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RESEARCH ARTICLE

PREVALENCE OF USING DENTAL WATER FLOSSER DURING ORTHODONTIC TREATMENT IN SAUDI ARABIAN POPULATION(JEDDAH REGION)

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Abstract

Introduction: Orthodontic treatment has many clear benefits for reinforcement the function, esthetics, and self-respect in patients. However, as any treatment, there are risks and complications in associated with such treatment, as it can cause gingivitis, enamel demineralization and tooth decay. Supreme self-care as tooth brushing and interdental cleaning using the adjuncts besides regular professional cleaning must be strengthened. Comparing the use of conventional manual toothbrush to the Dental Water Flosser with Orthodontic Tip on bleeding and plaque biofilm reductions with fixed orthodontic was done. The results showed that dental water flosser with a jet tip was effective in fixed orthodontic and it revealed favorable results for decreasing plaque and bleeding. Aim: to identify the awareness of patients about the use of dental water flosser and its effect on the oral hygiene during orthodontic treatment.

Materials and methods:-A cross-sectional study using convenient sampling technique was done. Sample size was calculated according to Cochran\'s formula (n=341). A questionnaire was prepared and translated to Arabic for ease in understanding. The content and linguistic validity of the questionnaire was checked by expert team of peers. The questionnaire was entered in google forms and mailed to the participants. The reliability of the questionnaire was tested by Cronbach\'s Alpha test. -The questionnaire was formed of 20 questions divided into three categories: Demographic information, Awareness of orthodontic treatment and its complications & Awareness of proper oral hygiene procedure during orthodontic treatment. The responses were tabulated in Microsoft Excel and statistically analyzed for comparison using IBM SPSS. Descriptive statistics followed by chi-square test was applied to test the variables in the questionnaire to determine their association. The significant value will be equal or less than 0.05. Results: Out of all participants, 240 (70.38%) reported hearing about the dental water flosser. 114 out of those 240 participants (47.5%) reported using it. Out of all participants who used the dental water flosser, 99 (86.84%) described their experience as \"Amazing and very effective\", 5 (4.39%) described it as \" Not effective\" . 97 (85.09%) of all participants agreed that dental water flosser help in cleaning between their teeth and improve the health of their gums during wearing the orthodontic appliance.

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Conclusion: The results showed that a dental water flosser with a jet tip is beneficial for adolescents in cleaning between the teeth and significant improvement of the oral cavity health is obtained, which may be due to plaque accumulation reduction during using the orthodontic appliance.

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Introduction:-

Orthodontic treatment has many recognized benefits for increase the function, esthetics, and self-respect in patients. However, as with any treatment, there are complications and risks in orthodontic treatment, can cause demineralization on the enamel, gingivitis, and tooth decay. Several studies have shown that orthodontic care can lead to increased demineralization, or white spot lesions, on the buccal surfaces of teeth bonded with fixed appliances as compared to untreated control teeth. {1}

Excessive plaque retention adjacent to brackets and attachments is the cause of this white spot lesion, inadequate pretreatment oral hygiene and poor oral hygiene during orthodontic treatment is associated with greater incidence and severity of white spots lesions {1}.

By accepting an orthodontic treatment, a patient makes a firm commitment to maintain oral hygiene regularly and thus, prevent potential iatrogenic damages, which may occur during therapy. Importance of oral hygiene in orthodontic patients is always intensified to prevent any further periodontal disease

Self-cleaning is also more difficult because of the reduced effect of mechanical chewing and rinsing the food residues off by saliva. All preventive programs referring to the prevention and treatment of gingivitis and periodontopathic include regular removal of dental plaque as a part of an adequate daily oral hygiene, so using optimal self-care, beside regular professional cleaning must be reinforced the following factors are necessary for adequate oral hygiene: Adequate devices, correct technique of using those devices, regular toothbrushing, and sufficient length of brushing every single tooth.{2}

The education, and training about a regular and correct oral hygiene maintenance together with preventive and prophylactic measures and patients' motivation will increase the comfort of patients undergoing orthodontic therapy and contribute to the functional and aesthetic success of it. {3}

The optimal self-care such as tooth brushing and interdental cleaning using the adjuncts such as power or electric toothbrushes, interproximal brushes, chlorhexidine mouthwashes, fluoride, water flosser which makes it easy to clean hard-to-reach places, such as the space between brackets and wires or retainers, as well as in interproximal spaces.

In a previous study, the Dental Water Flosser with the Orthodontic Tip was compared to manual tooth brushing and flossing on bleeding and plaque biofilm reductions in adolescents with fixed orthodontic. The results showed that a dental water flosser with a jet tip was effective for adolescents in fixed orthodontic and it demonstrated beneficial results for decrease the plaque and bleeding.{4}

A review regarding the dental water jet benefits on oral hygiene evidenced a reduction of gingival inflammation, bleeding and pathogenic bacteria in various patients, such as patients in a supportive periodontal maintenance program, patients with implants, crowns or bridges, patients with diabetes. {5}

This study aims to identify the awareness of patients about the use of dental water flosser and its effect on the oral hygiene during orthodontic treatment

Subjects and Methods:-

A cross-sectional study was conducted in Jeddah, Saudi Arabia, from October 2020 to February 2021. People who were willing to participate and had prior orthodontic treatment were included in this study, people who were not willing to participate was excluded. A convenient sampling technique was used to select participants, and according

to Cochran's formula (Cochran's W.G. Sampling techniques (3rd ed.) New-York: John Wiley and sons), sample size was set to 341.

A questionnaire was used in data collection and was prepared and translated to Arabic for ease in understanding. The reliability of the questionnaire was tested by Cronbach's Alpha test and content validity was tested by expert team of peers.

This study was conducted via an online questionnaire entered in Google forms and mailed to the participants. The questionnaire consisting of 20 questions divided into three categories: Demographic information, Awareness of orthodontic treatment and complications & Awareness of proper oral hygiene procedure during orthodontic treatment.

The collected data was tabulated in Microsoft Excel and analyzed using Statistical Package for the Social Sciences, SPSS 23rd version. Frequency and percentages were used to express categorical variables. Chi-square test was used to test for the presence of association between variables. Level of significance was set at 0.05.

Approval of the study was obtained from Research Ethics committee and informed consent was taken from participants in this study.

Results:-

There was a total of 341 participants. 242 (70.97%) were female and 99 (29.03%) were male. The education level of 15 (4.4%) was "Uneducated", 96 (28.15%) were "Primary/intermediate/secondarystage", and 230 (67.45%) were "Diploma/University/Postgraduate studies".

Out of all participants, 250 (73.31%) answered "Yes" to the question "Do you have an experience with orthodontic treatment?". There was no significant difference in the percentage of male and female participants who had an experience with orthodontic treatment (77.78% of males vs. 71.49% of females answered "Yes", χ^2 test p = 0.29, Table 1). There were also no significant differences between participants with different education levels (93.33% of "Uneducated", 73.96% of "Primary/intermediate/secondary stage", and 71.74% of "Diploma/University/Postgraduate studies" answered "Yes", χ^2 test p = 0.18, Table 1).

Table 1:-The frequencies of answers to the question "Do you have an experience with orthodontic treatment?" by gender and education level. Values are presented as n (%).

	Gender		**Education Level**		
	Female	**Male**	**Uneducated**	**Primary/intermediate/secondary stage**	**Diploma/University/Postgraduate studies**
No	69 (28.51%)	22 (22.22%)	1 (6.67%)	25 (26.04%)	65 (28.26%)
Yes	173 (71.49%)	77 (77.78%)	14 (93.33%)	71 (73.96%)	165 (71.74%)

Figure 1 displays the percentages of appliance types used by participants who had an experience with orthodontic treatment. The majority (87.6%) used fixed appliance whereas 11.2% used removable appliance.

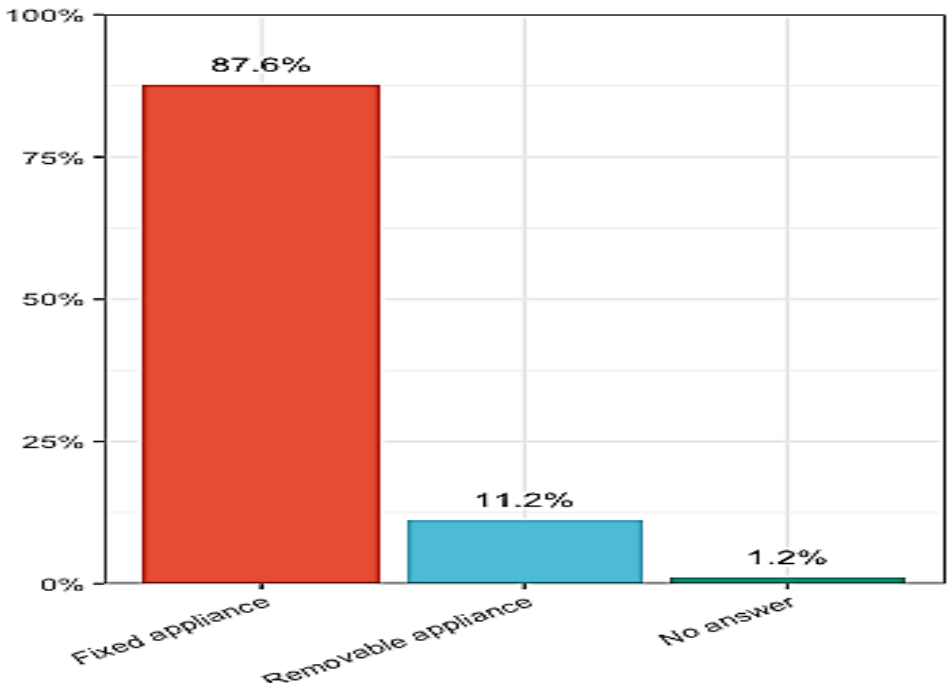

Figure 1:- Bar plot displaying the percentages of appliance types used by participants who had an experience with orthodontic treatment.

Whenthe participants with an experience with orthodontic treatment were asked "Did you feel changes in your teeth and gums' health?"206 (82.4%) answered "Yes", 37 (14.8%) answered "No", and 7 (2.8%) did not provide an answer.

Among those who felt changes in teeth/gum health, the most frequently reported change was "Bad breath" (31.55%), followed by "Caries" (30.1%), "Accumulation of calculus" (20.87%), "Change in teeth color" (19.9%), and "No change" (8.25%, Figure 2).

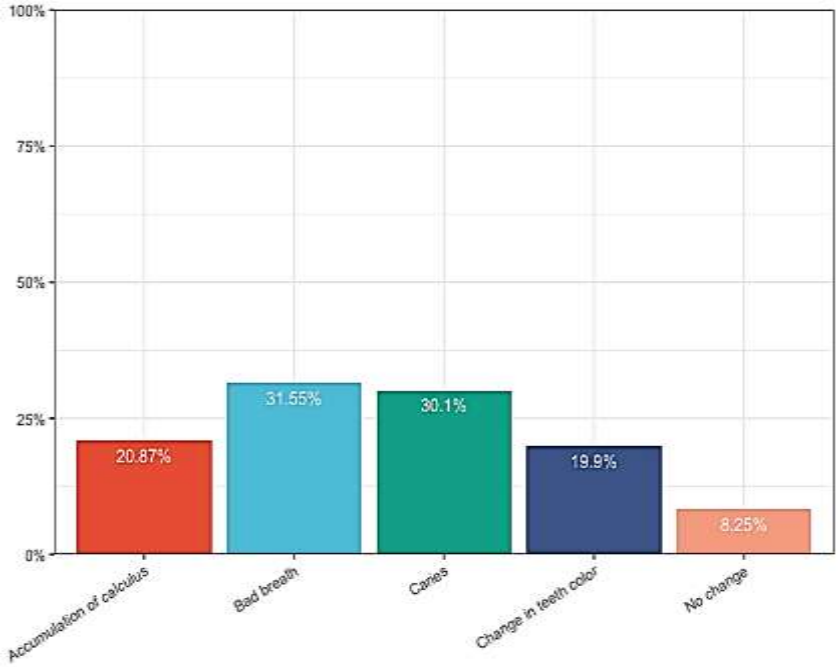

Figure 2:-Bar plot displaying the percentages of reported complaints for the question "What changes happened to you after using the orthodontic appliance?"

For the question "What tools did you use to clean your teeth before orthodontic treatment?", a high percentage of participants with an experience with orthodontic treatment (96.8%) reported using brush and toothpaste, 77.2% reported using mouthwash, and 6% reported using dental floss (Figure 3).

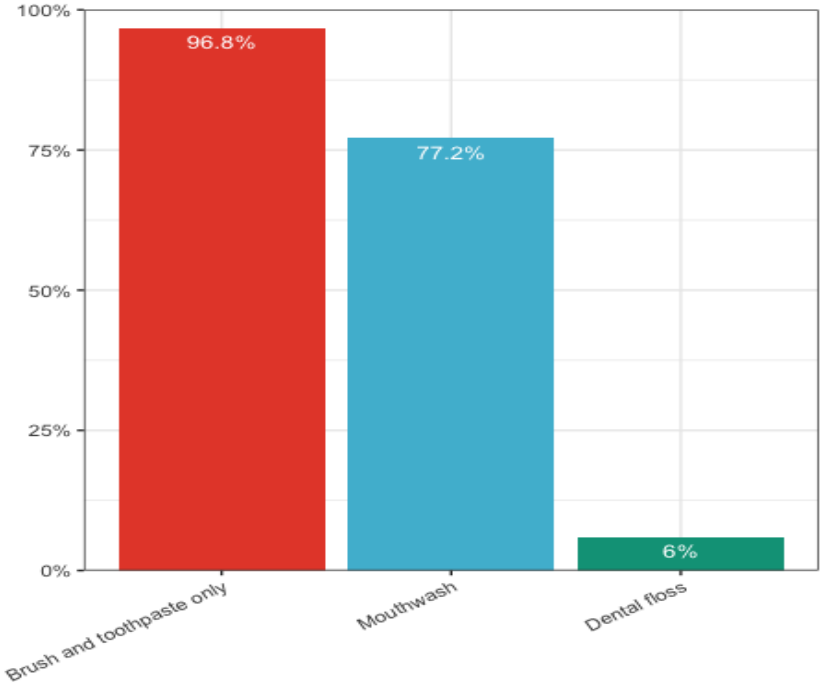

Figure 3:- Bar plot displaying percentages of participants with an experience with orthodontic treatment who reported using the indicated tools for cleaning their teeth before orthodontic treatment.

When asked "How many times do you clean your teeth?", 54% of participants with an experience with orthodontic treatment answered "Twice", 30.4% answered "Once" and 15.6% answered "After every meal" (Figure 4).

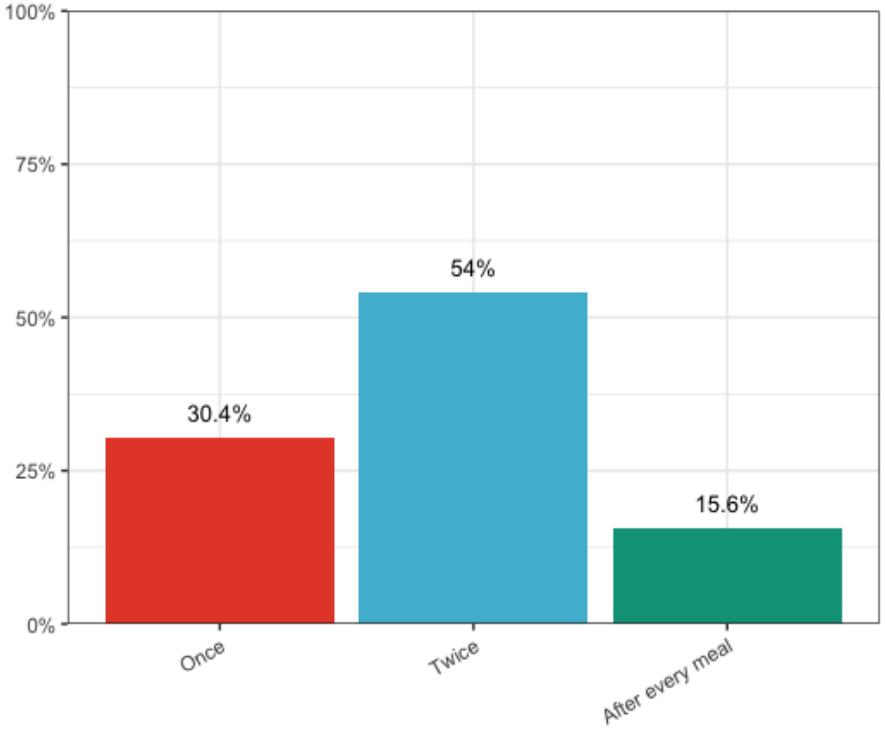

Figure 4:- Bar plot displaying the percentages of answers to "How many times do you clean your teeth?" by participants with an experience with orthodontic treatment.

Out of all participants with an experience with orthodontic treatment, 215 (86%) responded "Yes" to the question "Did you change the way in cleaning your teeth before and after the appliance?", and 218 (87.2%) answered "Yes" to the question "Did you face difficulty in cleaning your teeth during orthodontic treatment?".

Out of all participants, 240 (70.38%) reported having heard about the dental water flosser. 36.67% of participants who heard about the dental water flosser reported hearing from advertisements, 34.17% reported hearing from their dentists, 23.75% reported hearing from friends and family, whereas 5.42% did not report any source (Figure 5).

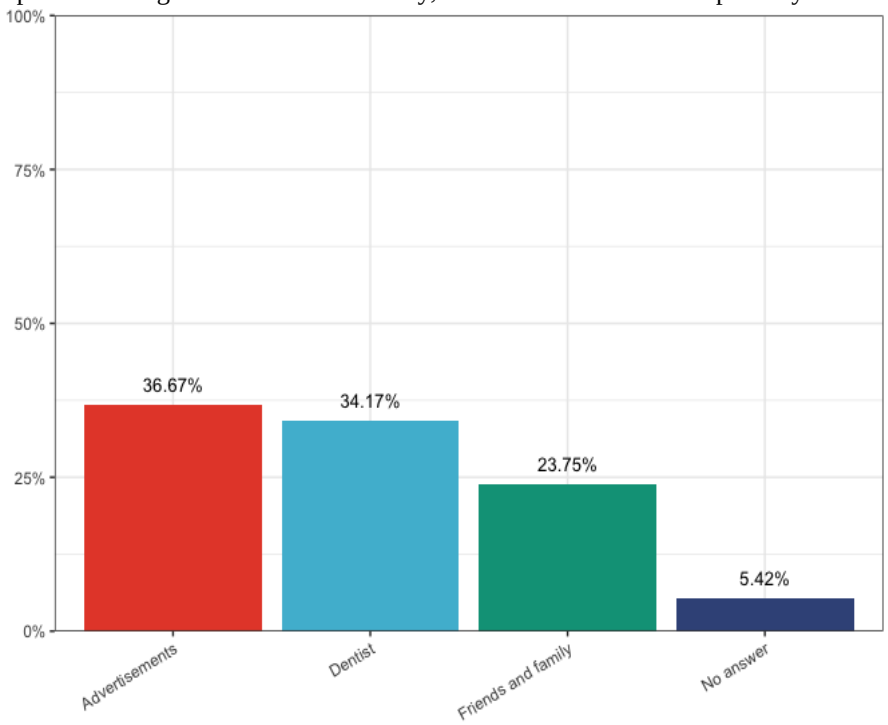

Figure 5:- Bar plot displaying the percentages of participants who gave the indicated answers to the question "Where did you hear about the dental water flosser?".

114 out of the 240 of participants who heard about the dental water flosser (47.5%) reported using it. There were no significant associations between the reported dental water flosser usage and gender (χ^2 test p = 1) or education level (χ^2 test p = 0.38, Table 2).

Table 2:-The frequencies of answers to the question "Did you hear about the dental water flosser?" by gender and education level. Values are presented as n (%).

	Gender		**Education Level**		
	Female	**Male**	**Uneducated**	**Primary/intermediate/secondary stage**	**Diploma/University/Postgraduate studies**
No	72 (29.75%)	29 (29.29%)	6 (40%)	32 (33.33%)	63 (27.39%)
Yes	170 (70.25%)	70 (70.71%)	9 (60%)	64 (66.67%)	167 (72.61%)

Out of all participants who used the dental water flosser, 99 (86.84%) described their experience as "Amazing and very effective", 5 (4.39%) described it as "Not effective" and 10 (8.77%) did not respond. For the question "Did it help in cleaning between your teeth and improve the health of your gums during wearing the orthodontic appliance?", 97 (85.09%) answered "Yes", 3 (2.63%) answered "No" and 14 (12.28%) did not answer. 61 (53.51%) reported using the dental water flosser "Once" during the day, 33 (28.95%) "Twice", 9 (7.89%) "After every meal" and 11 (9.65%) did not respond.When asked "Do you think you prefer it over dental floss?", 94 (82.46%) answered "Yes", 9 (7.89%) answered "No", and 11 (9.65%) didn't answer. When asked "Did you find any differences in refreshing your breath smell after its use?", 100 (87.72%) answered "Yes", 4 (3.51%) answered "No", and 10

(8.77%) didn't answer. When asked "Would you recommend it?" 102 (89.47%) answered "Yes), 3 (2.63%) answered "No", and 9 (7.89%) did not answer.

Discussion:-

An effective home-care program geared to the unique challenges of those with fixed or other orthodontic appliances is an important consideration in orthodontic therapy. Traditional methods might not be appropriate or sufficient because of increased plaqueretention and limitations in access. Some manual toothbrushes are designed to improve plaque removal around brackets and arch wires, but they still rely on the user to implement them effectively.

Power toothbrushes have been studied extensively in non-orthodontic patients and have demonstrated beneficial outcomes in supragingivalplaque removal and gingival health when compared with manual toothbrushes. Some power toothbrushes have also been studied with orthodontic subjects but rarely were superior to manual brushes{6}.

It is documented that flossing can reduce bleeding and inflammation when used daily.

The use of a dental water jet (DWJ) with orthodontic patients dates back to the 1960s. A 1967 study compared normal oral hygiene with normal oral hygiene plus a DWJ in a month split-mouth design. The study showed improvements in clinical parameters for the DWJ side in spite of decreased compliance toward the end of the study {7}.

Jackson and Orthod reported no significant differences in a crossover study with 20 subjects.

The results for plaque and gingivitis were inconsistent with most DWJ studies and can be attributed to sample size or study design {7}.

A study by Burch et al 1994 demonstrated superior results for the DWJ group regardless of toothbrush used (power or manual) over a 2-month period. Our study provides more current data for a DWJ with orthodontic subjects {8}.

Several studies demonstrated significant reductions of inflammation with the DWJ in 3 to 6 months with non-orthodontic Subjects but did not compare the DWJ with brushing and flossing or use the orthodontic tip {9}.

The results of the present survey showed a high satisfaction of 86.84% of the participants who used the dental water flosser as they responded with "amazing and very effective" and 87.7% found differences in refreshing their breath.

Conclusion:-

The results obtained revealed that a dental water flosser with a jet tip is effective for adolescents in cleaning between the teeth and it provide significant improvement of the oral cavity health which may be due to the decrease in plaque accumulation during wearing the orthodontic appliance.

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