INFORMATION ABOUT ORAL HEALTH AMONG WOMEN ATTENDING HEALTH CLINICS IN ARUSHA, TANZANIA.

A N Åstrøm*, A K Awadia*, and O Chande**
Norway and Tanzania

Summary: 140 women from Arusha, of who 50 % were affected by dental fluorosis, were interviewed. Only 27.5 % had ever heard about fluoride and their knowledge of the links between exposure to fluoride and health injuries was found to be rather low. The participants reported to receive most information about tooth decay from the sources they trusted most, health personnel in terms of dental auxiliaries and Mother-Child Health aids. Perceived personal risk or perceived likelihood of having dental caries, loss of teeth, gum disease, children with pitted, coloured and fractured teeth or injuries to the bones were below but close to average. Furthermore, perceived personal risk of having server tooth decay was significantly influenced by the amount of information received from health personnel and by the degree of trust in information from these sources in multivariate analyses. This result underscores the important role of health workers as providers of oral health information.

Keywords: Fluoride; Fluorosis; Oral Health; Perceived risks; Health information; Arusha.

INTRODUCTION

Due to high fluoride concentrations in drinking water, dental fluorosis is endemic in those parts of Northern Tanzania that belong to the East African Rift Valley.[1] Otherwise, oral diseases have traditionally not been among the most prominent health problems in Tanzania.[2,3] It is anticipated, however, that the caries prevalence will increase due to industrialization and economic progress with changed dietary habits in terms of increased sugar consumption and its refined by-products.[4] Apparently, there seems to be an urgent need for influencing dental care behaviors in the general population. Awareness and capability among the general population to take over a fair share of the responsibility for their own oral health will reduce the need for dental manpower and be in accordance with the self-reliance philosophy of this country.

Despite of considerable work done for oral health education in Tanzania, these activities have been evaluated to a lesser extent, both on the part of the promoters and the recipients [5.] Some studies performed soon after implementation of educational intervention have indicated poor oral health knowledge among primary school children.[5,6] Apparent gaps in oral health related knowledge and behaviour among children entering primary schools, indicate low parental contribution to their pre-school children regarding oral health issues. This provides some information about the success of educational activities provided to mothers as a means of reaching their pre school children .[7]

Personal beliefs about susceptibility to harm and diseases are cited as factors in the failure to change behaviour by education.[8,9] Knowledge might not lead to a change in risky behaviour among those people who do not perceive their susceptibility of contracting disease as high.[10] Hence, for health education to persuade individuals to change behaviour, those who provide the information must understand how individuals perceive their own susceptibility. While it appears that knowledge alone does not predict behaviour, perceived personal risk might do so. Therefore it seems to be important to study how information and perceived personal risk are related to each other as well as to preventive behaviour.

* *Centre for International Health, University of Bergen, Institute of Odontology, Faculty of Dentistry, University of Bergen, Norway.*
** *Regional dental officer, Mount Meru Hospital, Arusha, Tanzania.*

Previous investigations have suggested that people use direct experience to infer their perception of risk or susceptibility.[11] For instance, more risky behaviour in the past have usually resulted in higher levels of perceived risk, and ill people seem to feel more susceptible to health problems than to non-health problems.[12,13] Therefore, it was expected that behaviours leading to health and dental health problems and direct personal experience with health hazards result in higher risk appraisal.[12]

The present study set out to assess perceived personal risk/susceptibility with regard to a variety of oral health related problems in a sample of Tanzanian mothers differing in age, education and occupational status. The ways in which women's perceived personal susceptibility of having server tooth decay might be influenced by the amount of information received from various sources, trust in these informational sources and their level of oral health knowledge are also investigated. Finally, the women's personal experience with symptoms related to tooth decay and their frequency of sugar intake were examined as predictors of perceived personal risk of having server tooth decay. Such information might be valuable for oral health educators by providing a basis for the planning and improvement of further educational activities.

MATERIALS AND METHODS

Sample and survey instrument. A convenient eligible sample 140 women attending the Mother and Child Health Clinic (MCH) at Mount Meru regional hospital in Arusha volunteered to participate in a structured interview performed by research staff. Most of the women were young, in fact 59.6 % was between 15 and 25 years old (range 15-40 years). A total of 81 % of the women investigated reported to be married. Furthermore, 65 % reported primary school, 25 % secondary school, and only 3 % university or college as their highest educational level. The most frequently reported type of employment was housewife, 61.9 %. Nevertheless, 40 % of the women reported to be engaged as farmers, teachers and clerks.

After one week, a total of twelve women were re-interviewed by the same researchers. Test - retest reliability scores were in the range Pearson's r= .80 to .90 concerning the central variables utilised in this study.

Statistical analyses. The Statistical Packages for Social Sciences (SPSS, version 7.5) were use for statistical analyses of the present data.

Measures. A comprehensive, structured questionnaire was included in this study and used as a controlled interview schedule. This research instrument, originally constructed in English was translated to Swahili. The research team, which comprised two experienced researchers, one of them recruited from the Arusha regional hospital, had a training session prior to the actual fieldwork.

In addition to assess information about demographic factors in terms of age, marital status, level of education, and current work, the respondents were assessed on the following measures:

Awareness of a substance called fluoride was assessed in terms of "Have you ever heard /learned about fluoride- a substance commonly found in drinking water, toothpaste and several food items?". Response categories were: 1= "yes", 2= "no".

Risk awareness of fluoride related injuries to health and oral health was measured by the following questions: "Have you ever heard that pitted, discoloured

and fractured teeth may be caused by excessive exposure to fluoride?". Then "Have you ever heard that ingestion of high levels of fluoride from drinking water and food items might cause injuries in your bones?" Response categories for these two questions were 1= "yes" and 2= "no".

Presence/absence of dental fluorosis. A crude dental examination with regard to the presence/absence of dental fluorosis was performed in daylight by use of dental probe and mirror. This variable was coded 1= presence of dental fluorosis and 2= absence of dental fluorosis.

Symptoms related to tooth decay was based on a sum score derived from the following questions. "How often have you had toothache, bad breath, food impact and difficulties with chewing food items?" The response categories ranged from 1= "often" to 3= "seldom / never".

Amount of information from different sources was assessed by asking the women how much information about tooth decay, they had received from five different sources in terms of magazines/newspapers, dental auxiliaries, radio/TV and MCH aids, as well as how trusted were each source of information. The response categories ranged from 1= "very much" to 4= "non at all".

The amount of information about tooth decay (caries), received from MCH aids and dental auxiliaries and how trusted were these two sources of information were added into two sum scores yielding amount of information from **health workers** and trust in information from health workers. Furthermore, amount of information from radio/television and newspapers/magazines and trust in those sources were added into two sum scores yielding amount of information from **media** and trust in information from media.

Level of oral health knowledge. The participants also rated how well informed they were about tooth decay as compared to other mothers of their own age living nearby. Response categories ranged from 1= "better informed than other mothers living nearby" to 3 ="worse informed than other mothers living nearby"

Risk behaviour related to tooth decay was based on a sum score derived from three questions assessing the frequency of intake of soda, chocolate/sweets and cakes/biscuits. Response categories for each item ranged from: 1= "daily" to 3= "seldom never".

Perceived personal risk of having tooth decay, gum disease, children with pitted, coloured and fractured teeth, loss of teeth and injuries in bones was assessed by five separate questions. An example " How likely or unlikely do you think it is that you sometimes in your lifetime will acquire server tooth decay " Response categories on each question ranged from +2= "very likely" threw 0= "neither likely nor unlikely" to -2= "very unlikely".

RESULTS

Awareness of a substance called fluoride. As shown in Table 1, only 31 % of the total sample had ever heard about fluoride and 62 % was not aware of the link between excessive ingestion of fluoride and oral health hazards. Finally, 95 % answered no when asked if they knew that ingestion of fluoride might cause injuries in the bones. Because most of the respondents had low awareness regarding fluoride and related oral health problems and the eligible sample was rather restricted, further

analyses of the predictors of women's perceived risk of having children with dental fluorosis and their perceived susceptibility of acquiring injuries in bones could not be performed.

TABLE 1. Frequency of distribution of response to questionnaire and testing.

	Yes		No		Total	
	N	%	N	%	N	%
Ever heard of fluoride	43	31.4	94	68.6	137	100
May cause injuries in teeth	34	37.8	56	62.2	90	100
May cause injuries to bones	6	4.5	128	95.5	134	100
Dental fluorosis among women attending clinic in Arusha	63	45.3	76	54.7	139	100

Absence/presence of dental fluorosis. As shown in Table 1, a total of 54.7 % of the women had no experience with dental fluorosis when examined in daylight with a dental mirror.

TABLE 2. Means, standard deviations and range of reported amount of information about tooth decay from several sources and reported trust in these informational sources.

	N	Mean	SD	Range
Source of information				
Dental auxiliary	101	3.3	1.1	1-4
MCH aids	91	3.5	.99	1-4
Magazines/newspapers	88	3.4	.89	1-4
Radio/television	95	3.5	.88	1-4
Trust in information				
MCH aids	93	2.8	1.3	1-4
Dental auxiliaries	102	2.9	1.2	1-4
Magazines/newspapers	95	3.2	1.0	1-4
Radio/television	98	3.3	.99	1-4

Perceived personal risk (susceptibility) with regard to oral health hazards. As shown in Table 2, the respondents perceived their personal risk or susceptibility to be close to but below average regarding tooth decay, gum disease, loss of teeth, children with pitted, coloured and fractured teeth and injuries in the bones.

Table 3 and 4 show descriptive statistics for the predictors of perceived susceptibility of having server tooth decay in terms of mean (median) standard deviations and range. As a whole there appeared to be minor differences in the amount of information received from newspapers and magazines, radio or television, dental auxiliaries and MCH aids as illustrated in Table 3. However, there is a slight indication in the data that the women received most information from dental auxiliaries, the source they trusted most.

Correlates of perceived personal risk of having server tooth decay (bivariate analyses). According to Table 5, significant positive associations in terms of Pearson's correlation coefficients emerged between perceived personal risk of having tooth decay and amount of information from and trust in health workers and media.

TABLE 3. One sample t- statistics for perceived personal risk (perceived susceptibility) of having tooth decay, gum disease, children with pitted, coloured and fractured teeth, loss of teeth and injuries in bones.(scale: very likely=+2, neither likely nor unlikely = 0, very unlikely = -2.). Significant levels refer to t-tests of the hypothesis that the mean is different from zero.

	N	Mean	SD	T	Sig (2-tailed)
Tooth decay	139	-.13	1.01	-1.5	.282
Gum disease	138	-.30	.96	-3.60	.000
Pitted/discoloured/fractured teeth	148	-.55	.99	-6.6	.000
Loose all teeth	149	-.79	1.2	-8.3	.000
Injuries in bones	145	-.77	.80	-11.0	.000

TABLE 4. Descriptive statistics in terms of mean, (median*), standard deviation (SD) and range of the predictors of perceived risk of having server tooth decay in bivariate and multivariate analyses.

	Mean	SD	Range
Sum score-information from health workers	6.9	1.4	2-8
Sum score-information from media	7.0	1.1	4-8
Sum score-trust in health workers	6.0	1.8	2-8
Sum score-trust in media	6.7	1.5	2-8
Level of information about caries*	2.0	0.7	1-3
Sum score-personal experience with symptoms	11.0	1.2	8-12
Sum score-intake of sugary products	7.2	1.3	3-9

TABLE 5. Factors associated with perceived likelihood (personal risk) of having tooth decay among young women in Arusha. (Bivariate analyses, Pearson's correlation =r).

Predictors	Perceived personal risk/tooth decay (criterion)
Source of information	
Health workers/sum index	.45 **
Media/sum index	.32 **
Trust in sources	
Health workers/sum index	.47 **
Media/sum index	.40 **
Knowledge about caries	.16 n.s
Past experience	
Intake of sugary products/sum index	.19 *
Caries related symptoms/sum index	.25 **
* p<0.05, **p<0.000 n.s not statistically significant	

Furthermore, there was a positive bivariate relationship between perceived risk and personal experience with symptoms related to tooth decay. Hence, the more information from health workers and media and the more trust in these informational sources, the higher the level of risk appraisal. In addition, these women take past experience into account when judging their personal susceptibility. The more frequent experience with symptoms related to tooth decay and intake of sugary products, the higher their reported level of perceived risk. This supports our expectation and is

consistent with findings in other health related domains. Level of knowledge, on the other hand, did not seem to be of significance for these women's perceived susceptibility of having tooth decay.

Predictors of perceived risk of having tooth decay (multivariate analyses). The predictors of perceived risk (likelihood) of having tooth decay shown in Table 5 were not independent, and much of the variance apparently explained by the independent variables is redundant. Multiple regression calculations in which all variables were entered simultaneously into the prediction equation were carried out in order to determine which variables make unique contributions to the prediction of perceived vulnerability, how much variance can be predicted by these variables and whether the variance is greater than that expected by chance alone. Stepwise regression analyses which is more vulnerable to chance associations was then used to determine the most parsimonious set of predictors. Only independent variables significantly related to the dependent variable in the bivariate analyses were entered into the multivariate analyses.

TABLE 6. Summary statistics and results from stepwise regression analyses for the prediction of perceived personal risk of having tooth decay in a sample of Tanzanian women. Standardised regression coefficients beta.

Prediction model	Beta	Sig.
Age (control variable)	.13	.168
Information from health workers	.32	.010
Trust in information from health workers	.26	.073
Information from media	-.15	.300
Trust in information from media	.10	.547
Experience with symptoms related to tooth decay	.068	.468
Sugar related behaviour	.056	.574
R square = .35, F(7,78)=6.1 p<0.000).		

Table 6, presents the results of the multivariate stepwise regression analyses in terms of summary statistics for the sample. This table presents the standardised regression coefficients, betas, which is the correlation between each independent and the dependent variable after controlling for all other independent variables in the model. With all predictors entered the full regression model was significant, R square change = .35, F(7,78)=6.1 p<0.000), i.e. 35% of the variance in perceived likelihood of having tooth decay was explained by the model. Table 6 shows that when all variables were in the equation, only one of the individual predictors, amount of information from health workers, contributed significantly, while trust in information from health workers approached significance. Hence, for these women, the more information received from health workers and the more trust in information from these particular sources the higher risk appraisal for future oral health problems in terms of tooth decay.

Discussion

Predictors of perceived susceptibility in terms of indirect and direct experience with oral health hazards. It might be argued that changing risk perception is a goal of oral health education, if perceived risk is indeed a bridge to oral health behaviour change. In order to change risk perception the relationship between perceived risk and

level of information, sources of information and trust of these sources should be established. An interesting aspect of these data was how sources of information, levels of trust, past experience with oral health problems and previous risk behaviour might influence women's perceived susceptibility. In this present study it is focused upon how these variables may influence perceived personal risk of having server tooth decay.

The results from bivariate analyses indicate that the mother's perceived susceptibility of having tooth decay is based on the amount of information they receive from health workers and media, trust in these sources as well as direct experience with individual risk factors. In contrast, women's level of knowledge did not seem to be that important in arriving at personal risk judgements. From one point of view, the present data clearly support a common-sense premise of health education confirmed in previous studies;[14] that peoples perception of susceptibility is influenced by exposure to information about such risks. Hence, amount of information from health workers and trust in these informational sources were significantly associated with perceived susceptibility of having tooth decay both in bivariate and multivariate analyses. On the other hand, the insignificant role played by women's level of knowledge as compared to the significance of their personal risk experience, points to the notion that direct experience are superior to information transmitted via other people and the media, in influencing perceived personal risk.[15]

The data in table 5 and 6 might have implications for preventive oral health programs. Since previous experience with disease and risk behavior seems to constitute important influences of perceived personal risk, providers of oral health education need to go beyond the plain provision of general oral health information. Rather, they must try to make certain that the recipients actually apply information to themselves and form personal risk perceptions that reflect their own standing on different risk factors. In this regard, it has been suggested that an understanding of the powerful but complex effect of direct personal experience may shed light on the determinants of self protective behavior.[11] In other words, when people are exposed to information that have some of the ingredients of direct experience such exposure may feel "just as if it happened to me", and be as effective in influencing personal risk perceptions. In fact, an intervention derived from these line of reasoning proved successful in increasing the use of automobile seat belts.[16]

Nevertheless, the present results underscore the important role of health workers as providers of oral health information. Women attending MCH clinics reported to receive approximately as much information from health workers as from other sources in terms of radio/television and newspapers/magazines. However, they trusted the information from experts sources the most, such as dental auxiliaries and MCH aids. One implication for health education is that health workers besides of providing information in clinical settings also should place information through other sources such as magazines, newspapers, radio and television. The need to tie popular sources of information to the most trusted ones seems apparent.

In spite of the endemic nature of dental fluorosis due to high fluoride drinking water in Arusha, approximately half of the women investigated in this study showed no visible signs of fluorosis when examined in daylight with a dental mirror. This might reflect that many inhabitants of Arusha have moved to this town as adults. Consequently, they might have grown up in parts of the country where the Fluoride

content of drinking water is below the critical value. Unfortunately, there was no information on whether the participants of this study were life time residents of Arusha or not.

Methodological considerations. In spite of restriction in the range of the measures utilised in this study, the correlation with perceived risk was strong and the significant regression coefficients quite large. It should be noted, however, that the small sample size constrains the confidence in the observed relationships. This means that some measures which did not satisfy the criterion for significance but which may be true predictors of perceived risk have been ignored and some measures determined as salient might prove unstable or unreliable in repeated samples. As such the findings of this present study should be interpreted with caution. Apparently, further investigations are needed.

REFERENCES

1. Mosha HJ. Endemic dental fluorosis and the possibilities of de fluoridation and fluoridation of water supplies in Tanzania. *Odonto Stomatologie Tropicale 2* 89-97 1984.
2. Nørmark S, Mosha HJ. Knowledge, practices and dental health among rural Tanzania children. *African Dental Journal 3* 24-33 1989.
3. Muya RJ, Rambush E, Fejerskov O, Hordbell MH, Nørmark S. *Changing and developing Dental health services in Tanzania 1980-2000.* Ministry of Health - Danida 1984.
4. Frencken J, Truin GJ, Ruiken R. Is dental caries prevalence on the increase in Tanzania? *Odonto Stomatologie Tropicale 3* 189-193 1987.
5. van Palestein Helderman WH, Munck L, Mushendwa S, van't Hof MA, Mrema FG. Effect evaluation of an oral health education programme in primary schools in Tanzania. *Community Dentistry and Oral Epidemiology 25* 296-300 1997.
6. Frencken JE, Truin GJ, van't Hof MA, Konig KG, Mabelya L, Mulder J, Ruiken HM. Effect of two oral health programs on the prevalence of dental caries among secondary school scolars in Tanzania after 22 months. *Odonto Stomatologie Tropicale 3* 10-14 1993.
7. Nyandindi U, Palin Palokas T, Milen A, Robinson V, Kombe N. Oral health knowledge, attitudes, behaviour and skills of children entering school in urban and rural areas in Tanzania. *Public Health 108* 35-41 1994.
8. Kegeles SM, Adker NE, Irwin CE. Sexually active adolescents and condom use: changes over one year in knowledge, attitudes and use. *American Journal of Public Health 78* 460-461 1988.
9. Becker MH. The health belief Model and personal health behavior. *Health Education Monographs 2* 326-473 1974.
10. Baldwin JD, Baldwin JI. Factors affecting Aids related sexual risk taking behaviour among college students. *The Journal of Sex Research 25* 181-96 1988.
11. Weinstein ND. Effects of personal experience on self protective behavior. *Psychological Bulletin 105* 31-50 1989.
12. Otten W, van der Pligt J. Risk and behavior: The mediating role of risk appraisal. *Acta Psychologica 80* 325-46 1992.
13. van der Pligt J. Risk perception and self protective behavior. *European Psychologist 1* (1) 34-43 1996.

14. McGuire WJ. The myth of massive media impact: Savagings and salvagings. In G Comstock (ED). *Public communication and behavior.* Academic Press, Orlando 1986. pp173-257.
15. Eagly AH, Chaiken S. *The psychology of attitudes.* Harcourt Brace Jovanovich. New York. 1993.
16. Stapel DA, Velthuijsen AS. Just as if it happened to me. The impact of vivid and self relevant information on risk judgements. *Journal of Social and Clinical Psychology 15* 102-119 1996.