

Knowledge and attitude of dental health workers towards fluoride in Riyadh area

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ABSTRACT

Objectives: To assess the knowledge, attitudes, and beliefs of the dentists and hygienists in the Riyadh area of the Kingdom of Saudi Arabia towards fluoride.

Methods: One hundred and thirty dentists and hygienist working in dental clinics in Riyadh were randomly selected. Self-administered questionnaires covered the following areas: general information, the use and application of fluoride, pharmacodynamics and pharmacokinetics of fluoride. The subjects responded to each of the statements by ticking one of the 3-scaled options from "agree" to "disagree".

Results: The majority of the respondents (65%) supported an assessment of the pattern of dental caries before fluoridating the water, 23% disagreed and 5% did not know. Also one hundred and three (79%) of the sample supported fluoridation of water, 16 (12%)

disagreed, and 4 (3%) did not know. Fifty-five (42%) agreed that dental caries are expected to increase if fluoridating water is discontinued for one year, while 52 (40%) disagreed and 16 (12%) did not know. In addition, there was a low score concerning knowledge of side effects and toxicity of fluoride among health care workers. Overall, there was no statistical significance between academics and non-academics.

Conclusion: There was a good attitude and knowledge of fluoride as a preventive measure among dentists. This study also demonstrated that the majority of the health care professionals in Riyadh area were in favor of water and milk fluoridation, however; there was a lack of knowledge regarding side effects and toxicity.

Keywords: Fluoride, fluoridation, attitude, opinions, dentistry.

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In 1945, fluoride was added to the water supply in Michigan, which was the first city in the world that artificially fluoridated its water supply.¹ Presently, the effect of fluoridation is very well known and substantiated. In fact, the worldwide decline in caries is attributed to the common use of fluoride in its various forms.² The most frequent reported caries reduction is 40% to 50% for primary teeth and 50% to 60% for permanent teeth.³ In the Kingdom of Saudi Arabia (KSA), despite the great improvement in oral health care, there are still individuals who remain highly susceptible to caries.^{4,6} In contrast, endemic dental fluorosis has been described in several areas of the Kingdom such

as Riyadh and Hail regions.^{4,7,8} Different fluoride levels have been reported in KSA, for example in the western region, the level ranged from 0.3-2.47, while, in Riyadh the level ranged from 0.3-0.7.^{9,10} Preventive dental services and education are essential for all health care workers. Fluoride is one of the major issues in preventive dentistry. A principle factor in preventive dentistry, institution and enhancement, is the attitude and knowledge of dental health care workers. Studies have indicated that the use of fluorides as a preventive measure is associated with the dentist attitude. For instance, in Japan, where fluoride is not widely used, both dentists and the population have a low attitude and knowledge

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towards fluoride, in contrast to Americans, Australians and Swedes.¹¹⁻¹⁴ Among the Saudi population, there is a low use of both professionally and commonly available fluoride products.⁴ Therefore, there is a strong need to evaluate the present status of dental health care workers' knowledge, attitude, recommendations and use of fluoride in preventive oral health care. The purpose of this study was to assess the knowledge, attitudes, and beliefs of the dentists and hygienists in the Riyadh area towards fluoride.

Methods. One hundred and thirty dentists and hygienists working in public and private dental clinics across the city of Riyadh were randomly selected. Age-range was from 20-65 years. Seventy-five (58%) were females and 84 (37%) were males. A 30-item questionnaire was structured. The questions covered the following areas: general information, the use and application of fluoride, pharmacodynamics and pharmacokinetics of fluoride. Eleven responsive statements related to toxicity and its side effects. Subjects responded to each of the statements by choosing one of the 3-scaled options from "agree" through "disagree". The data was then statically analyzed using SPSS package (descriptive and χ^2).

Results. The age and sex distribution of the respondents is illustrated in Table 1, and the distribution of professional status of the respondents is illustrated in Table 2. Ninety-four (72%) graduated

from Saudi universities, whereas 28 (21.5%) graduated from non-Saudi universities and 8 were missing (6%). Sixty-seven (51.5%) of the respondents used fluoride sometimes, 15 subjects (11.5%) used it almost daily and 14 (11%) every week. Thirty-one (24%) of the respondents either never or rarely used fluoride and 3 cases (2%) were missing. The majority of the sample 85 (65%) supported that there should be an assessment of the pattern of dental caries before fluoridating the water, while 30 (23%) disagreed, 6 (5%) did not know and 9 (7%) were missing. As regard to discontinuation of water fluoridation 16 (12%) supported it, while 103 (79%) disagreed, 4 respondents (3%) did not know and 7 (5%) were missing. Fifty-five (42%) agreed that dental caries is expected to increase if fluoridating water is discontinued for one year, while 52 (40%) disagreed, 16 (12%) did not know and 7 (5%) were missing. More than half of the sample, 62 (48%), supported milk fluoridation, 37 (28%) disagreed, 20 (16%) did not know, and 10 (8%) were missing. When prescribing fluoride, 106 (82%) considered age, concentrations and availability of fluoride in other forms before recommending a dose to the patient, 7 (5%) respondents disagreed, 8 (6%) did not know and 9 (7%) were missing. Seventy-four (57%) agreed that regular use of dentifrices (topical) containing fluoride is enough for protection except in certain cases, 13 (10%) did not know, 34 (26%) disagreed and 9 (10%) were missing. The majority of the sample, 95 (73%), will request parents to supervise their children during brushing and ensure that a small amount is used and discourage swallowing of toothpaste. On the other hand, 14 (11%) disagreed, 10 (8%) did not know and 11 (8.5%) were missing. Approximately 96 (74%) agreed that fluoride reduces the solubility of enamel in acid, 17 (13%) did not know, 9 (7%) disagreed and 8 (6%) were missing. Almost 51 (39%) agreed that fluoride has a direct influence on the dental plaque, 25 (19%) did not know, 45 (35%) disagreed and 9 (7%) were missing. The majority, 94 (72%), believed that fluoride promotes the remineralization of the tooth enamel and interferes with dental tissue demineralization, 19 (15%) did not know, 9 (7%) disagreed, and 8 (6%) were missing. A total of 35 (27%) agreed that topical fluoride interferes with chain formation between microorganisms' cells, while 58 (45%) did not know, 27 (21%) disagreed and 10 (18%) were missing. A large number of the sample, 106 (81.5%), supported that over exposure to fluoride can lead to fluorosis of the teeth, 7 (5%) did not know, 8 (6%) disagreed and 9 (7%) were missing. There was a considerable percentage of lack of knowledge in relation to the side effects and toxicity of fluoride, ranging from 35% up to 83%. Table 3 summarizes the responses to those statements. Nineteen (15%) and 22 (17%), agreed that there is a positive association between fluoride

Table 1 - The distribution of age and sex of the sample.

Sex	20-30	30-40	40-50	50-60	60-70	Total
Females	40	34	-	1	-	75
Males	16	16	5	10	1	48
Missing	3	2	1	1	-	7

Table 2 - The distribution of professional status of the respondents.

Criteria	General practitioner n (%)	Hygienist n (%)	Specialist n (%)	Total n (%)
Non academic	35 (57)	16 (12)	44 (83)	95 (73)
Academic	26 (42)	-	8 (17)	34 (26)
Missing	-	-	1	1 (1)
Total	61 (47)	16 (12)	53 (41)	130 (100)
n - number				

Table 3 - Summary of the responses to the side effects and toxicity of fluoride

Statements	Agree n (%)	I do not know n (%)	Disagree n (%)	Missing n (%)
Over exposure to fluoride can lead to fluorosis of the teeth. This is particularly true of children under the age of 6.	106 (81.5)	7 (5)	8 (6)	9 (7)
The association between water fluoridation and hip fractures in women and men 65 years and over is reported to be positive.	19 (15)	87 (67)	12 (9)	12 (9)
Fluoride has the ability to aid in an increase in bone mass in females with post-menopausal osteoporosis.	22 (17)	75 (58)	23 (18)	10 (8)
Fluoride may cause death for a human adult (155 pound man) if 5-10 grams of sodium fluoride is ingested at one time.	38 (29)	72 (55)	11 (8.5)	9 (7)
Allergy or intolerance may develop due to fluorides used in the fluoridation of community water supplies.	17 (13)	46 (35)	58 (45)	9 (7)
Fluoride protects white blood cells against the effect of a mutagen (on experimental basis).	2 (1.5)	108 (83)	11 (8.5)	9 (7)
Sodium fluoride causes marginal increase in bone neoplasms (carcinogenicity) in laboratory animals.	12 (9)	90 (69)	18 (14)	10 (8)
Ingestion of high levels of fluoride have a neurological impact, cognitive deficits and hyperactivity in male offspring of experimental animals.	16 (12)	97 (48)	7 (5)	10 (8)
Exposure to various fluoride concentrations would likely manifest any health effects caused by fluoride in kidney cells.	24 (18.5)	80 (61.5)	10 (8)	16 (12)
In laboratory studies, fluoride produces significant inhibition of enzymes if presents in high concentration in body fluids or tissues.	20 (15)	90 (69)	7 (5)	13 (10)
Fluoride causes ameloblasts of tooth germs exhibited disruption of intracellular trafficking and reduction of height.	20 (15)	83 (64)	15 (11.5)	12 (9)
Adverse effects of long-term fluoride ingestion on the gastro-intestinal tract include stomach petechiae and erosions.	34 (26)	77 (59)	8 (6)	11 (8.5)
n - number				

and hip fractures and bone mass post-menopausal osteoporosis. Eighty-seven (67%) did not know the association between fluoride and hip fracture and 12 (9%) disagreed, 75 (58%) did not know, 23 (18%) disagreed and 10 (8%) were missing. Overall, there was no statistical significance between dental professionals, working in academic institutions and hospital staff using chi-square test (X^2).

Discussion. It is well known and agreed upon that caries is the most common and world-wide disease. Among the Saudi population, caries is reported to rise in incidence and unexpectedly increases with age along with periodontal diseases.⁴⁻⁶ This may enlighten the strong need for public awareness and institution of prevention. Among which, is the use of fluoride containing agents.

Fluoride has been used in dentistry for over 50 years now in a variety of forms.¹ It is believed that fluoride represents an efficient, successful and most cost effective strategy for prevention and reduction of caries among populations.^{2,15-17} In this study, the majority of the health care workers in the Riyadh area were in favor of water fluoridation. Similar findings have been reported among Australian and Swedish dentists and United States physicians, dentists and hygienists.^{11-14,18,19} On the contrary, a low proportion of dentists supported water fluoridation in Japan.¹⁴ The sample also supported milk fluoridation. The use of milk as a vehicle for fluoride has been supported by the World Health Organization to improve oral and general health. This is of a particular significance if implemented at an early age and in communities with fluoride deficient water.²⁰⁻²²

This study may also underline the role and the need for institution of public awareness of oral health care and dental disease prevention as a significant element in a prevention program, as almost half of the respondents disagreed that discontinuation of fluoridation would increase caries level among the Saudi population. The need for public awareness has been demonstrated by previous studies in KSA.⁴⁻⁶

In general, this research has demonstrated a good attitude and knowledge of fluoride as a preventive measure among dentists in Riyadh. Comparable results have been obtained among Canadian and Korean dentists and in contrast to Japanese dentists.²³⁻²⁵ The increase use of fluoride should be accompanied with the correct principles and knowledge by the health care workers. Professional attitude and knowledge govern the gap between current state of scientific knowledge and the public understanding of oral disease prevention. Thus, there is a strong need for professional education regarding the role of fluoride in prevention, prescribing and side effects and public need. A careful evaluation of the caries and fluoride status is needed before instituting a community based caries-preventive program. Such a program would include also the evaluation of fluoride sources and adjustment of drinking water fluoride.

In conclusion, this survey provides important evidence regarding the attitude among dental health care workers towards water fluoridation, as well as their fluoride usage. This knowledge can be used to improve their skills in treating patients and acquire an increased sense of control in their attempts to improve oral health in the Saudi population. Dental educators can thoroughly assess and determine what can be carried out to better train practitioners in areas identified as important.

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References

- Harris NO, Christen AG. Water fluoridation: Primary preventive Dentistry. Norwalk, Sanmateo (CA): Appelton & Lange; 1991. Ch. 8. p. 163.
- Bratthall D, Hänsel-Petersson G, Sundberg H. Reasons for the caries decline: What do the experts believe? *Eur J Oral Sci* 1996; 104: 416-422.
- Al-Shammery AR. Caries experience of urban and rural children in Saudi Arabia. *J Public Health Dent* 1999; 59: 60-64.
- Al-Shammery A, Guile E, El-Backly M, Lamborne A. An oral health survey of Saudi Arabia: Phase I (Riyadh). Monograph: King Saud University; 1991.
- Almas K, Al-Jasser N. Prevalence of dental caries and periodontal disease in a Saudi. *Saudi Med J* 1996; 17: 640-644.
- Al-Hadbani W, Rasheed P. Population Caries experience in urban Saudi schoolgirls. *Saudi Med J* 1997; 18: 37-41.
- Akpata ES, Fakiha Z, Khan N. Dental fluorosis in 12-15-year-old rural children exposed to fluorides from well drinking water in the Hail region of Saudi Arabia. *Community Dent Oral Epidemiol* 1997; 324-327.
- Hammer M. Flouridation of Saudi Arabia's water. *Middle East Health* 1986; 10: 46D-47D.
- Al-Khateeb T, Mullane DM. Caries prevalence and treatment need amongst children in Arabian community. *Community Dent Oral Epidemiol* 1991; 19: 277-280.
- Al-Shammery A, Akpata ES, Saed Hand Khan N. Caries increment over a 3-year period in adolescent children in Riyadh, Saudi Arabia. *Saudi Dental Journal* 1996; 2: 68-73.
- Isman R. Knowledge and attitudes of dentists about fluoridation. *J Am Dent Assoc* 1984; 109: 924-927.
- Pettersson EO. Attitudes concerning water fluoridation among graduating Swedish dentists. *Community Dent Oral Epidemiol* 1979; 7: 69-74.
- Pettersson EO. Attitudes concerning water fluoridation among Swedish dentists in 1975. *Community Dent Oral Epidemiol* 1981; 9: 117-121.
- Tsurumoto A, Wright FAC, Kitamura T, Fukushima M, Morgan MV. Cross-cultural comparison attitude and opinions on fluorides and fluoridation between Australia and Japan. *Community Dent Oral Epidemiol* 1998; 26: 182-193.
- Von der Fehr FR, Haugejorden O. The start of caries decline and related fluoride use in Norway. *Eur J Oral Sci* 1997; 105: 21-26.
- Burt BA. Prevention policies in the light of the changed distribution of dental caries. *Acta Odontol Scand* 1998; 56: 179-186.
- Burt BA. Introduction to the Symposium - AAPHD SYMPOSIUM: Fluoride-how much of a good thing? *J Public Dent* 1995; 55: 37-38.
- Sánchez O, Childers NK, Fox L, Bradley E. Physicians' views on pediatric preventive dental care. *Pediatr Dent* 1997; 19: 377-383.
- Chovannec CC, Majerus GJ, Duffy MB, Bernet JR, Frazier PJ, Newell KJ. Dental hygienists' knowledge and opinions about fluorides and fluoridation. *J Public Health Dent* 1990; 50: 227-234.
- Kahama RW, Damen JJM, Ten cate JM. The Effect of Intrinsic Fluoride in Cows' Milk on in vitro Enamel Demineralization. *Caries Res* 1998; 32: 200-203.
- Twerman S, Nederfors T, Petersson LG. Fluoride Concentration in whole Saliva and Separate gland Secretions in Schoolchildren after Intake of Fluoridated Milk. *Caries Res* 1998; 32: 412-416.
- Tóth ZS, Ginner Z, Bánóczy J, Phillips PC. The Effect of Fluoridated Milk on Human Dental Enamel in an in vitro Demineralization Model. *Caries Res* 1997; 31: 212-215.
- Main PA, Lewis DW, Hawkins RJ. A survey of general dentists in Ontario, Part II: Knowledge and use of topical fluoride and dental prophylaxis practices. *J Can Dent Assoc* 1997; 63: 607, 610-617.
- Lewis DW, Main PA. Ontario dentists' knowledge and beliefs about selected aspects of diagnosis, prevention and restorative dentistry. *J Can Dent Assoc* 1996; 62: 337-344.
- Moon H, Paik D, Horowitz AM, Kim J. National survey of Korean dentists' knowledge and opinions: dental caries etiology and prevention. *J Public Health Dent* 1998; 58: 51-56.