

# The Knowledge and Awareness Regarding usage of Interdental Water Flosser Devices among Saudi Community

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## ABSTRACT

**Aim.** Assess knowledge and awareness among the Saudi population of the use of interdental cleaning aids, particularly WFs, and determine the popularity of WFs as a supplementary device to toothbrushes.

**Material and methods.** This cross-sectional, questionnaire-based study was translated from English into Arabic and included 22 dichotomous, multiple-choice, and open-ended questions. The participants were asked if they had heard of WFs, whether they used one on a regular basis, and whether they would recommend one to others (and to explain why they would/would not recommend their use). The surveys were distributed randomly via social media.

**Results.** 322 individuals participated in this study. 96.6% of the participants were Saudi and mostly female with 89.1%. In addition, 43% of the participants were aged 18–29 years. In total, 60% of the participants used interdental aids. Dental floss was used by more than half of the participants, whereas WFs were used by only 13.6%. 54.7% reported that they had heard of WFs (from various sources, including social media and dentists).

**Conclusion.** WFs are effective for reducing bleeding and gingivitis in a wide variety of patients. Thus, they should be used along with toothbrushing to maintain oral hygiene. We found that there is a lack of knowledge about the usage and effectiveness of WFs among the Saudi population. Therefore, oral healthcare providers should aim to increase awareness of the utility of WF devices to enhance oral health.

**Key words:** Interdental aids, Water irrigation, Water Jet, Oral irrigator, Oral hygiene

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## INTRODUCTION

Dental plaque biofilms contain bacteria and firmly adhere to tooth surfaces and tissues [1]. They are the main cause of dental caries and inflammation of the gingiva, which leads to periodontal disease [2]. Brushing removes only approximately 60% of plaque because toothbrushes can only clean the surface of the tooth. Thus, interproximal molar and premolar regions are at increased risk of plaque buildup, like anterior teeth [1,3,4]. Since toothbrushes alone are not sufficient to remove all plaque, other devices, including water flossers (WFs) and oral irrigators, should be used to maintain oral hygiene. The WF is an electrical device introduced in 1962 by Dr. Gerald Moyer that delivers fluid through controlled pressure [1]. The pulsating action and pressure of WFs allow removal of supragingival and subgingival plaque [5]. Several studies

have reported that WFs can improve gingivitis, bleeding, pocket depth, and plaque [1,2,5,6]. Because of the effectiveness of WFs, several types are available with a variety of features, designs, and pulsation and pressure settings, depending on individual needs and preferences. This study assessed the knowledge and awareness of the Saudi population regarding interdental cleaning aids, such as WFs, and evaluated their popularity as supplementary devices to toothbrushes.

## MATERIALS AND METHODS

Ethical approval for this study was acquired from the Research Ethics Committee of the Faculty of Dentistry, King Abdulaziz University, Jeddah, Saudi Arabia. A self-administrated questionnaire was developed in English and translated into Arabic. Both versions of the questionnaire were evaluated for face validity by three experts in the field of dental public health. The questionnaire consists of three sections and a total of 22 questions, including dichotomous, multiple-choice, and open-ended questions.

The first, second, and final sections concern demographics; medical history; and dental visits and treatments, the frequency of tooth brushing, and the usage of interdental cleaning devices, respectively. In addition, participants were asked if they had heard of WFs, whether they used one on a regular basis, and whether they would recommend one to others (and to explain why they would/would not recommend their use). The survey was administrated using an online application (Google Forms; Google Inc., Mountain View, CA, USA). Participants could complete the questionnaire in their preferred language. All participants provided consent before completing the questionnaire and were assured of the confidentiality of their responses.

The participants were self-recruited by snowball sampling via social media networking sites. The survey link was distributed through various social media platforms including Twitter, Facebook, and WhatsApp. All responses were collected during a 2-week period from the end of August to mid-September 2020.

Data were collected, tabulated and analysed, and descriptive statistics (frequencies and percentages) were generated. All statistical analyses were conducted using SPSS for MAC software (version 25.0; IBM Corp., Armonk, NY, USA).

## RESULTS

A total of 322 individuals participated in this study. Most participants (86.3%) were from the western region of Saudi Arabia, including the provinces of Makkah (the cities of Jeddah, Makkah, and Taif: 44.4%, 1.6%, and 1.2%, respectively) and Medina (Medina and Yanbu: 32.2% and 8.1%, respectively). Most participants were Saudi (96.6%) and female (89.1%). In total, 43% of the participants were aged 18–29 years, while 35.4% were employed, 28.6% were unemployed, 11.8% were retired, and 23.6% were students (of whom 63% were college

students). Monthly income varied, with 61.5% of the participants reporting a monthly income lower than 10,000 SAR. The participants' responses to demographic questions are listed in Table 1. In terms of medical history, 85.4% of the participants were medically fit, while 14.6% reported having a medical condition; these included diabetes (4%), hypothyroidism (4%), hypertension (3.4%), and asthma (2.5%).

Most participants reported visiting a dental clinic in the past 6 or 12 months (41.6% and 31.4%, respectively), while 27% stated that their last dental visit was at least 2 years ago. The participants had undergone a variety of dental procedures, with 65% receiving scaling and prophylactic treatment, 55.3% dental restoration, 41% prosthetic treatment, 26.7% orthodontic work, 11.8% periodontal surgery, and 4% dental implants.

Most participants reported brushing their teeth once or twice per day (56.2% and 32.3%, respectively); only 8.4% reported brushing three or more times per day, and 3.1% reported that they never brushed their teeth. In addition, about 60% of participants reported using interdental aids, with dental floss being preferred by 52.2% of them (Table 2).

More than half of participants (54.7%) reported that they had heard of WFs, but only 13.6% of these participants stated that they use one. Social media was the main source of information about WFs for 67% of the participants, followed by dentists (23.2%); the rest of the participants cited other sources of information. All the participants who reported using a WF recommended them to others due to their effectiveness, and quick and easy use, (Table 3). The participants who did not use a WF gave various reasons for not using them, including the high cost, fear of discomfort or harm to the gums, doubts regarding effectiveness, perceived lack of availability, and lack of interest (Table 4).

**Table 1: Sample demographic characteristic (n=322).**

Frequency (%)	
Nationality	
Saudi	311 (96.6)
Non-Saudi	11 (3.4)
Gender	
Male	35 (10.9)
Female	287 (89.1)
Age (Years)	
18-29	138 (42.9)
30-39	72 (22.4)
40-45	69 (21.4)
50-59	34 (10.6)
60 and above	9 (2.8)
Education	

School Student	62 (19.3)
Diploma	33 (10.2)
Undergraduate Degree	203 (63)
Graduate Degree	24 (7.5)
Occupation	
Employed	114 (35.4)
Unemployed	92 (28.6)
Retired	38 (11.8)
Student	76 (23.6)
Others	2 (0.65)
Income (Saudi Riyals)	
Less than 10000	198 (61.5)
More than 10000	101 (31.4)
More than 20000	23 (7.1)

**Table 2: the usage of different types of interdental cleaning aids among the participants (n=322).**

Types of interdental cleaning aids	Frequency (%)
Dental floss	168 (52.2)
Wood pick	82 (25.5)
Interdental brush	39 (12.1)
Water flosser	24 (7.5)
Did not use any interdental cleaning aids before	129 (40.1)

**Table 3: Reasons given by the participants for recommending water flosser devices (n=24).**

Reasons	Frequency (%)
Effectiveness	21 (87.5)
Easy to use	3 (12.5)
Quick	1 (4)

**Table 4: Reasons given by the participants for not using water flosser devices (n=152).**

Reasons	Frequency (%)
High cost	74 (48.7)
Doubt about the effectiveness	28 (18.4)
Cause discomfort	26 (17.1)
Cause harm to the gum	22 (14.5)
Lack of availability	13 (8.6)
Lack of Interest	18 (11.8)

## DISCUSSION

Although individuals can access an abundance of information about oral diseases and oral hygiene devices,

the global prevalence of oral diseases remains high [5]. A recent report estimated that 2.3 billion people suffer from dental caries in their permanent dentition [7].

Periodontitis is also common, affecting 10% of the global population [8]. The etiology of the diseases is multifactorial, with the dental biofilm being a major biological determinant of both. To control dental biofilm, mechanical removal using toothbrushes and interdental cleaning aids is required. This study focused on the knowledge and awareness of interdental cleaning aids of the Saudi population. About 60% of the participants agreed that interdental aids should be used along with toothbrushing. Similarly, a previous study in Saudi Arabia reported that about 63% of the participants used interdental cleaning aids [9]. Another Saudi Arabian study reported that 84% of the participants used interdental aids [10]. By contrast, a study in the Jazan region of Saudi Arabia reported that only 25% of the sample used interdental aids [11]. Dental floss and toothpicks were the interdental cleaning aids of choice for 52.2% and 25.5% of that sample, respectively. Earlier Saudi Arabian studies reported lower dental floss usage rates, ranging between 4.1% and 39%, and greater usage of toothpicks (range: 25–97% [9-12]. It must be emphasized that the reported usage of interdental aids in most of these studies might not reflect the habitual usage; many people use interdental aids only occasionally to remove food impacted between the teeth.

The current study is one of the few to shed light on the awareness and usage of WFs in Saudi Arabia. More than half of the participants reported that they had heard of WFs, but only 13.6% of those stated that they used them. A previous study in Saudi Arabia reported an even lower prevalence of WF usage, of about 5% [9]. Unfortunately, data regarding the prevalence of WF usage globally is limited. A recent industrial report revealed a market value for WFs of USD 814.3 million in 2020, with a projected annual growth rate of 5.3% from 2021 to 2028 [13]. Notably, all of the participants who reported using a WF in this study recommended them to others because they are effective and easy to use; in a randomized clinical trial that compared patient satisfaction with two generations of one WF model (Sonicare AirFloss; Royal Philips N.V., Amsterdam, the Netherlands) only 80% of the participants recommended these devices to others [14]. The participants in that trial based their recommendations on the high efficiency and ease of use of the devices. Recent systematic reviews showed that WFs are an effective adjunct to toothbrushes for improving gingivitis [15-17]. However, these reviews were not conclusive regarding the effectiveness of the devices for controlling dental plaque, with the available evidence supporting the effectiveness of WFs for gingivitis but not periodontitis.

The participants in the present study gave various reasons for not using a WF; some thought that the devices might be uncomfortable or harmful to gingival tissue and dental restorations. A recent randomized clinical trial focused on patient satisfaction with WFs and reported that no participants felt any pain or discomfort while using them [14]. Moreover, Alharbi and Farah [18] found no significant changes in the color or surface roughness of composite restorations in association with

the use of WFs. Finally, Jolkovsky and Lyle [19] concluded that WFs are safe and effective for reducing inflammation, removing bacteria from a periodontal pocket rather than pushing it inside and causing bacteremia.

Available evidence on the efficacy of interdental cleaning devices suggests that it depends on the ability of the patients to use them correctly, and that dental practitioners should recommend devices capable of safe and effective interdental cleaning. Interdental cleaning aids like dental floss, interdental brushes, and toothpicks require some degree of manual dexterity. By contrast, powered devices like WFs can be used by patients with limited dexterity and can help the user reach difficult-to-access areas, such as those around dental implants, dental prostheses, and fixed orthodontic appliances. Several studies have demonstrated the efficacy of WFs in this respect [6,20,21].

The results of the current study support previous reports that social media is facilitating oral health promotion in Saudi Arabia, with 67% of our participants who had heard of WFs reporting that social media was their main source of information [22]. This trend should be exploited by oral health practitioners to distribute additional patient-centered education materials.

The results of the present study might have been affected by the inherent limitations of online self-administrated questionnaires, including low response rates, recall bias, sampling bias, the provision of idealized answers not reflecting actual dental hygiene habits, and misinterpretation of questions [23].

## CONCLUSION

The importance of oral health to general health and well-being is widely acknowledged. This study revealed a lack of knowledge about the effectiveness of WFs among the Saudi population. Therefore, oral healthcare practitioners should encourage regular dental examinations and raise knowledge about various methods for improving oral health, such as Water flosser devices. Studies with larger samples representing all regions of Saudi Arabia should be conducted, with a special focus on oral health habits including the use of interdental cleaning aids.

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