

Attitudes towards the use of fluorides for oral health among Islamic clerics in Kelantan Province, Malaysia

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Objective: To assess the knowledge, attitudes and practices of *Imams* (Islamic clerics) concerning fluoride toothpaste and fluoridated water to improve oral health in Kelantan. **Basic research design:** Cross sectional study of *Imams* in 65 registered mosques in Pasir Puteh district, Kelantan. **Method and participants:** Face-to-face interview, using structured questionnaire and some open ended questions. **Results:** Most of the 83 interviewees (82% participation rate) were unsure whether their toothpaste contained fluoride (64%), only 25% were sure. More than one-third (37%) were using fluoridated piped water. Most (87%) had little knowledge of fluorides and more than two-thirds (69%) had lacked positive attitudes towards its use. Television (54%) was the most common source of information about fluorides, followed by newspapers (9%). The main reasons given among the few who opposed fluoride use were i) fear of dangerous side effects (4%) and ii) uncertainty about the halal status of fluoride (2%). Attitudes were not associated with the use of fluoridated water supply ($p=0.999$), age ($p=0.103$), income ($p=0.540$) and location ($p=0.999$). **Conclusion:** Over two-thirds of *Imams* had little knowledge of and lacked positive attitudes towards fluoride use in toothpaste and piped water supplies.

Key words: Attitude, fluorides, fluoridation, toothpastes, Muslims

Introduction

Despite declining trends since the 1970s, dental caries remains a major public health problem in Malaysia with caries prevalences, according to national surveys, of 76%, 75% and 42% for 5, 6 and 12-year-olds respectively (Ministry of Health, 2005; 2007). Despite the declining caries trends from the 1970s the overall prevalence still remained high (Ministry of Health, 2008).

The religiously conservative province of Kelantan was chosen for this research because it has the worst caries experience of the Malaysian provinces (HMIS, 2006); the highest caries prevalence among 6-year olds and the second highest among 12-year olds (Ministry of Health, 2007). Dental public health strategies for caries prevention have been implemented throughout Malaysia through the community and high risk approaches. However in Kelantan, the national water fluoridation policy suffered from inconsistent implementation and was discontinued locally after 1995 due to political changes when the province's administration became governed by an opposition Islamic conservative party (Ministry of Health, 2006). Water fluoridation was not included when the water treatment plant was privatised. This could be a factor leading to higher caries experience in the province.

Recently, religiously conservative Malaysian Muslim sections of the population hesitate to use fluoridated products as evidenced by patients' expressed concerns during consultations, some print media and unofficial networks. A factor in this opposition is the permissible use of fluoride from the Islamic religious perspective; which some consider as *haram* (i.e. not permissible)

because fluoride is deemed a poison. However, reliable Islamic religious documents (Al-Khin, 1991) which provide guidelines and basic Islamic principles, clearly state that foods and drinks are considered *halal* (lawful) when its source is permissible according to Islamic law, hygienic and not detrimental to a person's health.

Any view that fluoride is *haram* among the Muslim conservatives could hamper dental public health strategies aimed at reducing caries prevalence. Kelantan is 95% Muslim (Official Site of Kelantan State, 2009) and highly influenced by strict Islamic norms and values. In this province, the Islamic cleric (*Imam*) is regarded as one of the most influential persons in the Muslim community. They lead mosques, head prayer congregations and guide their people by giving religious lessons, talks and obligatory weekly Friday sermons and so influence the perception and practices of the community.

Therefore, the present study focussed on the knowledge and attitudes of *Imams* regarding the issues of fluoride and fluoridation in order to understand their perceptions. The findings might inform planning for oral health promotion and integrated disease prevention by the World Health Organisation WHO to support local political action, broaden participation and sustain advocacy especially in conservative Muslim societies (Petersen, 2010; WHO, 2008). Furthermore, there is a lack of documented evidence about the perceptions of the Muslim community both in Malaysia and elsewhere. Thus the aim of the present study was to assess the knowledge, attitudes and practices among *Imams* concerning fluoride toothpaste and fluoridated water to improve oral health in Kelantan.

Material and Methods

The population of interest were Kelantan *Imams* working at 65 mosques registered under the state religious authority. A district (Pasir Puteh) was conveniently chosen based on its Malay-Muslim majority, mainly rural population and logistical convenience. The inclusion criterion was *Imams* who were officially appointed to lead Friday prayers and give religious sermons.

To set an authoritative benchmark concerning fluorides' *halal/haram* status, a theological expert's view on Islamic perspectives was sought from a respected university-based Islamic scholar. The criteria for choosing the expert were that the person must: have a recognised Islamic academic qualification; have done extensive research in the field of Islamic medicine (preferably PhD level); and, be a respected and authoritative figure in Islamic matters especially in the application of Islamic medicine. The Academy of Islamic studies at the University of Malaya was conveniently chosen for this purpose. From a list of 89 academic staff, one professor who was also the head of department of AlQuran and Hadith was found to fit the criteria.

The study was carried out in two stages. Firstly, a face-to-face interview using an open ended questionnaire was conducted with the religious expert in Islamic Medicine. His views on the Islamic perspectives of the perceived controversial issues related to the use of fluorides and dental care based on authoritative religious scriptures was used as the gold standard. The interview was transcribed and used to compare with the perceptions of other *Imams* obtained in the next stage.

Secondly, appointments to meet 101 eligible *Imams* were made through official letters and follow-up telephone call. If the first visit failed to make contact, a second was made but after that, due to the remote locations and poor telecommunications, those not met were considered non-participants. A validated and pre-tested structured questionnaire was used in a face-to-face interview with each *Imam* in their own village. The questionnaire consisted of quantitative (structured) and qualitative

(open-ended) questions regarding knowledge, attitude and practices related to fluoridated toothpaste and piped water (Table 1). Each interview was audio-recorded and transcribed to ensure accuracy.

The qualitative data from the religious expert and *Imams*' views were transcribed into concise phrases for comparison. The quantitative data were analysed using SPSS version 15. Knowledge about benefits and risks of fluoride were assessed based on the *Imams*' responses to five questions. If at least 3 out of 5 questions on "knowledge" were answered positively, we classified the *Imams* as knowledgeable, and the remainder as having little knowledge of fluoridation. There were 7 questions related to "attitudes towards fluorides". If at least 4 out of 7 questions regarding "attitudes" were answered positively, the respondent was classified as having positive attitudes towards fluorides.

Results

The religious expert opined that fluoride was allowed in Islamic law only if it is made from *halal* and hygienic materials and it does not cause harm. The use of fluoride was permissible because it is added in safely controlled doses to toothpaste and piped water supply and its sources were *halal*. The majority of *Imams* agreed that if used in this way, fluoride was *halal* and safe. Nonetheless, a few *Imams* were doubtful about "*dangerous side effects*" of fluorides (4%) and uncertain of the "*halal status*" of the fluoride source (2%).

The overall response rate for this study was high (82%). Table 2 shows the socio-demographic distribution of the sample. All *Imams* were male, the accepted convention in Islam, with a mean age of 55 years (sd 12). Half had received formal (mainstream) education only up to primary school level though 45% had received their education at non-mainstream traditional religious institutions. Their mean monthly income was low, equivalent to about 345 Euro (sd €257) and 90% of them worked in rural mosques.

Table 1. Questionnaire-knowledge and attitude-related questions

Knowledge-related questions
Do you know what fluoride is?
What do you know about the benefits of fluoride?
What do you know about the risks of fluoride?
Do you know whether your toothpaste contain fluoride?
Do you know whether fluoride is present in your piped water supply?
Attitudes-related questions (closed)
Do you agree that
- Fluoride should be added in toothpaste?
- Fluoride in toothpaste can help to prevent dental caries?
- Fluoride in toothpaste can have dangerous side effects on health?
- Using fluoride in toothpaste is <i>haram</i> ?
- Fluoride should be added in piped water supply to prevent caries?
- Fluoride in piped water supply can have side effects on health?
- Fluoride in piped water supply is <i>haram</i> ?
Attitude-related questions (open-ended)
What is your opinion concerning the use of fluoride in toothpaste and piped water supply?
If you agree that using fluoride in toothpaste is <i>haram</i> , why do you think so?
If you agree with the opinion that the fluoride in piped water supply is <i>haram</i> , why do you think so?

Table 2. Socio-demographic distribution of the *Imams*

Variables	n	%
Age category		
20-35	5	6
36-50	22	27
51 and above	56	68
Highest level of formal education		
No formal schooling	1	1
Primary school/equivalent	40	48
Lower secondary	8	10
Upper secondary	14	17
Diploma/Certificate	13	16
Degree/Professional qualification	7	8
Highest religious education		
State Government religious school	28	34
Federal Government religious school	2	2
Private (formal) religious Institution	13	16
Informal religious education	37	45
No formal religious education	3	4
Gross personal monthly income (Euro)		
< €123	2	2
€123 - €245	52	63
€246 - €490	19	23
> €490	10	12
Location of the Mosque		
Urban	8	10
Rural	75	90
Total	83	100

Nearly two-thirds of *Imams* (64%) were not sure whether their toothpaste contained fluoride while a quarter knew they were using fluoridated toothpaste. The importance of the Malaysia Islamic Council approved *halal* logo on packaging held more sway than fluoride content. Slightly more than one-third (37%) were using fluoridated piped water supply. Most *Imams* said their toothpaste was their personal choice (81%). A similar reason was given for those who used piped water (94%). Only small proportions were influenced in their choice by family or health personnel.

Under half (42%) of *Imams* knew what fluoride was. Their most frequent source of information about fluoride was the television (54%), newspapers (9%) or both (9%). Information from other sources was almost negligible. Overall, most *Imams* (87%) had little knowledge of fluoridation. Table 3 describes the knowledge of *Imams* concerning the benefits and risks of fluoride in toothpaste and piped water supply and the association with socio-demographic variables. There was no significant association between knowledge and fluoridated piped water usage ($p=0.195$). Those *Imams* aged over 50 were less aware of fluoride issues ($p=0.004$).

Under a third of *Imams* (31%) had positive attitudes towards fluoride. Attitude towards fluoride was not associated with piped water usage ($p=0.999$), (Table 3).

Discussion

This study involved one district in Kelantan province selected because of its high dental caries experience in children and its reluctance to implement water fluoridation

Table 3. Knowledge and attitudes among *Imams* concerning fluorides in toothpaste and piped water supply

Variables	Knowledge of <i>Imams</i>				<i>p</i> value	Attitudes of <i>Imams</i>				<i>p</i> value
	Low level		High level			Not positive		Positive		
	<i>n</i>	(%)	<i>n</i>	(%)		<i>n</i>	(%)	<i>n</i>	(%)	
Age category										
50 year olds and below	19	(70)	8	(30)	0.004	16	(59)	11	(41)	0.103
51 year olds and above	53	(95)	3	(5)		41	(73)	15	(27)	
Highest Level of Education										
Primary school or lower	39	(95)	2	(5)	*	31	(76)	10	(24)	*
Secondary school or equivalent	18	(82)	4	(18)		12	(55)	10	(46)	
Certificate, Degree or higher	15	(75)	5	(25)		14	(70)	6	(30)	
Highest religious education										
Government Institution	27	(90)	3	(10)	*	21	(70)	9	(30)	*
Private Institution	9	(69)	4	(31)		9	(69)	4	(31)	
Others	36	(90)	4	(10)		27	(68)	13	(33)	
Category of gross personal income per month (RM)										
€245 and below	49	(91)	5	(9)	0.180	39	(72)	15	(72)	0.540
above €245	23	(79)	6	(21)		18	(62)	18	(62)	
Location of the Mosque										
Urban	7	(88)	1	(13)	0.999	6	(75)	2	(25)	0.999
Rural	65	(87)	10	(13)		51	(68)	24	(32)	
All respondents	72	(88)	11	(13)		57	(69)	26	(31)	

$\alpha=0.05$.

* Only descriptive statistics are reported as the assumption of chi-square was not met.

policy. Hence the generalisability of the findings to all *Imams* in Malaysia may be limited. The high response rate in this study was considered adequate for it to represent the majority of *Imams* in Pasir Puteh district.

Most *Imams* received religious education from non-formal religious schools that could have deprived them of more knowledge about fluoride. As such, their concerns were more inclined towards the importance of the Malaysia Islamic Council approved *halal* logo normally printed on toothpastes' packaging, rather than about the fluoride content of the toothpaste itself. Thus the present study corroborates the findings of Williams and Sahota (1990) who found that among UK first generation Muslim Asian mothers their major concern for infant foods was that it must be *halal*. They also reported sugar was liberally used in milk and infant foods because it was considered intrinsically beneficial. This may explain why caries in young children was so prevalent.

Malaysian toothpaste manufacturers are acutely aware that to protect their market share they need to be sensitive towards *halal/haram* issues for the majority Muslim consumers. Considering this, it could be important that the manufacturers obtain approval and prominently label the *halal* certification logo on their products to secure the Muslim community's acceptance.

Imams with higher formal education levels are aware about fluorides and used fluoridated toothpaste regularly. Their access to contemporary information may have contributed to their greater knowledge of the benefits of fluoride for caries prevention. Although it would seem ideal to appoint *Imams* who have higher formal education, however at present, the need to enlighten and educate the older *Imams* on the *halal* status of fluorides should be considered a priority.

The use of piped water supplies was low among *Imams* but higher among those better educated and least among those whose religious education was from non-formal schools. However, the presence or absence of fluoride did not appear as a reason for not choosing piped water supply. Instead other issues such as poor water quality, low water pressure and recurrent cost of using piped water supply were cited.

Most *Imams* had little knowledge about benefits and risks of fluorides in toothpastes and water: predominantly those older or least educated, suggesting that priority in health education should be given to these sub-groups if they are to deliver proper health messages to the community and be less susceptible to the influence of anti-fluoridation groups. The finding that most of the information about fluoride came from television (54%) underlines the importance of mass-media as a method of public health education.

Attitude is one of the determinants of behavioural change. However, the relationship may not be linear (Daly *et al.*, 2002). In this study, more than two-thirds of *Imams* in the district lacked positive attitudes towards fluorides possibly because of their lack of knowledge. Providing them with adequate health education messages may increase the possibility of influencing their attitude favourably, thus enabling them to be better community health educators among the Muslim community. Fortunately, very few *Imams* disagreed with the expert religious opinion about the use of fluoride in toothpaste and piped

water supply; some citing uncertainty over its *halal* status. We note that even the holy "zamzam" water from the holy well at *Al-Haram* mosque in Makkah, Saudi Arabia, (which is used by millions of Muslim pilgrims as drinking water) contains 0.72ppm of natural fluoride (Al-Zuhair and Khounganain, 2006). As such, concerns about fluoride being toxic or *haram* at the WHO recommended fluoridation levels of 0.5 to 1.0ppm, are not an issue according to accepted Islamic practice. This may be a telling fact for health educators to use with any Muslims reluctant to use fluoridated water or toothpastes.

Conclusions

This study has highlighted that although most *Imams* in the district of Pasir Puteh, Kelantan province, agreed with the expert's view that fluoride in toothpaste and piped water supply is indeed permissible according to the Islamic law, many had little knowledge of, and lacked positive attitudes to, fluoridation. This was reflected in terms of their practices, whereby only a third of the *Imams* used fluoridated piped water supply and a quarter consciously preferred fluoride toothpaste. This study has highlighted the need for future discussions or forums involving respected Islamic experts and *Imams* to clarify issues regarding fluoride use.

Acknowledgement

This study was supported by Postgraduate Grant, University of Malaya; No P0107/2009.

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