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Original Research

Awareness of mouth wash use and benefits among residents of Riyadh city, Kingdom of Saudi Arabia

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ABSTRACT

Aim: The purpose of the current research is to comprehend the use as well as the attitude of mouthwash uses and indications among adult residents in Riyadh city, Kingdom of Saudi Arabia.

Materials and Methods: Questionnaires were distributed following convenience sampling to 200 respondents through Google Form online questionnaire link shared via social media to residents in Riyadh over a period of 2 months. The questions were divided into 4 main categories which were demographics, behavior, knowledge, and perceived benefits. The data collected were entered into PASW version 20 and analyzed. Descriptive and inferential statistics were applied.

Results: Total of 200 questionnaires were answered by the respondents, which were more than the minimum required sample of 185. Out of the 200 respondents, 28.7% were male while 71.3% were female. The majority of respondents were in the age range of 18-25 years (n = 77, 49.0%), while the rest were distributed among the three different age groups.
Conclusion: The public should be educated on the role of mouthwash. Knowledge gaps on mouthwash should be bridged to make sure the use of mouthwash is more beneficial. A detailed mixed method research extrapolating to Riyadh resident is recommended to gather extensive information on oral hygiene practices among general population living in Riyadh focusing on the use of mouthwash.

INTRODUCTION

Prevention of human disease is widely recognized and is related to making the occurrence or progression of a disease process unlikely or impossible. Oral health is important because the mouth is the gateway to the human body. The World Oral Health Report in 2003 highlighted oral health as an integral and essential component of general health. Good oral health is defined as more than just having healthy teeth; it implies being free of chronic orofacial pain, oral cancer, and other disorders affecting the craniofacial complex.[1]

Bacteria are always present in the oral cavity and when not frequently removed, the dental plaque biofilm leads to the development of oral disease of soft and hard dental tissues. Studies of tooth cleaning suggest that despite technological innovations, the level of mechanical oral hygiene practice is inadequate.[2-3]

The incidence of dental problems has significantly decreased in most of the developed countries because of the significant increase in the level of awareness toward oral health hygiene general population.[4] Currently, there are many utilities such as toothbrushes and floss that are used to clean oral cavity and maintain its hygiene. However, statistics showed that these utilities do not achieve their theoretical potential for controlling plaque and gingival disease[5]. Thus, adjuncts such as mouthwashes are recommended to supplement toothbrushing as they can access areas interdentally which are considered the most frequent sites of plaque accumulation.[6]

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The first recorded practice of using mouthwash is attributed to Chinese traditional medicine as a treatment for gum diseases.[7] Moreover, the principle that plaque biofilm is the major etiologic factor causing gingivitis provides the justification for the use of antimicrobial mouth rinses.[8] Since then, many different combinations of ingredients were used to obtain the mixture of mouthwash.

The use of mouthwash is related to many factors such as sociodemographic characteristics, health, and behavioral factors.[6] For example, women use mouthwash products on a regular basis as compared to men. It has been reported that mouthwash use declines with age.[6] While not a replacement for daily brushing and flossing, use of mouthwash containing fluorides , or chlorohexidine may be a helpful addition to the daily oral hygiene routine for many patients especially those who with high caries risk.

Fluoride is considered one of the most effective agents for caries prevention and that could be attributed to the ability of Fluoride ions to make the tooth structure resistant against demineralization, through transforming hydroxyapatite into fluoroapatite. In addition, they play a role in remineralization of demineralized tooth structure. Some studies have shown that fluoride even inhibits colonization, metabolism, and growth of bacteria, preventing plaque maturation and reducing acid production by some species, especially S. mutans.[9-11]

Mouthwash is an easy and simple method to improve patients' oral hygiene and with addition of agents such a fluoride or chlorohexidine could aid in improving patients' oral health. However, there have been esthetic concerns regarding mouthwashes containing chlorhexidine as they cause a change in taste and produce yellow or brown pigments on tooth surfaces. As a result, there is controversy on the use of chlorhexidine for caries prevention.[12] Thus the use of chlorhexidine should be closely monitored and patients should be educated with proper instructions to prevent its side effects, in addition some concerns regarding the alcohol content in some types of mouthwash and this is linked to oral cancer. However, studies linking mouthwash with cancer have conflicting results, and thus, further studies are warranted to investigate the effects of alcohol in mouthwash.[13]

As the use of mouthwash is becoming increasingly popular, more research studies are being conducted.[14] Hence, the aim of this study is to investigate the association between demographic variables and use of mouthwash as well as the association between the use of mouthwash and its perceived benefits among adults living in Riyadh, Kingdom of Saudi Arabia.

Materials and Methods

This is a descriptive, cross-sectional study design that was conducted through Google Form to adult residents living in Riyadh .The study's main instrument was a questionnaire comprised 36 items. The questions were divided into four main domains of demographics, behavior, knowledge, and perceived benefits. Andrew's Faces Scale which is a seven-point interval scale including stylized faces were used to rate the respondent's perception. The survey instrument was developed from previously published studies and was validated by pharmacy and dental academics from the collaborated research institutions[6]. The questions mainly focused on this study's objectives and hypothesis. An informed consent form was developed and attached to the questionnaire.

The ethical approval letter was obtained from the institutional research board research center of REU. Informed consent was obtained from all participants before they have been enrolled for taking the

questionnaire. A pilot study using Cronbach's alpha was conducted to ascertain the reliability coefficient. Using the Raosoft sample size calculator, the minimum sample size is determined to be 385 with 95% confidence interval and 5% margin error. A convenience sample of 200 mouthwash users consisting of Malaysian adults was obtained in October to November 2019 after 2 months of conducting the survey. As the inclusion criteria entail only mouthwash users, all the recruited respondents were mouthwash users. The recruitment of samples via different social media platforms ensures heterogeneity of the sample. Data were collected and then subjected to analysis using SPPS. Descriptive and inferential statistics were performed.

Results

A total of 200 questionnaires were answered by the respondents, which were more than the minimum required sample of 185. Out of the 200 respondents **,** 28.7% were male while 71.3% were female**.**The majority of respondents were in the age range of 18-25 years (n = 77, 49.0%) while the rest were distributed among the three different age groups. Other detailed demographic characteristics are shown in Table 1.

Their oral hygiene behavior helps determine the overall attitude of the respondents toward their oral health and how they use mouthwash. The majority of respondents (n = 155, 98.7%) have visited a dentist in their life **,**with the majority going less than once or twice a year (n = 55-63, 35%-40.1%). As this study was focused on the use of mouthwash, the respondents were questioned on how frequently they use mouthwash. About 79 (50.3 %) respondents reported use on a less than once a week basis, followed by daily (n =28, 17.8%). The mouthwash of choice appears to be Listerine (n =43, 27.4%), followed by others (water + salt, morrh) (n =42, 26.8%) and Colgate (n= 33, 21.0%) respectively. Most (n =79, 50.3%) of the respondents also did not keep any time interval between brushing and mouthwash use and did not dilute their mouthwash (n =80, 51.0%). More detailed oral hygiene behaviors of respondents are shown in Table 2.

Respondents were also tested on their knowledge of mouthwash ingredients with more than half (n = 87, 55.4%) answering "no" that most mouthwashes does not contains alcohol (n = 141, 89.8%) and answering "yes" that chlorhexidine has an antibacterial effect. In terms of mouthwash use, more than half of the respondents (n = 86, 54.8%) answered "NO" that it is impossible to prevent gum disease with tooth brushing alone. Most respondents (n = 140, 89.2%) answered "no**"**that mouthwash use cannot replace the role of the toothbrush. The respondents, however, (n= 105, 66.9%) answered "yes" on the use of mouthwash is necessary. Other results of the respondents' knowledge are shown in Table 3.

When respondents were asked how was the taste of their mouthwash, the majority (n =49, 31.2%) perceived it as good. While it helps in plaque reduction (n=47, 29.9%) also perceived it as good The majority of the respondents had similar opinions (excellent) when asked whether the use of mouthwash was convenient , helps reduce periodontal disease and gum disease helps eliminate bad breath and whether mouthwash**,**and helps prevent tooth decay with a frequency of (n= 50 , 31.8%), (n=74, 47.1%), (n=75, 47.8%), (n=53, 33.8%) respondents, respectively. Detailed perception of respondents on mouthwash is shown in Table 4.

From the results associating demographics and use of mouthwash, we can observe that the dilution of mouthwash and time interval kept between brushing

teeth is significant with age ($p < 0.05$). When do you use mouthwash is significant with gender ($p < 0.05$) and what do you use mouthwash for significant with race ($p < 0.05$).

Tables

Table 1. Demographic characteristics of the respondents

Variables	Description	Frequency (Percent)
Age (years)	**18-25**	**77 (49.0)**
	26-33	**39 (24.8)**
	34-41	**22 (14)**
	≥50	**19 (12.1)**
Gender	**Male**	**28.7 (28.7)**
	Female	**71.3 (71.3)**
Race	**Saudi**	**139 (88.5)**
	Non-Saudi	**18 (11.5)**
Marital status	**Single**	**96 (61.1)**
	Married	**58 (36.9)**
	Divorced	**3 (2.0)**
Monthly income	**None**	**80 (51.0)**
	<SAR10000	**45 (28.7)**
	SAR 10000 SAR 20000	**22 (14.0)**
	>SAR 20000	**10 (6.3)**

Discussion

The processing of the data and its analysis have led to important conclusions about the use of mouthwash in Saudi Arabia, as well as the general dental practices of the population. First, the analysis leads to several practical conclusions. A significant proportion of respondents have inadequate dental habits (42%) and inadequate knowledge of mouthwash and its usage (66.9%). Better results were obtained in terms of the perception of use, with 70.7% being rated in the adequate category.

Next, an analysis of these results was made in terms of socio-demographic characteristics. Dental practice is basically rated as bad for all age groups, and mostly in the case of respondents aged 50+ (where 57.9 % are assessed with inadequate habits). The lowest percentage is in the age group of 18-25 (38.9 %), however, it is still an indicator of a significant percentage of young population practicing unsatisfactory oral hygiene. Furthermore, the male population (62.2 %) has higher deviance, compared to the female population (33.9 %). In terms of nationality, there is also a higher contrast in the case of Non-Saudi (66.6%), as opposed to domestic respondents (38.8 %). There is also a certain differentiation in terms of employment, where the highest percentage of inadequacy is shown by the employees in the government sector (55.5 %), and the lowest in case of the unemployed (37.5 %).

When it comes to assessing the knowledge about mouthwash, respondents show quite consistent results compared to their socio-demographic background - except in two cases. There is a big difference in the mouthwash knowledge assessment for the criterion - working in the dental field, where surprisingly, inadequate knowledge was shown by 43.6% of those working in the dental profession, compared to 29.7% of those not employed in the dental field. Furthermore, the youngest group (36.06 %) showed the worst result in

terms of age, and the most satisfactory knowledge was in the case of the oldest group (26.3 % rated as having inadequate knowledge). The other categories show similar results.

Table 2. Oral hygiene behavior of the respondents

Question	Description	Frequency (Percent)
Have you ever visited a dentist in your life?	Yes	155 (98.7)
	No	2 (1.3)
How frequent do you visit the dentist?	Never been to a dentist	4 (2.5)
	Once a year	55 (35)
	Twice a year	63 (40.1)
	Three times a year	9 (5.7)
	More than three time a year	26 (16.6)
How frequently do you use mouthwash?	Daily	28 (17.8)
	Less than once\week	79 (50.3)
	Once a week	22 (14.0)
	Twice a week	10 (6.4)
	Three times a week	18 (11.5)
What brand of mouthwash do you generally use?	Colgate	33 (21.0)
	Oral B	19 (12.1)
	Listerine	43 (27.4)
	Others	42 (26.8)
	Colgate + Oral B	7 (4.5)
	Colgate + Listerine	4 (2.5)
	Colgate + Others	1 (0.6)
	Oral B + Listerine	1 (0.6)
	Listerine + Others	7 (4.5)
How long do you keep it in the mouth?	Not known	43 (27.4)
	A few seconds (less than < 20s)	74 (47.1)
	Longer (more than > 20s)	40 (25.5)
Do you dilute the mouthwash?	Yes	77 (49.0)
	No	80 (51.0)
What is the time interval you keep between brushing teeth and use of mouthwash?	No time interval	79 (50.3)
	Less than 1 min	46 (29.3)
	About 5 min	13 (8.3)
	About 1 hour	11 (7.0)
	About 2 hour	8 (5.1)
How many mouthful of mouthwash?	Only one	131 (83.4)
	Two or more	26 (16.6)
When do you use mouthwash?	Before Brushing	21 (13.4)
	After brushing	136 (86.6)
What do you use mouthwash for?	To replace tooth brushing	5 (3.2)
	To mask bad breath	36 (22.9)
	To prevent oral diseases	47(29.9)
	To replace tooth brushing & mask bad breath	4(2.5)
	To replace tooth brushing & prevent oral diseases	47(29.9)
	To mask bad breath & prevent oral disease	18(11.5)

The last group is the questions about the perception of using mouthwash. The worst results, rated in relation to the age group were in the case of individuals 50 + (84.2 %), and the most positive results in the case of 34-49 (54.5 % inadequate perception). There is also a significant difference in terms of living in and out of town (inadequate 68.6 % vs. 85 %). Further, there is a better perception score in the case of government employees (adequate perception 51.8 % vs. low score of19.2 % in the case of private employees). Lastly, earnings proved to be another factor of differentiation - the most positive perception in terms of individuals making less than <10,000 SAR (40 %), and the most negative in the case of earning more than> 20,000 SAR (20 %).

Table 3. Knowledge of the respondents on mouthwash

Question	Description	Frequency (Percent)
Most of the mouth wash contain alcohol	**Yes** **No**	**70 (44.6)** **87 (55.4)**
Chlorhexidine has an antibacterial effect	**Yes** **No**	**141 (89.8)** **16 (10.2)**
Fluoride may help reduce plaque	**Yes** **No**	**115 (73.2)** **42 (26.8)**
Fluoride may help prevent tooth decay	**Yes** **No**	**135 (86.0)** **22 (14.0)**
Impossible to prevent gum disease with tooth brushing alone	**Yes** **No**	**71 (45.2)** **86 (54.8)**
Mouth Wash replace the role of toothbrush	**Yes** **No**	**17 (10.8)** **140 (89.2)**
Use of mouth wash is necessary?	**Yes** **No**	**105 (66.9)** **52 (33.1)**
Cannot be swallowed?	**Yes** **No**	**135 (86.0)** **22 (14.0)**

Following this analysis, a further analysis was performed to determine the statistical significance, and the dependence of each aspect on socio-demographic factors. A high correlation has been found in several cases - the brand of mouthwash used with marital status and working in the dental sector, employment and how long mouthwash is kept in the mouth, as well as the use of mouthwash for masking the bad breath, mouthwash dilution and working in the dental sector, which also appears to be a statistically significant factor in the question of whether Fluoride may help to reduce plaque, and lastly the aspect of age with the use of mouthwash as a replacement for brushing teeth. There are also a few cases of statistical significance with lower intensity.

The thought of a dentist's chair is unpleasant for even the brave people who have good and healthy teeth. And for those who simply have sensitive and fragile teeth, an ally in the fight against dentistry may be oral hygiene - brush, paste, dental floss, mouthwash and regular dental check-ups.

How to use the basic tools against caries and toothache - brushes and pastes - we learn as children. Floss and mouthwash, unfortunately, often come only much later, when some gum problem occurs - which almost 95% of the adult population will encounter at some point in their life.[15] The problem, of course, is the bacteria that live in the oral cavity as the lobby of the digestive tract. That is why it is good to know and use the important fighter against the bacteria just mentioned - and that is mouthwash.

Although it acts as a relatively new product, mouthwash dates from the 19th century, but at that time it was used primarily as an antiseptic during operations, and only in the 1970s did it become an odorant.[16] With the development of dentistry, pharmacology and cosmetology, mouthwashes have evolved that contribute to dental and gum health, but only if used properly.

Table 4. Perception of respondents on mouthwash

Question	Description	Frequency (Percent)
How is the taste of your mouthwash?	Excellent	33 (21.0%)
	Very good	40 (25.5%)
	Good	49 (31.2%)
	Indifferent	21 (13.4%)
	Bad	12 (7.6%)
	Very bad	2 (1.3%)
How was your taste of food and drinks affected?	Excellent	11 (7.0%)
	Very good	27 (17.2%)
	Good	33 (21.0 %)
	Indifferent	44 (28.0%)
	Bad	30 (19.1%)
	Very bad	12 (7.6%)
Was the use of the mouthwash convenient?	Excellent	50 (31.8%)
	Very good	44 (28.0%)
	Good	41 (26.1%)
	Indifferent	14 (8.9%)
	Bad	7 (4.5%)
	Very bad	1 (0.6%)
Does mouthwash help in plaque reduction?	Excellent	38 (24.2%)
	Very good	28 (17.8%)
	Good	47 (29.9%)
	Indifferent	39 (24.8%)
	Bad	3 (1.9%)
	Very bad	2(1.3%)
Does mouthwash help reduce periodontal disease and gum disease?	Excellent	74 (47.1%)
	Very good	26 (16.6 %)
	Good	38 (24.2%)
	Indifferent	14 (8.9%)
	Bad	2 (1.3%)
	Very bad	3 (1.9%)
Does mouthwash help eliminate bad breath	Excellent	75 (47.8%)
	Very good	37 (23.6%)
	Good	35 (22.3%)
	Indifferent	8(5.1%)
	Bad	1 (0.6%)
	Very bad	1 (0.6%)
Does mouthwash help prevent tooth decay?	Excellent	53 (33.8%)
	Very good	32 (20.4%)
	Good	41 (26.1%)
	Indifferent	27 (17.2%)
	Bad	2 (1.3%)
	Very bad	2 (1.3%)
How long did the taste remain in the mouth after rinsing?	Very long	17 (10.8%)
	Long	20 (12.7%)
	Short	98 (62.4%)
	Very short	22 (14.0%)
What is your opinion about the rinsing time?	Very long	33 (21.0%)
	Long	23 (14.6%)
	Short	90 (57.3%)
	Very short	11 (7.0%)

There are people who often use these agents even though they do not know the basic information about them, while on the other hand, a number of people never include them in their daily routine of maintaining oral hygiene. Therefore, it is important to know basic information about mouthwash.

First, the use of mouthwash cannot replace tooth brushing - it is just an aid.[14] Toothbrush and toothpaste mechanically removes most of the soft deposits and bacteria from the teeth and gums; the use of an interdental toothbrush cleans the inaccessible parts between the teeth, and the mouthwash reduces the number of bacteria in the mouth after tooth brushing, and thus the ability to form new plaque. Secondly, the liquid does not remove bad breath but just masks it and temporarily eliminates bad taste in the mouth.[17] Third, not all mouthwashes are the same - there are cosmetic and therapeutic ones, prescribed by dentists, which serve to treat a certain condition or problem. They should not be taken on their own, and it is best to follow the manufacturer's instructions. Fourth, it is advised to use mouthwashes as needed, and unless diagnosed, it is not necessary to use them daily or several times a day.[18]

With the purpose of discovering more about the dental practices of the population in Saudi Arabia, as well as their perception and knowledge on mouthwash a survey was conducted. The results from the analysis are alarming – the dental practices are unsatisfactory, the level of knowledge is disappointing, and the overall perception displeasing. This conclusion indicates, first of all, to a need to improve the knowledge about oral health, good dental practices, oral hygiene practices, and certainly how to use a mouthwash in this process. Additional spreading of awareness about the importance of dental care, regular brushing and flossing and mouthwash usage is also needed.

Further research of this topic should also be done. The conducted survey had limitations, such as time and budget. Additional analysis can be done, especially to those factors showing high statistical significance. Future surveys can include a greater number of respondents, and take into account different aspects, including some suggestions and recommendations that the individuals will benefit most from. That will help in setting the right means to improve the oral, and overall health of Saudi Arabia population.

Conclusion

The public should be educated on the role of mouthwash**.** Knowledge gaps on mouthwash should be bridged to make sure the use of mouthwash is more beneficial**.** A detailed mixed method research extrapolating to Riyadh resident is recommended to gather extensive information on oral hygiene practices among Saudi, non-Saudi general population living in Riyadh focusing on the use of mouthwash.

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