Misconceptions on Causes and Management of Dental Caries: Experience from Central Tanzanian Society

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ABSTRACT

Background: Misconceptions about causation and management of diseases are common in societies, thereby affecting health seeking behavior, including for oral diseases. Thus, this study aimed at determining the misconceptions on causes and management of dental caries in central Tanzanian society. **Methods**: A cross sectional study was conducted in central zone of Tanzania, comprising of people aged 18 years and above, who were obtained by stratified two stage sampling technique. The oldest person per household was interviewed. A questionnaire consisting of questions regarding misconception on causes and management of dental caries, use of local remedies and treatment seeking behaviour was used to collect data. Analysis of data was done using computer program SPSS version 19 whereby the level of significance for Chi-square was set at p-value of ≤ 0.05. **Results**: A total of 371 participants were included. There were more female participants with male to female ratio of 0.8:1. The age range of respondents was 18 to 81 years with mean age of 38.04 ±13.2 years. The overall incidence of misconception was 87%. With regards to age, sex, and marital status; the misconceptions were more prevalent in females, older adults and those who ever married. The most common misconception was "extraction of upper jaw teeth can lead to head swelling and death". **Conclusion**: Misconceptions concerning dental caries and its management are very widespread in Tanzanian society. They are more common amongst those who have ever married and older adults. Use of local remedies is very common amongst individuals of all walks of life.

Keywords: Misconception, Dental caries, Local remedies.

INTRODUCTION

Culture is regularly described as intelligible, shared patterns of actions or beliefs by a specific group of people aiming at giving a direction about life in specific social contexts, consisting of behavioral norms and interpersonal relationships as well as unwritten rules for proper living.[1] It is transmitted from one group to another through learning process.[1,2] It has a great role on influencing health and sickness in every discipline of medical practices including dentistry.[3]

Oral diseases are amongst the most prevalent human diseases, affecting a significant proportion of world's population,[4] and of this group of diseases, dental caries is the most common, characterized by the progressive demineralization of the tooth, following the action of bacterial acid metabolism.[5]

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Since time immemorial, the oral cavity, and the face have held seemingly inherent fascination for mankind which were affected by cultural customs, habits, beliefs, superstitions and taboos.[6] Due to the lack of knowledge, and in attempt to explain occurrence of disease, man established misconceptions, myths and taboos with regards to diseases including the oral diseases. These misconceptions, myths and taboos eventually became part of culture thus handed down from one generation to next.[2] All people of rural or urban area, have their own beliefs and practices concerning health and diseases,[7] which eventually affect health seeking behaviour and management of diseases.

Tanzania, as for many other African counties, faces various challenges as far as health sector is concerned. Majority of Tanzanians (70.9%) reside in rural areas where health facilities are scarce,[8] and considering the fact that these people come from different social and economic backgrounds, they have various myths and misconceptions regarding health seeking behaviour. These misconceptions are also towards dental caries and its management, thus they opt for local remedies

and alternative forms of medicine initially instead of seeking for professional help.

Several studies have been carried out in different parts of world to address the misconceptions regarding oral health.[2, 6,9] In Tanzania most of the studies carried out are related to the myths on neonatal teeth and teething,[10–12] however, none dealt with misconception about dental caries and its management.

To address the fact that no study exists regarding misconceptions related to dental caries in Tanzania, this study was conducted. Thus, aim of the study was to investigate on misconception regarding causes and management of dental caries in central Tanzanian society.

MATERIALS AND METHODS

Study Population

This cross sectional study was conducted in Igunga district, one of 7 districts of Tabora region found in central zone of Tanzania. The district covers a total area of 6,912 square kilometres, with an estimated population of 399,727 people, (195,607 males and 204,120 females) and 51,176 households with average size of 6.4 people.[8]

The sample comprised of people aged 18 years and above, who were obtained by stratified two stage sampling technique, with ward as a primary sampling unit. From a total of 26 wards, only 6 wards were involved. One ward with nomadic inhabitants was purposively selected. Then wards were listed alphabetically and by systematic sampling using sampling frame the first ward was selected followed by the every 5th ward in the list. The second unit was selection of one village from each of the 6 pre-selected wards. Villages were determined by simple random sampling after listing names of all villages in a ward and randomly picking one name. In a selected village, 64 households were involved. The direction of village to be followed was determined randomly through picking one paper among 4 papers each one bearing one name of the four compass directions. The oldest person per household was interviewed.

Data Collection

A questionnaire was used to collect data. It consisted part for demographic data (age, sex, residence, and marital status), questions regarding misconception on causes and management of dental caries, use of local remedies and treatment seeking behaviour.

The principal researcher conducted personal interviews in Kiswahili with the oldest person present in the household and information was filled in the questionnaire. Each filled questionnaire was given a serial number and at the end verification

was done to make sure the questionnaires were properly filled.

Data analysis

Data was entered in a computer and analyzed using SPSS version 19. Data cleaning was performed by generating frequency distributions of all variables to check for completeness of the entered data. Wrong entries were corrected by revisiting the filled questionnaires. Independent variables studied were: sex, age in years, and marital status. The dependent variables were: misconceptions (cause of caries, and management of caries), local remedies used and health seeking behaviour.

To facilitate studying the distribution of variables; Age was dichotomized into young adults (≤40 years) and older adults (> 40 years); Marital status was also dichotomized as singles (never married, cohabiting) and ever married (married, divorced, widow/widower); The misconceptions were also dichotomized as those without misconceptions (if they had ≤ 2 misconception) and with misconceptions (> 2 misconceptions). The level of significance for Chi-square and logistic regression analysis was set at p-value of ≤ 0.05.

Ethical considerations

Ethical clearance to conduct the study was granted by Muhimbili University of Health and Allied Sciences Research and Ethical Committee. Permission to conduct the study was sought from district, ward and village authorities. A verbal consent was obtained from each participant after thorough explanation of the aim of the study and freedom to participation.

RESULTS

Table 1: Socio-demographic characteristics of study population.

Variable		Frequency (n)	Percentage (%)
Sex	Female	206	55.5
	Male	165	44.5
Age group	18-29	118	31.8
	30-39	105	28.3
	40-49	80	21.6
	50-59	38	10.2
	60+	30	8.1
Marital status	Married	279	75.2
	Not married	51	13.7
	Divorced	15	4.0
	Widow	26	7.0

Socio-demographic characteristics

The study included a total of 371 participants. There were more female participants compared to the males. Males were 165 (44.5%) while female were 206 (55.5%) with male to female ratio of

0.8:1. The age range of respondents was 18 to 81 years, and overall mean age of the participants was 38.04 ±13.2 years. The mean ages for male and female were 39.18±13.5years and 37.14±12.9 years respectively. The most prevalent age group was that of 18-29 years (n=118, 31.8%) followed by 30-39 years (n=105, 28.3%). Of all the participants, 279 (75.2%) were married [Table 1].

Misconceptions

Of all 371 participants, only 12.9% (n=48) had no any kind of misconception, while 3.2% (n=12) had misconception regarding all the five aspects that were investigated. Out of all the participants in this study, the overall incidence of misconception was 87% (n= 323) [Table 2].

Generally, the findings of this study revealed that 46.6% of females and 27.3% of the males had misconception with respect to the dental caries and its treatment. Moreover it was also revealed that as far as age was concerned, the prevalence of this misconception was 27.2% and 57.6% in young adults and older adults respectively. The relationship between marital status and misconception also showed that 41.6% of those who ever married and 15.7% of those who were single had misconceptions. All these differences within different groups (i.e. age, sex, and marital status) were statistically significant (p≤0.05).

Table 2: Distribution of participants according to number of misconceptions they had.

Number of misconceptions that participants had	Frequency (n)	Percentage (%)
0	48	12.9
1	85	22.9
2	97	26.1
3	89	24.0
4	40	10.8
5	12	3.2
Total	371	100.0

Regarding the misconception that "dental caries is an inheritable disease", 84 participants (22.6%) had that misconception. Results of analysis for the relationship of this misconception with sex, age and marital status, revealed a significant association with age (p=0.00) only but not other variables [Table 3].

Table 3 also summarises other misconceptions as detailed below. Concerning the misconception that "Immobile tooth should not be extracted", 165 (44.6%) of the participants had this wrong notion. Analysing the response to this misconception by sex, age and marital status of the participants, there was a significant association between the misconception and age (p=0.02) and marital status (p=0.02) but not sex of participants.

The misconception that "one should not eat when going for dental treatment because it makes extraction difficult" was also investigated whereby 66 participants (17.8%) had this misconception. The misbelief had a significant association with age (p=0.016) but not marital status and sex of the participants.

"Vomiting by mothers during labour cause decay" was another misconception that was studied; 213 participants (57.6%) had this misconception. The misconception had a significant association with age (p=0.00), sex (p=0.001) and marital status (p=0.00) of the participants

Studying the results of the misconception that "extraction of upper jaw teeth can lead to head swelling and death", 238 participants (64.2%) had this misconception. This wrong conviction had a significant association with age (p=0.01) and marital status (p=0.00) of the individuals [Table 3].

Treatment

All the participants except one reported that they would use local remedy when they experience dental pain. When asked about type of local remedies they would use, 83.3% (n=309) mentioned only one type of the local remedy that they would prefer, while the rest reported to prefer using more than one type of the local remedies.

Generally, the findings of this study revealed that 100% of females, older adults and those who have experienced marriage life and 99.4% of the males, younger adults and those who have not experience married life will use local remedies for treating dental pain however this slight difference observed was statistically insignificant (p>0.05).

Upon further analysing whether or not there was difference in preference of use of different remedies between different groups with respect to age, sex and marital status, no statistically significant difference was obtained on use of different remedies except, in the use of other remedies in which younger adults were found to use more of other remedies as compared to older adults and this difference was statistical significant (p=0.01).

Health seeking behaviour

Majority of participants (91.1%, n = 338) would go to hospital when experience dental pain while the rest prefer to carry out self-medication (8.9%, n=33). Age, sex and marital status had no influence on health seeking behaviour (p>0.05).

Having or not having misconception about dental caries and its treatment had no significant influence on individuals response to whether they would use local remedies in an event they experienced tooth ache (p=0.433). However a significant association between having a misconception and choosing to self-medicate, rather than going to hospital was obtained (p= 0.04) (OR= 2.1, 95%CI (1.02-4.31).

Table 3: The distribution of the participants in relation to different misconceptions.

Misconceptions	Variable		Number of those who had misconception	Percentage (n%)	p-value
Dental caries being an inheritable disease	Sex	Male	32	19.4	0.18
		Female	52	25.2	
	Age	Young adults	32	13.4	0.00
		Older adult	52	39.4	
	Marital status	Single	7	13.7	0.101
		Ever married	77	24.1	
Immobile tooth not to be extracted	Sex	Male	72	43.6	0.74
		Female	93	45.4	
	Age	Young adults	92	38.7	0.02
		Older adult	52	55.3	
	Marital status	Single	15	29.4	0.02
		Ever married	150	47	
Eating before treatment makes extraction difficult	Sex	Male	34	20.6	0.204
		Female	32	15.5	
	Age	Young adults	34	14.2	0.016
		Older adult	32	24.2	
	Marital status	Single	6	11.8	0.32
		Ever married	60	18.8	
Vomiting by mother during labour cause caries	Sex	Male	56	33.9	0.00
		Female	157	76.6	
	Age	Young adults	119	50	0.00
		Older adult	94	71.2	
	Marital status	Single	30	15	0.00
		Ever married	198	61.9	
Extraction of upper jaw teeth can lead to death	Sex	Male	97	58.8	0.054
		Female	141	68.4	
	Age	Young adults	142	59.4	0.01
		Older adult	96	72.7	
	Marital status	Single	19	37.3	0.00
		Ever married	219	68.4	

Table 4: Frequency of local remedies used during dental pain experience.

Local remedy	Frequency (n)	Percentage (%)
Ndulele (*Solanum incanum*)	72	19.4
Grinded mwarobaini leaves (*Azadirachta indica*)	40	10.8
Aloe Vera leaves	23	6.2
Cloves	13	3.5
Others	290	78.2

Others = Other remedies used included: Paraffin oil mixed with other herbs, soda ashes, car battery acids, unprocessed table salts, younger guava leaves extracts, extract from bark of mango roots, *Zanthoxylum chalybeum* ("mlungulungu"), *Cassia abreviata* ("mlundalunda").

DISCUSSION

Misconception which is defined as a belief or an idea that is not based on correct information,[3] do vary from one geographical area to another depending upon the socioeconomic status, geographic location and cultural characteristics. They are prevalent in a population due to a variety of reasons like poor education, cultural beliefs and social misconceptions, moreover, they are usually passed on from one generation to the next.[2] Often, people choose to believe in misconception rather than finding out the truth and, after a while, they become so ingrained in their respective cultures that it is hard to tell fact from fiction.[3]

The present study specifically focuses on the misconceptions regarding dental caries and its management in Tanzanian society. It included more female participants compared to the males, with overall means age 38 years. The predominance of female in this study coincides with the census that was conducted in Tanzania in 2012.[8] Likewise this difference can be attributed by the fact that mostly during day time it is women who stay back at home while man goes out in attempts to earn the daily bread.

In this study, the prevalence of one or another misconception amongst the participants was 87%, a slightly higher prevalence was reported in a study done in India.[2] This indicates that misconceptions about oral health including dental caries are widely spread in different societies especially in developing countries.

Amongst the misconceptions that were studied, was that 'Dental caries is an inheritable disease'. Almost a quarter of the participants had this misconception, and it was common amongst older adults and participants in 'ever married' categories. As a matter of fact, dental caries is infectious multifactorial disease characterized by the progressive demineralization of the tooth, following the action of bacterial acid metabolism [5]. The role of genetics as one of the key risk factor predisposing an individual to dental caries,[13,14]

cannot be over looked, but that does not imply that it is inheritable disease. The notion that makes people believe that it is totally an inheritable disease may be attributed to the circumstance where people have noticed that when mother has dental caries then chances of their children having caries to are high, but this can be elucidated by the fact that children spend most time with their mothers and thus it is likely to have eating habits similar to their mothers consequently developing caries. Higher prevalence of the wrong notion amongst 'ever married' and older adults, could be explained by the fact that older adults have experienced being in married life, thus they have observed this trend for ages to come into such wrong conclusion.

Another common misconception concerning the cause of caries was that 'vomiting by mother during labour cause caries'. More than half of the participants had this misconception of which almost three quarters were female. The intensification of this misconception can be related to the fact that during pregnancy, there are a lot of physiological changes which when accompanied by poor oral health care and dietary change predisposes one to oral diseases.[15,16] Pain is one of the commonest symptom of oral disease, and in the society, any pain in the oral cavity is related to dental caries. In addition to that during pregnancy vomiting does occur, and since the vomitus being acidic in nature contributes to demineralization of teeth hence causing sensitivity (search literature). Due to changes in diet and poor oral hygiene during pregnancy, one is predisposed to dental caries, which is a slow and progressive process and for its signs and symptoms to be apparent there is lapse of time, consequently being noticeable during late stage of pregnancy, coinciding with labour. The finding that more female believed this compared to male could probably be due to natural factors of sex differences, whereby female being biological able to get pregnant are passed down with cultural beliefs regarding pregnancy and society finds it useless to share such beliefs to the less-concerned group (i.e. male and un married). However higher existence of the belief among female could also mean that men are less aware of maternal issues in society. Generally this finding is not only in relation to oral health matters, but also for matters concerning maternal and reproductive health.

There are misconceptions that exist within community members with regards to management of dental caries. These include misunderstandings concerning what not to do before extraction, which tooth is not to be extracted and what are the effects of extraction of teeth. In most part of Tanzania, there is a misconception that one should not eat anything when going for extraction since it will lead to a complicated and difficult procedure. In

this study, one in every five person had this misconception, and this wrong notion was more among the older adults. The exact root cause of this misconception is not clearly known, however, it can be speculated that it might have been put forward by people who misinterpreted the medical advice. It is a known fact that, before undergoing any surgical procedure under general anaesthesia (GA), a period of starvation is required to allow gastric emptying, so that one may not aspirate gastric contents during and after GA. Considering extraction being a surgical procedure whereby anaesthesia is used though local, the same concept of starving might have been applied in this case too.

Almost half of the participants believed that the only time one has to extract a tooth is when it is mobile. This misconception was more established in older adults and those who were ever married. One speculation concerning this misconception can be explained by the fact that people have been noticing the trend of exfoliation of the deciduous teeth, whereby the deciduous teeth do become mobile prior to exfoliating, thus they apply the same notion to the permanent teeth. Of the all misconceptions that were studied, the most common belief was that "extraction of upper jaw teeth can lead to head swelling and death". Misconception regarding extraction of the upper jaw tooth is not only common in our locality, but has also been reported in literatures form other part of the world with prevalence of 30%-60%.[3,9,17] Unlike the myth in our locality, in these studies it was believed that vision is affected if an upper jaw tooth is extracted. One possible reason for the development of this myth is that when an infection starts from posterior maxillary teeth it tends to spread to the temporal spaces easily thus appearance of head swelling. Another reason could possibly be that the infection can as well spread to involve cavernous sinus, which is a life threatening condition. Such kind of misconceptions are inherited due to incorrect exaggerated information promulgated by those who had previous personal negative dental experiences, and attributed due to lack of awareness, low educational levels, anxiety and apprehension.[9]

People have tried different materials for curing their ailments since ancient times. Fortunately enough, the nature has provides abundant plant wealth that have medicinal qualities.[18] The use of traditional, complementary, and alternative medicine is widespread, although most users of such medicine also use allopathic care.[19] In this study, almost every individual reported that they will use local remedies for treating dental pain. The younger adults were more likely to use different types of remedies as compared to older adults who had more specific choices. This can be qualified by the fact that, the older adults usually inherit strong

cultural and tradition beliefs, with a lifelong effect of experience, on the other hand, the younger adults due to lack of experience try different remedies in attempt to seek for relief, including some caustic chemicals like battery acid.

The most common remedies used were the *Solanum incanum* fruits extract, *Azadirachta indica* leaves and Aloe Vera extracts. Pharmacological and phytochemical studies have shown that *Solanum incanum* extract possess analgesic effect that was comparable to that of aspirin, and in addition to that, the extract also exhibit antimicrobial and antipyretic effects.[20,21] Aloe vera contain ingredients with anti-inflammatory effect, and these include bradykinase, fatty acids, salicylic acid and hormones called auxins and gibberellins.[22] The other commonly used remedy is the *Azadirachta indica* tree leaves which are believed to cure minimum of forty ailments according to local beliefs, thus the name mwarobaini. Phytochemically, the extract of *A.indica* have been found to contain phenols, unsaturated sterols, triterpenes and saponine, and these have anti-inflammatory and anti-rheumatic activity.[23,24] A boiled preparation of *A.indica* leaves is used as gargle in stomatitis and gingivitis.[24]

This study furthers revealed that misconception has a direct impact on health seeking behaviour of individual. The participants who had misconceptions were less likely to go to hospitals to seek for care at early stage, and instead they opt for local remedies. They believe that traditional medicines are better and cure of their sicknesses.[18] These beliefs lead to delay in seeking for definitive treatment thus causing further complications thereby increasing cost of treatment to both the patients and health care system.

It is the duty of the health professionals to educate the society, and take time to give proper information to the patients in a simple and clear way to avoid rise of misconceptions in society. In order to gain acceptance by society, the health education message should be in clear words, in local language and be sent in a friendly manner.[17]

Some of the local remedies have been proven scientifically to possess chemical components that aid in treating ailments. Plant extracts have been used for several thousand years, in alternative medicine and natural therapies. It is necessary to investigate those plants scientifically which have been used in traditional medicine to improve healthcare, in addition there is a need to enhance awareness of local community incorporating the traditional knowledge with scientific findings.[24] More research on the healing properties, antibacterial, and anti-inflammatory properties of these remedies as far as dentistry is concerned is required.

CONCLUSION

The findings of this study have revealed that misconceptions concerning dental caries and its management are very prevalent in Tanzanian society. These misconceptions are more in those who have ever married and older adults. Use of local remedies is very common amongst individuals of all walks of life. From the findings of this study we recommend that healthcare professions should educate the society, and also efforts should be taken by scientific community in utilizing the pharmacological properties of some herbal remedies commonly used in the communities.

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