only 18(10%) used dental floss or miswak and 144(80%) had a habit of using toothpicks. Majority of the sample never experienced bleeding gums. Limited fizzy drinks intake and moderate consumption of the sugary snacks was exhibited by 53.1% (96) of the sample. It is evident from the results that as the frequency of brushing increases the caries are less (Table 1). The participants were also asked about the knowledge of the brushing technique. We asked the participants if they were aware of different brushing techniques and 123 (68.2%) participants responded positively. Figure 1 shows the frequency of type of brush used by participants for brushing whereas Figure 2 shows the grading of oral hygiene by participants against the caries. Pearson Chi- square test was used to assess the reasons of skipping brushing, grading of oral hygiene status and last visit to dentist and against the carious teeth. Significant relationship was found between perception of the oral hygiene and also of reasons of skipping brushing when related with the carious teeth as shown in figure 2 and table 2 respectively; and a highly significant association between the dental visit and the diagnosed dental caries (Table 3).

Table 1: Frequency of Brushing (descriptive statistics)

Diagnosed Dental Caries	Once a day	Twice a day	Thrice a day	Irregularly	Total
Yes	38.4%	43.7%	66.6%	71.4%	77
No	61.5%	58.8%	33.3%	28.6%	103
Total	78	85	3	14	180

Figure 1: Types of toothbrushes used for brushing

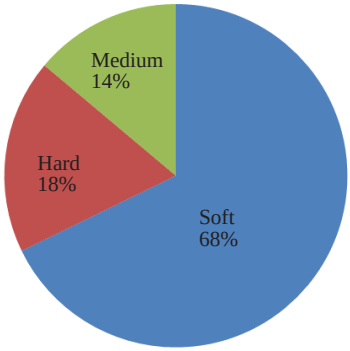
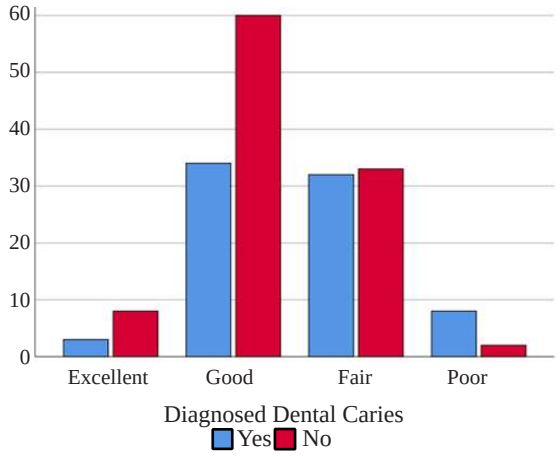


Table 2: Reasons for not brushing the teeth regularly

Diagnosed Dental Caries	Too lazy	Forget	Brushing is useless	Never skip brushing	Total	Pearson Chi-Square
Yes	25	20	4	28	77	
No	42	12	2	47	103	**0.042***
Total	67	32	6	75	180	

(*p<0.05)

Figure 2: Oral hygiene status



(p-value= 0.023) (*p<0.05)

Table no.3: last dental check- up

Diagnosed Dental Caries	2 month ago	6 month ago	1 Year ago	when I have a dental problem	Never been to a dentist	Pearson Chi-Square
Yes	6	5	12	48	6	
No	5	7	5	51	35	**<0.001***
Total	11	12	7	99	41	

(*p<0.05)

DISCUSSION:

Oral health can be kept at optimum if healthy oral practices are ensured. Healthy habits should be developed early in life and reinforced throughout life. Brushing is the key to oral health maintenance along with use of other aids. General oral hygiene home-care instructions were given to patients consistently after visit to dentist/dental hygienist. 77.7% of the participants in a study conducted on dental hygienists giving oral hygiene instructions were positive that emphasis on brushing helped reduce caries and gingival diseases in them.[10] Other factors like diet, general health and some local factors like malocclusion etc. all affect the oral health and its maintenance.

When we talk of brushing, we have to look into different aspects of the brushing which involve the brushing technique, types of brushing, frequency of brushing, timing of brushing and use of fluoridated toothpaste etc. Our study had the objective of assessing the association of dental hygiene practices and dental caries, establish factors that can help in reducing the caries. It was intended to assess the awareness about oral hygiene practices and help people in reducing caries.

As soon as the first tooth appears in the oral cavity the process of its cleaning starts. Parents are advised to clean the delicate deciduous teeth with a damp clean cloth after every meal. Later they may switch to soft bristles and once the child is able to spit, the toothpaste for children should be introduced with caution regarding the fluoride content. The toothpastes formulated for the children has low fluoride content which does not cause danger in case of swallowing yet provides the anti caries effect.[11] It was seen in a previous study that the introduction of the fluoridated toothpaste reduced caries to about 95%.[12] It is advised to continue with the supervised brushing till seven years of age and they are properly conditioned into brushing.[13] The parents also have a major role in modeling of the children.[14]

Our sample had a majority (70%) of female educated participants. There are several factors that play a role in dental caries. These include poor oral hygiene, high intake of sugars, less frequent use of brushing, use of improper brushing technique, less use of fluoride, xerostomia and malocclusion etc.

Brushing twice a day is advised, once before going to sleep at night and after breakfast in morning and then only it is effective in controlling the caries. A study conducted by Ashley shows that the mean DMFT decreases by 27% as you increase the frequency of brushing.[15] In our study we can appreciate that the caries is less in people who brush frequently while a higher percentage of caries is seen in people who brush irregularly (71.4%). Rinsing of the mouth after every snack can help further in improving the situation as the food does not adhere to the surfaces of teeth. It was established by the results that the diagnosed dental caries

was much more in the participants who less frequently brushed their teeth. One of the reasons could be a higher level of education and knowledge related to their hygiene status and oral health. This was further strengthened by the participants as they tell us how often they skip brushing. The brush used should have soft bristles whereas in our study only 67% used soft bristles. Rest used either medium or hard which can cause abrasion in the long run. There are different brushing techniques that are used to effectively remove plaque and calculus. These techniques are known to decrease plaque by 2.9 times as compared to normal practices.[16] We asked the subjects about the three popular brushing styles i.e., horizontal, round and up and down. Most prevalent was horizontal brushing technique and it is inadequate when it comes to proper cleaning. The modified bass technique among these is considered to be the ideal brushing technique and should be emphasized.[17,18] In our study 68.2% of the participants claim to have an idea of the brushing but previous studies reveal that horizontal scrub technique is most prevalent technique which is unable to clean the oral cavity thoroughly.[19] 31.8% are still unaware of proper brushing techniques so it is advised to include more demonstrations of these techniques either with the help of media or through active community programmes. Next important thing is the role of fluoridated toothpaste in control of caries.[20] The participants were asked if their toothpaste had fluoride and only 56.7% were aware of the content of the toothpaste and used the fluoridated toothpaste. If we increase the awareness about role of fluoride in prevention of caries, we can definitely reduce the prevalence of caries in general as shown by previous studies.[12]

Participants reported the use of toothpicks which might cause injury to gingiva. We need to educate people about the use of dental floss and interdental brushes for better interdental cleaning. We need to establish periodontal health and also be mindful of the physical ability of the people while using interdental cleansing devices. The awareness about the consumption of sugary snacks and fizzy drinks is also an important aspect of caries control programmes run worldwide. Excessive consumption of sugary snacks with little or no effort to maintain oral hygiene may result in higher prevalence. We need to make people aware about the modification required to prevent and reduce incidence of caries. Moreover, we need to educate people about reducing the consumption of these snacks and drinks and encourage use of healthy diet.

People who do not skip brushing have less caries as compared to the people who are lazy and do not brush regularly. These results confirm the previous research that the frequency of brushing and maintaining the habit of brushing daily helps us achieve good oral hygiene and decrease caries (p=;0.05)[21]

Rating of the oral hygiene status by the participants and establishing its relation with caries helped the subjects get a better perception for their future reference. The results exhibit that people who are meticulous about oral hygiene have less caries and hence proving previous conclusions of various studies done globally to establish the relation between caries and oral hygiene.[22,23] Every professional should play their part in reducing the burden of the dental caries and there should be awareness campaigns on different levels and different areas to address the problem.

Self- maintenance of oral hygiene is easy, accessible and affordable and this puts a lesser burden on the existing health care system. However, the role of a dental health professional cannot be overlooked in assurance of the disease- free oral cavity. It is advised to regularly pay visits to the dentist twice a year. Our results also showed a highly significant association between the two variables too and it is for this very reason that regular Dental visits/ check-ups are advised and the role of the dentist in diagnosis of caries and its management is crucial.[24] As we are a developing country, approximately 40% of our population is earning below the poverty line. The people do not have the money to pay for regular visits to the dentist.[25] Government sector should come forward and help establish dental camps for free.

Our study targeted the population with a bachelor's degree which is considered a fair level of education in a developing country like Pakistan. The results however are still far from what is expected in developed countries. Considering the number of uneducated people in our country, it is an alarming situation that the basic oral health awareness is not accessible to the majority of the population. Dentistry is added in the second level in the hierarchy of the healthcare system. Not even the basic oral health education is a part of the basic health care system. The oral health education regarding the oral hygiene practices and caries is really important in reducing the prevalence of caries. Thorough knowledge of these basic instructions needs to be spread among the general population.

CONCLUSION:

Objective of our study was to study the association between oral hygiene practices and dental caries and our results conclude that healthy hygiene practices can reduce dental caries. This study was conducted on a population with at least bachelor's level of education and still we can see a large caries count. Further studies should be carried out to assess the status of the general population from different backgrounds and more educational programmes should be ensured.

Authors Contribution:
Mariam Fatima: Searched the literature, wrote the first draft, analyzed the data, compiled the data and wrote the second draft
Nazli Gul Shujaat: Chose the topic, supervised the study, added the discussion and refined the draft.
Syeda Lalarukh Saba Shah: Collected the data and helped in compilation of data
Shujaat Hasan Idris: Critically reviewed the article

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