[Now published in full after the initial publication as an Epub ahead of print on Jan 24, 2022 at www.fluorideresearch.online/epub/files/175.pdf]

MEDICAL PERSONNEL'S ATTITUDES AND AWARENESS REGARDING BENEFITS AND RISKS OF USE OF FLUORIDATED SUBSTANCES: CASE STUDY IN PESHAWAR CITY, KHYBER PAKHTUNKHWA, PAKISTAN

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ABSTRACT: ***Background:*** **This study was conducted to analyze the attitudes and awareness regarding the risks and benefits of the usage of fluoridated substances among medical personnel practicing in various medical-related professions, both as dentists and non-dentists, in Peshawar city, Pakistan.**

Materials and methods: **In this study, a semi-structured questionnaire was used for data collection. Data were collected using purposive sampling from respondents in five urban areas (Hyatabad, Daborigarden, Hyshatnagry, Andersher, and Sadar) of Peshawar city. The data were collected from 456 dentists, family medicine practitioners/general surgeons, and pediatric practitioners (the proportions were dentistry 142, family medicine 165, and pediatrics 149).**

Results: **This study found that attitudes and awareness regarding fluoride's anti-caries efficacy and the usage of fluoridated toothpaste among dentists was significantly higher than among non-dental doctors. The results indicated that 30% of dentists identified swallowing toothpaste as the main concern when using fluoridated toothpaste, while 27% of family medicine practitioners stated that dental fluorosis was their main concern. However, more than 30% of all doctors were found to be using fluoridated toothpaste without any concerns. Similarly, about 50% of dentists and 60% of pediatric practitioners believed that the benefits of using fluoridated toothpaste for children aged from 3–6 years outweighed the risks; however, only 29% of family medicine practitioners shared this perspective. It is noteworthy that 47 medical practitioners from this group of doctors stated that they could not assess the risks due to a lack of relevant knowledge.**

Conclusions: **This study found that most respondents were not aware of the usage and effects of fluoridated substances, nor of their risks and benefits. Dentists and non-dental doctors were concerned about the potential dangers of the use of fluoridated toothpaste and other substances. This study suggests that local authorities should focus on health education and training to improve the knowledge of all medical personnel about all aspects of fluoridated substance usage, with this being a surety for good public health.**

Keywords: Administrative policies; Awareness; Fluoride; Medical personnel; Peshawar.

INTRODUCTION

In recent decades, a substantial decrease has occurred in the prevalence of dental caries, especially in developing countries, primarily due to widespread systemic or

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topical fluoride products.[1,2] Dental caries affects the physical health and well-being of infants. Evidence has shown that dental caries in children[1,2] leads to a significant decline in their quality of life. It also has a tendency to negatively impact on the child's academic achievement with increased absenteeism from school and a decrease in academic results. According to the Centers for Disease Control and Prevention, laboratory and epidemiological studies, which have brought in a clearer understanding of how fluoride inhibits dental caries, suggest the overall effects of fluoride are post-eruptive and topical. Fluoride worked extensively after teeth have erupted, particularly when small quantities are continuously retained in the mouth, especially in saliva and plaque.[3]

This conflicts with the commonly accepted assumption that fluoride's key benefits are pre-eruptive and structural.[4]

Fluoride, in adequate doses, reduces oral caries in children.[5] The optimum amounts may be obtained from several sources, including community water flow, fluoride toothpaste, fluoride varnishes, fluoride rinses, and dietary fluoride supplements, most of which can be considered through clinical guidelines. Insufficient knowledge of oral health leads to inappropriate oral hygiene behavior.[6,7] According to the fourth Chinese Oral Health Epidemiological Survey, the perception of fluoridated toothpaste among Chinese citizens was still at a comparatively low level.[8] Therefore, oral health education on the awareness and usage of fluoridated toothpaste is essential. As medical professionals, physicians' awareness of health care problems impacts on their professional practice decisions and recommendations and affects patient and public awareness.[9] However, few studies have explicitly concentrated on the knowledge of fluoridated substances among doctors in Pakistan. No research has investigated the risks of using fluoridated toothpaste. Various experiments have been undertaken in recent years to determine dental professionals' expertise and experience regarding fluoride.

In 2012, 94% of American dentists confirmed that they regularly practiced fluoride therapy in their clinics. Of these, 20% accepted that the usage of topical fluoride was not helpful to low-risk patients. In high-risk children aged under six, 93% correctly reported that topical fluoride should be administered every three to six months.

Dentists' knowledge and awareness about the mechanism behind the action of fluoridated substances were found to be weak. Productive fluoride usage was also emphasized, based on a patient's risk of caries and following evidence-based guidelines.[10] A related study on caries diagnosis, professional decision making authority utilizing risk evaluation guidelines for caries, and the usage of preventive strategies found that 69% of clinicians conducted a risk assessment for caries. They were also more likely to include individualized treatment of caries through the use of sealant and fluoride.[11] In another study, only 9% of residents in Florida in the United States (US) obtained at least one fluoride application; in all, 75% received dental cleaning, but subjects with high needs were less likely to receive preventive services.[12]

The current study examined the awareness and attitudes towards fluoride risk among dentists and non-dental physicians (NDDs) involved in different types of medical practice in Peshawar. The study assessed pediatric oral fluoride

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supplementation, level of knowledge, and existing gaps that needed to be addressed with training and sessions conducted for NDDs and dentists.

METHODOLOGY

This study's cross-sectional method was designed to analyze the awareness and attitudes regarding the usage and knowledge of fluoride supplements (their risks and benefits) among medical personnel involved in different types of medical practice in Peshawar (the capital city of Khyber Pakhtunkhwa, Pakistan). Most urban parts of Peshawar city, namely, Hyatabad, Daborigarden, Hyshatnagry, Andersher, and Sadar, are considered the most popular areas for medical procedures (as shown by the large number of public and private hospitals and clinics).

To meet ethics requirements, the first page of the questionnaire explained in detail the purpose of the study and confirmed the local administration's permission to gain the confidence and cooperation of interested respondents.

Sample technique and size: The non-probability purposive sampling technique was used for data collection. With an unknown population size and a search for highly reliable data, 456 respondents were chosen as the sample size with a 95% confidence interval (CI) and a 5% margin of error (Yamane, 1973). Three different types of medical practitioner were selected, namely, health professionals from dentistry, family medicine or general surgeons, and pediatrics.

Area profile: Peshawar is the capital of the Pakistani province of Khyber Pakhtunkhwa and is the largest city of this province. It is the sixth-largest city in Pakistan. Peshawar is also the largest Pashtun-majority city in Pakistan. Situated in the broad Valley of Peshawar near the eastern end of the historic Khyber Pass, close to the border with Afghanistan, Peshawar's recorded history dates back to at least 539 BCE (Before the Common Era), making it the oldest city in Pakistan and one of the oldest cities in South Asia (Figure 1)

Figure 1. Map of Peshawar, Pakistan. Source: Peshawar Google My Maps: https://maps.google.com

Data collection instrument: A semi-structured questionnaire with 30 items was used for data collection, with most items related to the awareness and usage of

fluoridated substances regarding their risks and benefits, with respondents given two options (Yes, No). The first page of the questionnaire explained the purpose and asked several demographic questions, while the following pages presented other items related to the usage and awareness of fluoridated substances.

Selection criteria of respondents (exclusion and inclusion): This study focused on recruiting only three groups of medical professionals (dentistry, family medicine or general surgeons, and pediatrics) who were practicing in the public or private sector in Peshawar and who had rich experience. Respondents without experience or who were not yet in practice, as well as respondents with any sort of disability or who were unwilling to participate, were not able to take part in this study.

Statistical analysis: A multistage random sampling procedure was used to select respondents for the study. Peshawar is divided into 93 Union Councils (UCs), with the city's revenue department providing the list of all UCs to this study. Next, a list of all doctors belonging to dentistry, family medicine, and pediatrics was prepared by obtaining data from medical representatives who usually visit all doctors in the area. In the next step, 180 respondents were randomly selected from each category. However, due to varying response rates at the time of the survey, the final sample comprised 142 dentists, 165 family medicine practitioners, and 149 pediatric professionals, thus making a total sample size of 456 respondents. After consultation with several doctors, a well-structured questionnaire was prepared to obtain the data. Before implementation, the survey instrument was used in a small pilot study to see if it had any deficiencies. Finally, the data were collected through face-to-face interviews conducted by trained enumerators. All data were entered into spreadsheet software using Microsoft (MS) Excel (Microsoft Inc., Redmond, WA, USA). The data were analyzed using SPSS 22 (IBM Inc, Armonk, NY, USA). Descriptive and bivariate analysis was performed between the outcomes. A chi-square test was used to estimate the measures of association between different variables. The significance level was considered at $p<0.05$.

RESULTS AND DISCUSSION

The descriptive statistics of respondents are presented in Table 1. The sample comprised an almost equal distribution of respondents from all three categories of specialty, with approximately 31% dentists, 36% family medicine practitioners, and 32% pediatrics professionals. About 47% of the sample were female respondents. As more than 70% of respondents reported they had completed their training more than five years ago, they had sufficient experience to participate in the study. About 36% of respondents worked in both public and private hospitals which was quite common in this area. About 19% and 15% worked only in government hospitals or private hospitals, respectively, while approximately 23% of respondents had their private clinic.

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Table 1. Characteristics of respondents (N=456)

	N	Percentage (%)
Specialty		
Dentistry	142	31.14
Family medicine	165	36.18
Pediatrics	149	32.68
Gender		
Female	211	46.27
Male	245	53.73
No. of years since training completion		
Training to 5 years	103	22.59
6–14 years	128	28.07
15–24 years	117	25.66
25+ years	108	23.68
Practice type		
Public + private hospital	168	36.84
Private hospital	87	19.08
Public hospital	69	15.13
Own private clinic	106	23.25
Others	26	5.70
Total	456	100

Tables 2 and 3 presents the results for fluoride supplementation knowledge and the distribution of respondents who attended any type of education session regarding fluoride supplementation. The results are provided based on several categories. Specialty-wise, dentists were the largest group of respondents who stated that they knew the current American Dental Association (ADA) recommendations for daily fluoride supplementation. The proportion of dentists attending educational sessions on this topic was also the highest of the three categories. The knowledge of fluoride supplementation increased as the number of years following training completion increased. The same trend was observed among those who had attended educational sessions during this time. By practice type, the study found that doctors who were

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simultaneously working in both public and private hospitals had more knowledge, and that their frequency of attending educational sessions was also higher. A positive association was found between doctors' attendance at education sessions and their fluoride supplementation knowledge. To be specific, 88% of those who attended educational sessions stated that they knew the current ADA recommendations about fluoride supplementation.

Table 2. Fluoride supplementation knowledge by selected characteristics

Characteristics	Do you know the current ADA recommendations for daily fluoride supplementation? (N=456)			
	Yes %	Some knowledge %	No %	Chi sq (sig.)
Specialty				
Dentistry	95.07	4.93	0.00	
Family medicine	54.55	29.70	15.76	57.04 (0.000)
Pediatrics	65.77	20.81	13.42	
No. of years since training completion				
Training to 5 years	64.08	24.27	11.65	
6–14 years	59.38	25.78	14.84	
15–24 years	75.21	17.09	7.69	38.73 (0.000)
>25 years	86.11	8.33	5.56	
Practice type				
Public + private Hospital	79.76	13.10	7.14	
Private hospital	72.41	18.39	9.20	
Public hospital	65.22	23.19	11.59	25.71 (0.001)
Own private clinic	63.21	24.53	12.26	
Others	53.85	26.92	19.23	
Educational session				
Yes	88.18	7.88	3.94	59.24 (0.000)
No	56.92	28.06	15.02	
Total	70.83	19.08	10.09	

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Table 3. Educational session attendance by selected characteristics

Characteristics	Have you attended any educational session on fluoride supplementation in the past five years? (N=456)		
	Yes %	No %	Chi sq (sig.)
Specialty			
Dentistry	58.50	41.50	18.78 (0.000)
Family medicine	33.90	66.10	
Pediatrics	43.00	57.00	
No. of years since training completion			
Training to 5 years	32.00	68.00	14.26 (0.003)
6–14 years	39.80	60.20	
15–24 years	51.30	48.70	
>25 years	44.50	55.50	
Practice type			
Public + private Hospital	51.79	48.21	9.73 (0.045)
Private hospital	47.13	52.87	
Public hospital	33.02	66.98	
Own private clinic	42.03	57.97	
Others	42.31	57.69	
Educational session			
Yes	-	-	-
No	-	-	
Total	15.13	67.98	

The distribution of respondents, in accordance with their knowledge of fluorosis and its perceived health risk, is provided in Tables 4 and 5. The results indicate that dentists had the highest proportion (92%) of those with knowledge about fluorosis, while only 57% of family medicine practitioners stated that they knew about fluorosis (Figure 2). Very few dentists thought that fluorosis was a serious health risk,

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but a relatively higher proportion of doctors in the other specialties perceived this to be the case (Figure 3). Knowledge of fluorosis increased as the number of years since training completion increased. However, the perception of fluorosis as a serious health risk decreased as the length of doctors' experience increased. Doctors who had practices in both public and private hospitals had more knowledge of fluorosis compared to those who worked only in either public or private hospitals. A positive association was found between attending education sessions and knowledge about fluorosis.

Table 4. Distribution of medical professionals by knowledge of fluorosis

Characteristic	Knowledge of fluorosis (N=456)			
	Yes %	Somewhat %	No %	Chi sq. (sig.)
Specialty				
Dentistry	92.96	7.04	0.00	57.04 (0.000)
Family medicine	57.58	25.45	16.97	
Pediatrics	65.77	20.81	13.42	
No. of years since training completion				
Training to 5 years	54.37	28.16	17.48	38.73 (0.000)
6–14 years	63.28	22.66	14.06	
15–24 years	77.78	14.53	7.69	
>25 years	89.81	7.41	2.78	
Practice type				
Public + private hospital	82.74	10.71	6.55	25.71 (0.001)
Private hospital	72.41	17.24	10.34	
Public hospital	68.12	20.29	11.59	
Own private clinic	60.38	25.47	14.15	
Others	46.15	34.62	19.23	
Educational session				
Yes	89.66	6.40	3.94	59.24 (0.000)
No	56.52	27.67	15.81	
Total	71.27	18.20	10.53	

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Table 5. Distribution of medical professionals by perceived health risk of fluorosis

Characteristic	Think fluorosis is a serious health risk (N=456)			
	Yes %	No %	Unsure %	Chi sq. (sig.)
Specialty				
Dentistry	5.63	86.62	7.75	37.12 (0.000)
Family medicine	20.00	55.15	24.85	
Pediatrics	18.79	64.43	16.78	
No. of years since training completion				
Training to 5 years	31.07	45.63	23.30	51.55 (0.000)
6–14 years	15.63	62.50	21.88	
15–24 years	11.11	76.92	11.97	
>25 years	3.70	86.11	10.19	
Practice type				
Public + private hospital	8.93	79.17	11.90	36.18 (0.000)
Private hospital	11.49	71.26	17.24	
Public hospital	13.04	66.67	20.29	
Own private clinic	26.42	56.60	16.98	
Others	26.92	34.62	38.46	
Educational session				
Yes	7.88	83.74	8.37	41.77 (0.000)
No	20.95	55.34	23.72	
Total	15.13	67.98	16.89	

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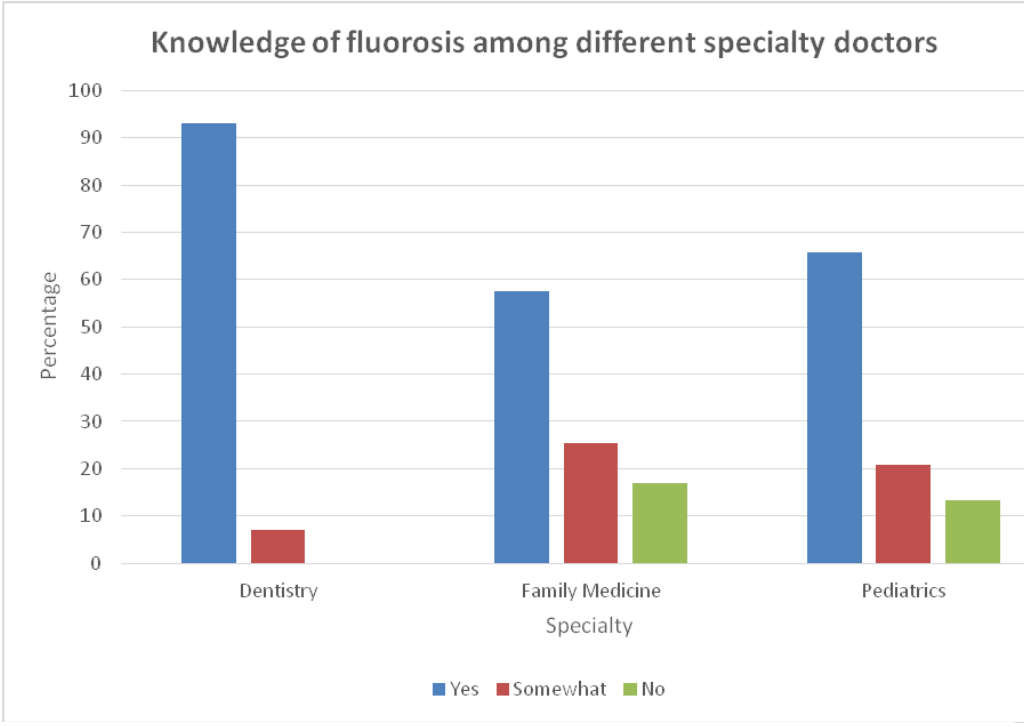

Figure 2. Knowledge of fluorosis among different specialty doctors.

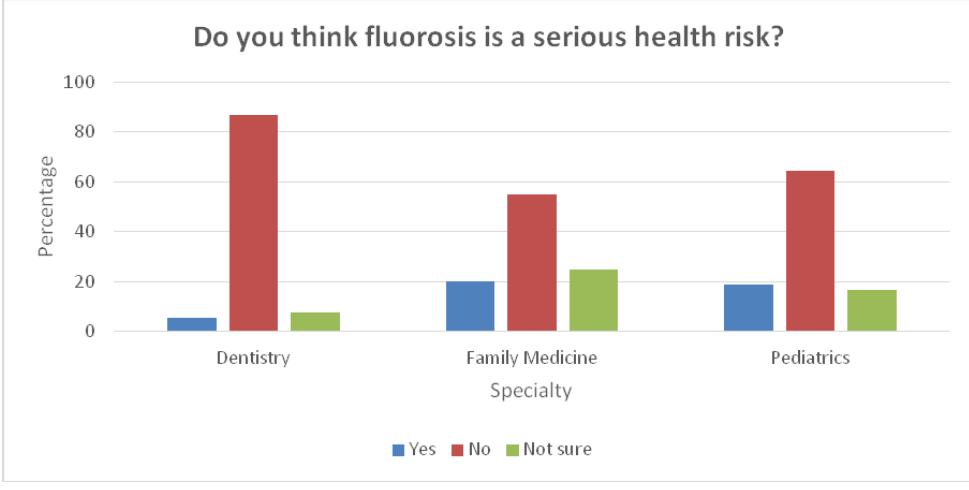

Figure 3. Perceived health risk of fluorosis by different specialty doctors.

The results for doctors' awareness about the anti-caries efficacy of fluoridated toothpaste show that the highest proportion of doctors with this awareness were dentists (Table 6), with a lower number of family medicine practitioners having this

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awareness. Moreover, more than half the dentists reported usage of fluoridated toothpaste, while fluoridated toothpaste usage was lower among family medicine practitioners (Figure 4). About 20% of non-dental doctors (NDDs) stated that they could not identify whether the toothpaste was fluoridated.

Table 6. Awareness of anti-caries efficacy of fluoridated toothpaste

Perspective	Specialty			Chi sq. value	p-value
	Dentistry % (N=142)	Family Medicine % (N=165)	Pediatrics % (N=149)		
Awareness of the anti-caries efficacy of fluoridated toothpaste					
Agree	92.25	55.76	63.09	52.584	0.000
Somewhat agree	4.93	24.85	19.46		
Disagree	2.82	19.39	17.45		
Are you using fluoridated toothpaste?					
Certainly	55.63	35.15	46.98	13.657	0.008
Certainly not	29.58	41.82	32.21		
Not sure because I don't know how to identify it	14.79	23.03	20.81		

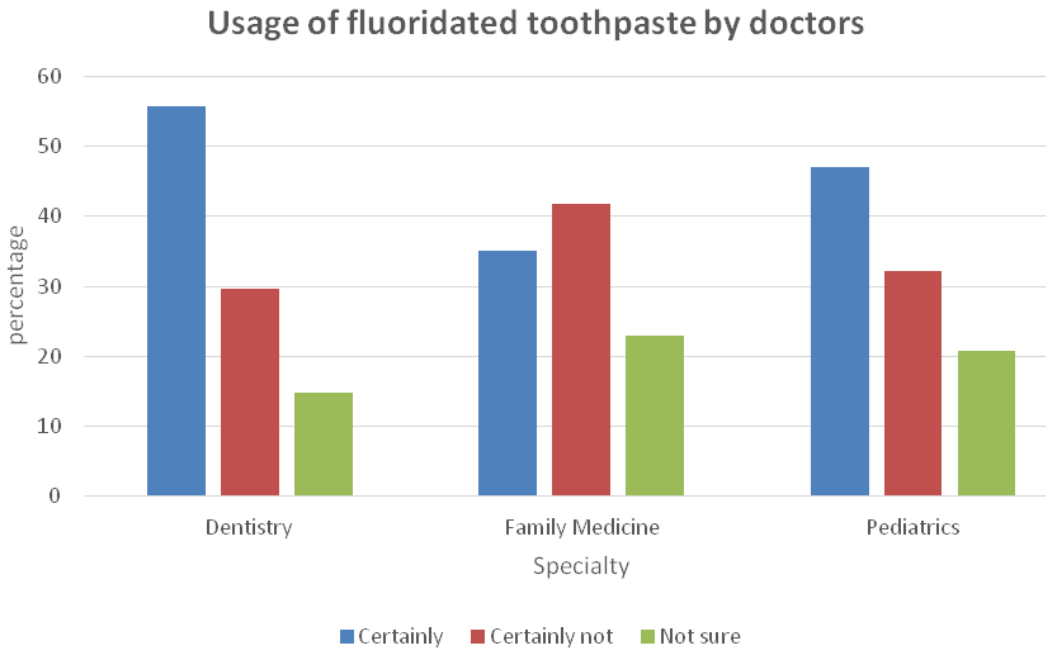

Figure 4. Usage of fluoridated toothpaste by doctors.

A significant difference was found between dentists and NDDs regarding concerns about using fluoridated toothpaste (Table 7). For instance, about 30% of dentists stated that swallowing toothpaste was the main concern of using fluoridated toothpaste, while 27% of family medicine practitioners stated that dental fluorosis was their main concern. However, more than 30% of all doctors were found to be using fluoridated toothpaste without any concerns.

Table 7. Main concerns about using fluoridated toothpaste

Perspective	Specialty			Chi sq. value	p-value
	Dentistry % (N=142)	Family Medicine % (N=165)	Pediatrics % (N=149)		
Swallowing	30.28	16.97	27.52	8.34	0.015
Dental fluorosis	14.79	27.27	12.75	12.90	0.002
Skeletal fluorosis	2.82	10.30	3.36	10.22	0.006
Have concerns but don't know what the concerns are	7.04	12.12	17.45	7.32	0.026
Without concerns	45.07	33.33	38.93	5.43	0.049

Doctors in different specialties differed in their perspectives regarding the use of fluoridated toothpaste in children of different ages (Table 8). For instance, more than one-quarter of dentists and pediatric professionals stated that the risks of using fluoridated toothpaste among children under three diluted the benefits. However, this proportion was 20% among family medicine practitioners. A similar trend was found when considering the use of fluoridated toothpaste for children between the ages of three and six years. About 50% of dentists and 60% of pediatric professionals believed that the benefits of using fluoridated toothpaste for children aged from 3–6 years outweighed the risks; however, only 29% of family medicine practitioners shared this perspective. It is noteworthy that about 47 doctors stated that they could not assess the risks due to a lack of relevant knowledge.

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Table 8. Consideration about use of fluoridated toothpaste in children of dfferent ages among different specialty doctors

Perspective	Specialty			Chi sq. value	p-value
	Dentistry % (N=142)	Family Medicine % (N=165)	Pediatrics % (N=149)		
In children aged under 3 years					
No risks exist	12.60	5.30	3.50	-	-
Benefits outweigh risks	43.00	23.00	46.70	-	-
Risks outweigh benefits*	27.50	20.40	25.21	1.489	0.197
Could not assess due to lack of relevant knowledge	16.90	51.30	24.59	-	-
In children aged from 3–6 years					
No risks exist	15.30	7.20	4.32	-	-
Benefits outweigh risks*	50.12	28.32	59.00	12.32	0.002
Risks outweigh benefits	15.30	18.22	20.20	-	-
Could not assess due to lack of relevant knowledge	19.28	46.26	16.48	-	-

* Indicates an answer which is relatively reasonable.

More than 60% of dentists and more than 30% of NDDs believed that the risks of using fluoridated toothpaste among people with highly fluoridated drinking water outweighed the benefits (Table 9). However, about 46% of family medicine practitioners reported that they could not assess this owing to a lack of relevant knowledge.

A relatively higher proportion of dentists (about 26%) believed that benefits outweighed risks when using fluoridated toothpaste among pregnant women, compared to 17% of family medicine practitioners and 6% of pediatric professionals (Table 8). However, a significant proportion of these doctors stated that they could not identify this risk due to their lack of relevant knowledge.

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Table 9. Consideration of use of fluoridated toothpaste by individuals living in areas with highly fluoridated drinking water among different specialty doctors

Perspective	Specialty			Chi sq. value	p-value
	Dentistry % (N=142)	Family Medicine % (N=165)	Pediatrics % (N=149)		
No risks exist	4.20	6.21	5.29	-	-
Benefits outweigh risks	22.35	12.38	14.65	-	-
Risks outweigh benefits*	64.54	35.76	48.53	16.71	0.001
Could not assess due to lack of relevant knowledge	8.91	45.65	31.53	-	-

* Indicates an answer which is relatively reasonable.

Table 10. Consideration of use of fluoridated toothpaste in pregnant women among different specialty doctors

Perspective	Specialty			Chi sq. value	p-value
	Dentistry % (N=142)	Family Medicine % (N=165)	Pediatrics % (N=149)		
No risks exist	19.11	16.29	10.12	-	-
Benefits outweigh risks*	26.55	17.32	6.30	9.46	0.003
Risks outweigh benefits	15.30	18.22	20.20	-	-
Could not assess due to lack of relevant knowledge	39.04	48.17	63.38	-	-

* Indicates an answer which is relatively reasonable.

DISCUSSION

The detection of the anti-caries impact of fluoride has opened a new arena in the treatment of dental caries. Fluoride may shape a calcium fluoride reservoir or it may develop enamel demineralization. Calcium fluoride formation may continue for a long time on the enamel's surface. The calcium fluoride releases fluoride ions when the tooth surface's pH decreases to below 6 and finally forms hydroxyapatite (HA) which encourages re-mineralization.[13] Fluoridated toothpaste incorporates mono-fluorophosphate sodium fluoride, stannous fluoride, and other toothpaste fluoride

compounds. The fluoride in the oral cavity and surface of the teeth may remain and have an improved effect for more than 10 hours after tooth brushing. Also, ample evidence-based trials and foundational analysis have shown that the usage of fluoridated toothpaste is a realistic and viable dental caries control measure.[14,15]

The current study examined the understanding of dentists and NDDs of the usage of fluoridated toothpaste. It evaluated their knowledge of fluoridated toothpaste's drawbacks and benefits, with findings including data to inform public health policy and health education. This study's findings revealed that fluoridated toothpaste usage was substantially higher by dentists than by NDDs, which correlated with a higher percentage of dentists who recognized the efficacy of fluoridated toothpaste in caries regulation. However, nearly half of the dentists and most NDDs did not use fluoridated toothpaste or were uncertain if what they were using was fluoridated toothpaste. In contrast, 92% of dentists and 55% of NDDs understood fluoridated toothpaste's anti-caries effect, indicating that doctors might have low compliance in their behavior or might have concerns. The findings found that most respondents were worried about the possible risks of fluoride.

Animal tests and clinical studies have shown that excessive fluoride ingestion can induce functional organ dysfunction (e.g., liver, kidney, stomach, and brain) and may be cytotoxic.[16,17] It should be noted that these harmful consequences resulted when large fluoride amounts were swallowed, with the fluoride amounts in fluoridated toothpaste significantly smaller than toxic concentrations. Several tests have demonstrated that the usage of fluoridated toothpaste is healthy for adults with a regular swallowing function,[18] and that the risk of fluorosis attributable to toothpaste consumption is minimal. Therefore, undue vigilance about the probable dangers of fluoridated toothpaste can constitute an obstacle to the usage or prescription of fluoridated toothpaste by physicians.Wright (2014)[19] stated that if overall fluoride intake exceeds the acceptable level, increasing the consumption of fluoridated toothpaste will contribute to fluorosis.

It has been suggested that fluoridated toothpaste usage in children raises these risks.[19] Marinho et al.[20] found that children swallow 30–50% of the overall toothpaste volume when brushing their teeth. The amount of swallowing is positively associated with the amount of toothpaste used.[21] Furthermore, the swallowing mechanism of children aged under three years is not established, with erroneously ingested doses of toothpaste significant to the extent that they could quickly contribute to fluorosis. Fluoride consumption can have significant detrimental effects on children's intellect and physical development;[22,23] thus, the risks of using fluoridated toothpaste exceed the advantages for children under three years of age. The American Dental Association (ADA) Council noted that the evaluation of caries risk is crucial before prescribing fluoride therapy for children at high risk of developing caries. Nevertheless, no established sensitivity- and precision-validated caries risk assessment instruments are available for children, rendering it impossible to focus clinical decisions on potential disease risk. This study's findings revealed that most dentists and NDDs lack sufficient awareness of fluoridated toothpaste usage. The proportion of dentists who correctly measured the risks and benefits was not substantially higher than that of NDDs in response to this problem.

These findings indicate that the understanding of fluoridated toothpaste's hazards in children aged under three years was not sufficiently strong among doctors and that their decisions could place children under three years of age at risk. Prior literature indicated that children aged three or older could comfortably use a limited volume of fluoridated toothpaste ("pea" dimensions)[24] but must be checked by their parents or teachers when brushing their teeth. The consumption of sugar in young children could increase[25] and, in this age category, the occurrence of caries in teeth is high.[26]

However, this study's findings indicate that most dentists and NDDs cannot correctly determine the benefits and costs of using fluoridated toothpaste. These findings suggest that more research is required to determine the advantages and possible consequences of using fluoridated toothpaste and that health education should be focused on its use by pregnant women.

CONCLUSION

In conclusion, all medical personnel participating in this study's survey were concerned about the potential risks of using fluoridated substances and lacked adequate knowledge about the benefits and risks of fluoridated substances. This could impair doctors' decisions and discourage patients from using fluoridated toothpaste and other fluoridated substances. Health education for doctors is needed to improve their knowledge about fluoridated substances. Further health education research is needed on doctors' assessment of the benefits and risks of fluoridated substances. This study provides some information, based on data provided by survey respondents, regarding the clinical use of fluoride supplementation in children. More efforts are needed among dental and medical professionals to consistently raise their awareness of the importance of fluoride supplementation to effectively promote the oral health of Peshawar city's local population.

ADMINISTRATIVE POLICIES

This study explored medical personnel's awareness of fluoride usage and its pros and cons. Based on the study's findings, the following suggestions are proposed for consideration by the local administration in relation to relevant policy formation:

1. The local administration needs to provide awareness training for medical personnel regarding the benefits and risks of using fluoridated substances.

2. In the education system, health and nutrition knowledge should be provided to students as well as to staff.

3. The relevant city departments should check fluoridated substances on a timely basis in various products and other substances (water, coal burning, toothpaste, etc).

4. Timely micro and macro level training should be provided to the local population about the effects of fluoridated substances.

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