

Diseases and conditions falsely linked with “nylon teeth” myth: a cross sectional study of Tanzanian adults

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Abstract

Background: Different communities associate children’s ailments with their developmental milestones and they have beliefs on a variety of causes of the ailments. The objective of this study was to determine the diseases and conditions falsely linked with “nylon teeth” myth among Tanzanian adults.

Methods: A cross sectional cluster study was conducted in five zones of Tanzania. A total of 200 individuals from each region stratified by age and sex were targeted. Study subjects included adults of child bearing age, elders, health care workers, teachers and traditional healers. A structured questionnaire was used to inquire for the demographic characteristics of the participants as well as diseases and conditions falsely linked with the nylon teeth myth.

Results: A total of 1,359 people participated in the study. Of the total participants, 262 (19.3%) reported nylon teeth myth to exist in their locality. The main symptoms that were falsely linked with nylon teeth myth were diarrhoea (83.5%), long standing fevers (81.2%) and difficult in sucking (76.7%). Respondents less likely to falsely link nylon teeth myth with various diseases and conditions were residents in southern regions. They linked nylon teeth myth with diarrhoea (OR=0.29, CI=0.14-0.63), fevers (OR=0.38, CI=0.18-0.80), cough (OR=0.38, CI=0.16-0.94), stunting (OR=0.24, CI=0.10-0.58), excessive crying (OR=0.19, CI=0.09-0.40) and difficult sucking (OR=0.35 CI=0.17-0.70). Males linked the myth with stunting (OR=0.57, CI= 0.34-0.98) and excessive crying (OR 0.431, CI=0.24-0.78). The more educated respondents linked the myth with long standing cough (OR=2.068, CI=1.11-3.84) and stunting (OR=2.07, CI=1.10-3.76). The health care workers less likely linked nylon teeth with excessive crying (OR=0.37, CI=0.15-0.96) and difficult sucking (OR=0.29, CI=0.11-0.81).

Conclusion: Diarrhoea, fevers and difficult in sucking were the symptoms most frequently linked with nylon teeth myth. Linking of the symptoms and the myth was more common among respondents from northern regions, non – medics, males and the more educated ones. Educational and behavioural change intervention against the diseases frequently falsely linked with nylon teeth myth is recommended to control the myth.

Keywords: myth, tooth-buds, nylon-teeth, tooth-gouging, Tanzania

Introduction

Different communities associate children’s ailments such as fever, diarrhoea and vomiting with children’s developmental milestones and they have beliefs on a variety of causes of the ailments. In some instances, they invent methods to cure and/or prevent the children’s illnesses (Barzangi *et al.*, 2014). “Nylon teeth” myth explains the belief and practices associated with the myth that un-erupted primary canine tooth buds cause a variety of children’s ailments (Pindborg, 1969; Mosha, 1983; Matee & van Palenstein Helderma, 1991; Irisol *et al.*, 2000; Jamieson, 2006; Nuwaha *et al.*, 2007; Tirwomwe *et al.*, 2013) and is potentially fatal thus it is necessary to enucleate or gouge the tooth buds so as to prevent or cure the child of the illness (Abdel-Wahab, 1987; Hassanali *et al.*, 1995; Jamieson, 2006). In addition, some communities in Kenya (Hassanali *et al.*, 1995) and Uganda (Jamieson, 2006) believe that worms infest the tooth bud eventually lead into the child’s illness.

The nylon teeth myth is prevalent in African countries, such that even children born to African parents immigrants to Israel (Holan & Mamber 1994), United States of America (Edwards *et al.*, 2008), United Kingdom (Longhurst, 2010) and Sweden (Barzangi *et al.*, 2014) have been found

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with sequalae of canine tooth buds gouging. The tooth buds that are alleged to cause a variety of illnesses in children have been named differently in different societies. They are commonly referred to as ‘nylon teeth’ or ‘plastic teeth’ in Tanzania (Mosha, 1983; Kikwilu & Hiza, 1997) and “false teeth”, “ebinyo” or “telek” in Uganda and Sudan (Baba & Kay, 1989; Nuwaha *et al.*, 2007; Tirwomwe *et al.*, 2013).

Published reports from different communities in five African countries (Ethiopia, Kenya, Sudan, Tanzania and Uganda) show various diseases and conditions that have been falsely linked with nylon teeth myth. They include diarrhoea, fever, vomiting, unsatisfactory weight gain, general malaise or ill-health, itching gums, crying with an unknown cause and failure to suckle (Pindborg, 1966; Abdel-Wahab, 1987; Baba & Kay, 1989; Welbury *et al.*, 1993; Hassanali *et al.*, 1995; Kikwilu & Hiza, 1997; Iriso *et al.*, 2000; Mogensen, 2000; Dewhurst & Mason, 2001; Accorsi *et al.*, 2003; Masiga & Musera, 2003; Mutai *et al.*, 2010). The diseases and conditions reported to be linked with nylon teeth myth in all five countries are diarrhoea and vomiting, whereas fever was reported in four of the countries, excluding Sudan. Itching of the gums and weight loss were reported in Tanzania (Kikwilu & Hiza 1997), Ethiopia (Welbury *et al.*, 1993) and Uganda (Mogensen, 2000). Long standing cough was reported in Sudan (Asefa *et al.*, 1998) and Uganda (Steven, 2006). The myth has been reported to be more common among rural, less educated and those with low socioeconomic status (Barzangi *et al.*, 2014). Regional variations in diseases and conditions association with ‘nylon teeth’ myth have been reported in Tanzania (Kikwilu & Hiza, 1997) and Uganda (Tirwomwe *et al.*, 2013).

In Tanzania there are no current published literature on the “nylon teeth” myth and its associated practices. But unpublished communications and observations indicate that the myth still prevails among various communities though the practice of tooth bud gouging has either gone down or a new treatment procedure has been invented. On the other hand, it is not known as to whether the conditions falsely linked with nylon teeth myth have changed overtime. Furthermore, there are no studies reporting variations of “nylon teeth” myth by age, sex, educational and occupational characteristics which may be useful factors in planning intervention. Therefore, this study was conducted among Tanzanian adults to determine the diseases and conditions falsely linked with “nylon teeth” myth.

Materials and Methods

Study population

The study population was obtained using the World Health Organization Oral Health pathfinder methodology (WHO, 1997). The pathfinder methodology requires a study population to be drawn from each of the geographical zones of the country, and that from each zone two study sites has to be selected. Tanzania is divided into five geographical zones namely Central, Coastal, Lake Victoria, Northern and Southern Highlands. Of the five zones, a high prevalence of nylon teeth myth was previously reported in Central, Lake Victoria and Northern zones. One region from each zone (Dodoma, Kagera and Manyara) was included in the study on the basis of highest prevalence of nylon teeth myth. In the other two zones where the belief has not been previously reported, two regions Rukwa and Mtwara were conveniently selected for accessibility reasons. In addition, Dar es Salaam region was selected to represent urban cosmopolitan clusters.

The study population was stratified into characteristics that are known to influence the disease or condition under study. In this study, the population strata of interest were adults of child bearing age (18-45 years); elders (≥ 46 years); health care workers (nurses, doctors, dentists, pharmacists); teachers and traditional healers. One zone that included cosmopolitan city of Dar es Salaam was chosen to represent cosmopolitan population. The second zone that had a large urban population was chosen to provide two study sites comprising urban population. From each of the

remaining three zones, two villages from each zone were purposely selected to represent the rural population.

Data collection

A questionnaire was used to collect data. It consisted of demographic characteristics, inquiry on whether a participant had ever heard of 'nylon teeth' myth in her/his lifetime and whether the myth existed in the village/street he/she was living at the time of the study. Respondents who reported that nylon teeth myths still exist in their village/street were further asked questions on diseases and conditions that are linked with "nylon teeth" myth. In addition, drooling and tongue tie that were reported to be linked with "teething" myth (Kawia & Kahabuka, 2009) were also added in the variable list. Information on conditions and diseases that are falsely linked with nylon teeth were collected using a Likert scale (*agree completely, agree, neither nor agree, disagree, disagree completely*). To check for clarity and meaning of questions, the questionnaire was field tested among 15 individuals from all intended strata in a region known to have "nylon teeth" myth but not included in the main study. The results of which were used to make corrections accordingly.

For each study site, the interviewers were led by the street or village leaders to school, health facility, known traditional healers homes and house to house for the rest of the study population, until the desired number of subjects per stratum was attained and or when all persons for a given strata had been interviewed.

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 regional, 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.

Data analysis

Data was entered in a computer and analysed using SPSS version 16. 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 region (6 regions); sex, age in years, education, and profession (peasants, traditional healers, teachers, nurses, dentists, pharmacists, medical doctors). The dependent variables were diseases that had been reported in previous studies to be falsely linked with "nylon teeth" myth.

To facilitate studying the distribution of dependent variables, the five interval scale for determining the degree of agreement was re-categorized into agree (agree completely + agree); neutral (neither/nor agree); disagree (disagree + disagree completely) and for independent variables age was categorized into 16-35, 36-50 and +51 years; Education was dichotomized into less educated (\leq primary education); educated (\geq secondary education); profession was dichotomized into medics (dentist + medical doctor + nurse + pharmacist) and non-medics (teacher + peasant + traditional healer).

To enable statistical analysis using Chi-square test and logistic regression, both demographic/independent and dependent variables were dichotomized as follows: Region was dichotomized into "northern regions" (Manyara, Kagera, Dodoma) dummy coded 0 and "southern regions" (Dar es Salaam, Mtwara, Rukwa) and dummy coded 1. Sex was dummy coded 0 for male, and 1 for female. Age was dichotomized into "young adults" (16 – 39 years) and dummy coded 0; and "older adults" (40 – 94 years) dummy coded 1. Education was dichotomized into lower education (\leq primary education) dummy coded 0, high education (\geq secondary education) dummy coded 1. Profession dichotomized into "medics" (medical doctor + dentist + nurse + pharmacist) dummy

coded 0, and non-medics (teacher + peasant + traditional healer) dummy coded 1. Dependent variable “agree that a disease/condition is falsely linked with nylon teeth myth” was dichotomized into no (neither/nor + disagree + disagree completely) dummy coded 0, and yes (agree +agree completely) dummy coded 1. In logistic regression analyses, the referent categories for independent variables were coded 0; and the outcomes of interest for dependent variables were coded 1. The level of significance for Chi-square and logistic regression analysis was set at p-value of ≤ 0.05 .

Results

A total of 1,359 respondents participated in the study. They were aged 17 to 98 years, 58% were males, 61.5% had primary education or less; 15.2% were health facility workers. Of all respondents, 614 (45.2%) had heard of nylon teeth, of whom only 262 (42.6%) reported that the myth existed in their village/street at the time of the study (Table 1).

Table 1: Distribution of respondents, n (%) by age, education, region, profession, and whether they have ever heard about nylon teeth by sex

Characteristic		Male	Female	Total
Age group (years)	17-35	393 (28.9)	235 (17.3)	628 (46.2)
	36-50	244 (17.9)	175 (12.9)	419 (30.8)
	51+	146 (10.7)	166 (12.2)	312 (22.9)
	Total	783 (57.6)	576 (42.4)	1,359 (100)
Education	Primary education or less	466 (34.3)	370 (27.2)	836 (61.5)
	Secondary education or higher	317 (23.3)	206 (15.2)	523 (38.5)
	Total	783 (57.6)	576 (42.4)	1,359 (100)
Region	Dar es Salaam	116 (8.5)	94 (6.9)	210 (15.5)
	Kagera	140 (10.3)	65 (4.8)	205 (15.1)
	Dodoma	107 (7.9)	89 (6.5)	196 (14.4)
	Manyara	118 (8.7)	86 (6.3)	204 (15)
	Rukwa	110 (8.1)	86 (6.3)	196 (14.4)
	Mtwara	192 (14.1)	156 (11.5)	348 (25.6)
	Total	783 (57.6)	576 (42.4)	1,359 (100)
	Profession	Medics	65 (4.8)	142 (10.4)
Non-medics)		511 (37.6)	641 (47.2)	1152 (84.8)
Total		576 (42.4.0)	783 (57.4)	1359 (100.0)
Ever heard about nylon teeth?	Yes	235 (17.3)	379 (27.9)	614 (45.2)
	No	341 (25.1)	404 (29.7)	745 (54.8)
	Total	576 (42.4)	783 (57.6)	1359 (100.0)
If yes, has nylon teeth myth ever existed in your village/street?	Never existed	68 (11.1%)	97 (15.8%)	165 (26.9%)
	Yes, existed but extinct	64 (10.4%)	123 (20.0%)	187 (30.4%)
	Yes, it still exist to-date	103 (16.8%)	159 (25.9%)	262 (42.7%)
	Total	235 (38.3%)	379 (61.7%)	614 (100%)

NB: Medics= Dentist+ Medical doctor+ Nurse+ Pharmacist; Non-medics=teacher+ peasant+ traditional healer

The occurrence of nylon teeth was most frequently associated with long standing diarrhoea (83.2%), long standing fevers (80.9%) and difficult in sucking (76.0%). The least associated diseases and/or conditions were long standing cough (35.1%) and tongue tie (29.4%) (Table 2).

Table 2: Distribution of respondents by the level of agreement that a disease or condition was associated with “nylon teeth” myth (n = 262*)

	Level of agreement that a particular disease/condition is linked with nylon teeth myth		
	Agree	Neutral	Disagree
Disease/condition linked with “nylon teeth” myth	N (%)	N (%)	N (%)
Long standing diarrhoea	218 (83.2)	15 (5.7)	29 (11.1)
Long standing fevers	212 (80.9)	21 (8.0)	29 (11.1)
Difficult sucking milk from mother’s breast	199 (76.0)	18 (6.9)	45 (17.2)
Itching in the mouth	175 (66.8)	34 (13.0)	53 (20.2)
Excessive crying	163 (62.2)	25 (9.5)	74 (28.2)
Drooling	135 (51.5)	33 (12.6)	94 (35.9)
Stunting	117 (44.7)	31 (11.8)	114 (43.5)
Long standing cough	92 (35.1)	32 (12.2)	138 (52.7)
Tongue tie	77 (29.4)	28 (10.7)	157 (59.9)

* Respondents who reported that “nylon teeth” myth still existed in their village/street

Higher proportions of respondents from northern regions, those who were non-medics and or those with low education falsely linked most of the diseases and conditions with nylon teeth myth compared to their counterparts. The differences were statistically highly significant (Table 3).

In logistic regression analyses (Table 4), proportionately more respondents from southern regions were statistically significantly less likely to falsely link diarrhoea (OR=0.29, CI=0.14-0.63; $p < 0.01$); fevers (OR=0.38, CI=0.18-0.80, $p < 0.01$); cough (OR=0.38, CI=0.16-0.94, $p < 0.05$); stunting (OR=0.24, CI=0.10-0.58, $p < 0.001$); excessive crying (OR=0.19, CI=0.09-0.40, $p < 0.001$); and difficult sucking (OR=0.35 CI=0.17-0.70, $p < 0.01$) with nylon teeth myth than their counterparts from northern regions.

In relation to sex, proportionately less females were statistically significantly more likely to link stunting (OR=0.57, CI= 0.34-0.98, $p < 0.05$) and excessive crying (OR 0.431, CI=0.24-0.78, $p < 0.01$) with nylon teeth myth than males. Regarding education a higher proportion of respondents with higher education were significantly more likely to link long standing cough (OR=2.068, CI=1.11-3.84, $p < 0.05$) and stunting (OR=2.07, CI=1.10-3.76, $p < 0.05$) with nylon teeth myth than their counterparts who were less educated. A higher proportion of medics were statistically significantly less likely to link excessive crying (OR=0.37, CI=0.15-0.96, $p < 0.05$) and difficult sucking (OR=0.29, CI=0.11-0.81, $p < 0.05$) with nylon teeth myth than non-medics. With respect to age, a higher proportion of older adults were significantly less likely to link tongue tie with nylon teeth myth than young adults (OR=0.56, CI=0.33-0.56, $p < 0.05$).

Table 3 Distribution of respondents who agreed that a given disease or condition was falsely linked with nylon teeth occurrence by region, age, sex, education and employment status

Disease/condition	Region		Age		Sex		Education		Employment	
	Southern	Northern	Young adults	Older adults	Female	Male	≤1 ^o	≥2 ^o	Medics	Non-medics
Diarrhoea	29 (61.7)	189 (87.9)**	139 (83.7)	79 (82.3)	134 (84.3)	84 (81.6)	133 (86.9)	85 (78.0)	36 (69.2)	181 (85.8)**
Fever	28 (59.6)	184 (85.6)**	133 (80.1)	79 (82.3)	128 (80.5)	84 (81.6)	132 (86.3)**	80 (73.4)	32 (61.5)	179 (84.8)**
Cough	7 (14.9)	85 (39.5)**	52 (31.3)	40 (41.7)	49 (30.8)	43 (41.7)	68 (44.4)**	24 (22.0)	9 (17.3)	82 (38.9)**
Stunting	7 (14.9)	110 (51.2)**	72 (43.4)	45 (46.9)	63 (39.6)	54 (52.4)*	85 (55.6)**	32 (29.4)	12 (23.1)	104 (49.3)**
Drooling	19 (40.4)	116 (54.0)	87 (52.4)	48 (50.0)	79 (49.7)	56 (54.4)	84 (54.9)	51 (46.8)	23 (44.2)	111 (52.6)
Itching mouth	28 (59.6)	147 (68.4)	119 (71.7)*	56 (58.3)	102 (64.2)	73 (70.9)	101 (66.0)	74 (67.9)	29 (55.8)	145 (68.7)
Excessive crying	13 (27.7)	150 (69.8)**	99 (59.6)	64 (66.7)	88 (55.3)	75 (72.8)**	111 (72.5)**	52 (47.7)	22 (42.3)	140 (66.4)**
Difficult in sucking	26 (55.3)	173 (80.5)**	128 (77.1)	71 (74.0)	117 (73.6)	82 (79.6)	125 (81.7)*	74 (67.9)	31 (59.6)	167 (79.1)**
Tongue tie	8 (17.0)	69 (32.1)*	41 (24.7)	36 (37.5)*	39 (24.5)	38 (36.9)*	47 (30.7)	30 (27.5)	11 (21.2)	65 (30.8)

Key: 1^o= primary; 2^o=secondary; χ^2 test: * significant; p < 0.05; ** highly significant; p < 0.01

Table 4: Odds ratios (95.0% C.I.) for regression analyses of diseases and conditions falsely linked with nylon teeth myth (dependent variables) and region, sex, age, education, profession (independent variables)

Dependent variable [§]	Independent variable*	Odds Ratio (95% CI)
Diarrhoea	Region	0.29 (0.14 - 0.63)
	Profession	0.58 (0.27 - 1.28)
Long standing fevers	Region	0.38 (0.18 - 0.80)
	Education	1.17 (0.56 - 2.46)
	Profession	0.44 (0.19 - 1.01)
Long standing cough	Region	0.38 (0.16 - 0.94)
	Education	2.07 (1.11 - 3.84)
	Profession	0.66 (0.27 - 1.60)
Stunting	Region	0.24 (0.10 - 0.58)
	Sex	0.57 (0.34 - 0.98)
	Education	2.07 (1.14 - 3.76)
	Profession	0.68 (0.30 - 1.56)
Excessive crying	Region	0.19 (0.09 - 0.40)
	Sex	0.43 (0.24 - 0.78)
	Education	1.05 (0.41 - 2.68)
	Profession	0.38 (0.15 - 0.96)
Difficult sucking	Region	0.34 (0.17 - 0.70)
	Education	0.66 (0.234 - 1.83)
	Profession	0.30 (0.11 - 0.81)
Tongue tie	Region	0.47 (0.21 - 1.08)
	Age	0.56 (0.32 - 0.96)
	Sex	0.62 (0.35 - 1.07)

*Region: (0=northern regions; 1=southern regions); Profession: (0=non-medics, 1=medics); Education: (0=primary or less; 1=secondary or higher); Age: (0=young adults; 1=older adults); Sex: (0=male; 1=female)

[§]Dependent variables (disease/conditions): (0=no; 1=yes)

Discussion

Diarrhoea, long standing fevers and failure to suck featured as the diseases and conditions most falsely linked with nylon teeth myth in Tanzania. Malaria, acute respiratory infections and diarrhoeal diseases are among the major health problems for both under five and above five year olds in Tanzania (Ministry of Health and Social Welfare, 2013). The common childhood diseases occur repeatedly in such a way that parents are tempted to seek alternative management. This prompts them to accepting hearsays and myths. Our findings are similar to those of Kikwilu & Hizza (1997) that persistent fevers and diarrhoea were the major symptoms which led parents to go to a traditional healer. Our findings are also in agreement with those of Tirwomwe *et al.* (2013) who stated that the parents in Uganda identify the false teeth (nylon teeth) by the presence of the associated conditions of diarrhoea, fever, and vomiting in their children.

The proportion of respondents falsely linking most of the studied diseases and conditions with nylon teeth myth was similar in young and older adults, indicating that the diseases and conditions are prevalent in the communities thus easily linked with the myth across the ages. Proportionately more males linked stunting and excessive crying with 'nylon teeth' myth compared to females probably because females are likely to be more conversant with causes of stunting and crying in children than males. Linking 'nylon teeth' with the two common conditions diarrhoea and long standing fevers was not different among educated and those not educated, while more of those with high level of education linked 'nylon teeth' with stunting and cough. Possibly our

education system does not integrate health education with issues of public health importance. Our observation is different from an earlier study where the nylon teeth myth was reported to be higher among less educated (Barzangi *et al.*, 2014).

Higher proportions of non-medics falsely linking most diseases and conditions with nylon teeth myth compared to medics would be anticipated because the later are better placed to differentiate facts from fiction on health issues. Nonetheless, the proportion of medics who falsely linked the diseases with the myth is substantial. This calls for a need of educating the medics on the myth so as to put them in a better perspective to be used for combating the myth in communities they live in.

The likelihood of participants from northern regions to associate 'nylon teeth' with childhood diseases than their southern counterparts is in line with previous findings which reported nylon teeth myth and practice of tooth bud gouging to be prevalent in central and northern regions of Tanzania (Moshia, 1983; Matee & van Palenstein Helderma, 1991; Hiza *et al.*, 1992; Kikwilu *et al.*, 1997), but not in the southern regions (Matee & van Palenstein Helderma, 1991). No rational explanation for this geographical difference is thought of since in Tanzania there is free movement from one region to the other which allows social interaction. The observation points to a need to explore the factors that may have influenced this demarcation, the results of which can be employed to design an effective intervention.

The inherent danger in the persistence of falsely linking signs and symptoms of some childhood diseases with the 'nylon teeth' myth is detrimental to children's general health due to connected delayed seeking for medical attention. It is imperative to cause for action through various mechanisms in order to rescue children from worrying consequences resulting from people's myths and practices.

In this study, each participant was interviewed confidentially therefore there was no time for respondents to discuss the questions that would lead to giving similar answers. This is considered as the strength of the study. In addition, participants were drawn from all five geographical zones of Tanzania thus the results can be said to represent perceptions of Tanzanians regarding nylon teeth myth. Nevertheless, few traditional healers were recruited in the study which hindered analysis that would show a meaningful conclusion on the diseases they falsely link with "nylon teeth" myth. This made it difficult to suggest a meaningful intervention to this important stratum in the "nylon teeth" myth.

In conclusion, diarrhoea, fevers and difficult in sucking were the diseases and conditions most frequently linked with 'nylon teeth' myth. The linking of diseases and conditions with 'nylon teeth' myth was more common in northern regions and among non-medics. Males were more likely to falsely link stunting and excessive crying with 'nylon teeth' myth. The more educated respondents were more likely to falsely link long standing cough and stunting with 'nylon teeth' myth. From the findings of this study we recommend intensification of comprehensive management of infectious diseases that manifest as fever, diarrhoea and cough particularly in the northern regions ensuring that both females and males are reached. We also recommend raising knowledge among communities on normal features in the oral cavity associated with 'nylon teeth' myth in children; empowering dental and medical practitioners on the myth and facilitate them to collaboratively render comprehensive management of children suspected to have "nylon teeth".

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