



This is a self-archived – parallel-published version of an original article. This version may differ from the original in pagination and typographic details. When using please cite the original.

AUTHOR Nyamuryekung'e Kasusu Klint, Lahti Satu, Tuominen Risto

TITLE Costs of dental care and its financial impacts on patients in a population with low availability of services

YEAR 2019

DOI http://www.doi.org/10.1922/CDH_4389Nyamuryekung'e06

VERSION Final draft (AAM)

CITATION Nyamuryekung'e Kasusu Klint, Lahti Satu, Tuominen Risto. 2019. Community Dental Health 36(2) SSN 0265-593X

Costs of dental care and its financial impacts on patients in a population with low availability of services

Nyamuryekung'e Kasusu Klint ^{1,2}

Lahti Satu^{2,3}

Tuominen Risto^{4,5}

¹ School of Dentistry, Department of Orthodontics, Paedodontics and Community Dentistry, Muhimbili University of Health and Allied Sciences, Tanzania

² Department of Community Dentistry, University of Turku, Turku, Finland

³ Turku Clinical Research Centre, Turku University Hospital, Finland

⁴ Department of Public Health, University of Turku, Turku, Finland

⁵ Department of Dentistry, University of Namibia, Windhoek, Namibia

Corresponding author:

Nyamuryekung'e Kasusu Klint

E-mail: kasusuklint@yahoo.com

Keywords: healthcare costs, dental utilization

Abstract

Objectives: To determine the direct and indirect costs of accessing and utilizing dental services in Tanzania and proportions of patients experiencing economic burden due to treatment costs. **Basic research design:** Survey amongst 489 dental patients utilizing out-of-pocket payment modality was carried out in four regional hospitals in Tanzania. Direct and indirect costs for their utilization of dental services were calculated. Financial expenditures were used to calculate and assess significant financial impacts of utilization of dental services on household economies. **Results:** Most of the patients attended the dental clinics due to toothache and the most widely expected treatment was tooth extraction. Only 7.1% of the patients that attended the dental clinics received a tooth-filling. The costs for tooth fillings were three-times those for tooth extraction services. Direct costs comprised 80% of the total treatment costs whereas indirect costs comprised 20%. About half of the patients would experience significant financial impacts as a result of their current utilization of dental services. Financial impacts were observed in highest proportions amongst patients residing in households with low levels of income. **Conclusions:** Dental service utilization leads to significant financial impacts to many of the households in this setting. Increasing the rate of prepayment for health services and reduction of income inequality may help to mitigate these negative effects.

Introduction

According to the World Health Organization there are three main goals for a healthcare system: good health, responsiveness to the expectations of the population, and fairness of financial contribution (World Health Organization, 2007). The way a health system is financed is key to population health and well-being. The mechanisms of financing a health system vary for each country depending, among many other factors, on the economic context (McIntyre, 2001). Problems in financing health services may lead to high patient fees that are unaffordable for the majority of the served populations.

The health care systems of many low-mid income countries (LMICs) have long been facing a crisis. The problems within these systems are numerous, ranging from inadequate infrastructure, unresponsiveness to needs, insufficient number and diversity of health personnel, poor governance and underfunding of the health sector generally (Kandelman *et al.*, 2012). The situation may often be worse as far as oral health is concerned. Oral health care is commonly detached from general health policies of LMICs and considered to run parallelly and separately from the general health system (Helmchen and Lo Sasso, 2010). In many LMICs, health financing programs give a very low priority to oral health, evidenced by only very small proportions of the health budget being allocated to it (Petersen, 2003).

Tanzania is a large East African country with a population of approximately 50,000,000 (*2015 census projections*) and is considered to be a low-income country (World Bank, 2018). The most prominent oral health problems in Tanzania are periodontal diseases, dental caries, trauma and oral cancers. However, the primary cause for dental attendance is toothache due to dental caries and the treatment modality offered most of the time is tooth extraction with restorative care and preventive services being negligibly represented. (Mosha and Scheutz, 1993; Mashoto *et al.*, 2009; Kikwilu and Mandari, 2001)

Cost of services has been determined by several studies as one of the most commonly offered reasons for delays, and sometimes indefinite postponements in accessing oral care services in LMICs. Further, it has been reported as an obstacle towards utilization of comprehensive dental care. However, there is no retrievable information on the financial burden and costs that these patients incur while utilizing dental services.

The objectives of this study were to determine the direct and indirect costs of accessing and utilizing dental services in Tanzania and proportions of patients experiencing economic burden due to treatment costs.

Methods

This study was conducted in four public dental clinics located within regional hospitals in Tanzania. Public dental clinics are located within regional and district hospitals usually situated in administrative headquarters in municipalities and cities. These hospitals were located in Dar es Salaam, Mbeya, Mwanza and Kilimanjaro regions. Restorative services are not consistently available in public dental facilities, usually due to unavailability of necessary material and equipment. The studied clinics in Dar es Salaam and Mbeya regions only were offering restorative services at the time of the study.

All dental outpatients aged 18 years or more attending the dental clinics during the 4-5-week study period in the respective regions were eligible for participation and included into the study. Dental outpatients were enlisted daily and consecutively for the duration of the study period. In order to accurately calculate their financial expenditures and variation in purchasing behaviour based on available resources, only patients that utilised out-of-pocket payments (OOP) were included for analyses. Patients were approached as they were waiting for treatment outside the dental clinic treatment rooms. A research assistant explained the importance and purpose of the study and invited them to participate. Furthermore, they were informed of the voluntary nature of the study, assured of their confidentiality and right to withdraw at any point. The research assistant also clarified and responded to any questions that the patients had. Patients who exhibited significant physical discomfort and pain were approached only after they had received their treatment. Signed, informed consent was obtained from all participants.

This study utilised a self-administered questionnaire and all costs were reported in Tanzanian shillings (1 Sterling Pound = 2,772 Tanzanian shillings (Tshs), FOREX August 2016). The questionnaire contained questions pertaining to the social demographic characteristics of the patients (sex, age, education), monthly household income, number of people in the household, perceived status of teeth, major oral health problem causing attendance at the dental clinic, expected dental treatment and various costs associated with seeking it. Monthly household incomes were recorded as (1) Below 100,000 Tshs (2) 110,000 – 250,000 Tshs (3) 260,000 – 500,000 Tshs (4) 510,000 – 750,000 Tshs (5) 760,000 – 1,000,000 Tshs and (6) Greater than 1,010,000 Tshs. Since the monthly household incomes were recorded as ranges of values, the means of these ranges were calculated and considered as the monthly household

income values. Therefore, the mean household incomes were 1) 55,000 Tshs (2) 180,000 Tshs (3) 380,000 Tshs (4) 630,000 Tshs (5) 880,000 Tshs and (6) 1,125,000 Tshs.

Direct costs were determined by inquiring on investigation and treatment fees. All patients underwent routine visual and tactile clinical examinations included as part of their treatment fees. However, subject to the presenting clinical condition we inquired whether any specific additional investigations were requested by the dental practitioner. If so, the additional amount paid and the type of investigation undertaken was recorded. The types of additional investigations inquired upon were: periapical radiographs, orthopantomograms (OPGs), dental impressions and others. Treatment fees inquired on the amount of money paid for the rendered treatment. The treatment options were (1) Tooth extraction (2) Tooth filling (3) Periodontal treatment (4) Consultation and (5) Others. The total direct costs were calculated as the sum of additional investigations and treatment fees for each patient.

For travel costs, patients were asked of the amount of money spent commuting to the hospital. If the patients did not spend any money on travel (i.e. they walked) to the hospital, a value of "0" was filled-in. One-way travel costs were multiplied by two to account for the return trip. Patients were also asked whether they were escorted to the clinic, and if so escort's travel costs were also included using the same procedure. The final calculated amount was considered to be the travel costs.

Patients were asked of the times that they left and arrived at the hospital. Thus, travel time was calculated as the time difference between arrival at the hospital and departure to attend the hospital. The obtained travel time was multiplied by two to account for the corresponding return trip. Treatment time was calculated as the time difference between arriving at the hospital and completion of treatment at the dental clinic. In order to transform these times into cost, a variable which corresponded to income per unit time was constructed as follows:

The mean monthly household incomes were divided by the total number of members in the household to derive an approximate value of one individual's time per month. The time cost estimates were based on assumptions that there were on average 21 working days in a month and 8 working hours per day, giving 168 hours per month. Thus, the value of an hour was calculated by dividing the mean monthly household income per household member by 168. This value of unit time was used to calculate the travel, waiting and total treatment time costs. Therefore, indirect costs were calculated based on the travel costs and value of time spent travelling (return trip) and waiting for treatment.

To define whether utilized oral health care service costs can be expected to cause an economic burden on households, cash expenditures during seeking and obtaining dental treatment were calculated. Travel, treatment and investigation fees were summed to form the cash expenditures related to obtaining current dental treatment. The cash expenditures were converted to a percentage of the calculated mean monthly household income. If the overall expenditure exceeded 10% of the monthly household income, it was considered to result into a significant financial impact (Aspler, 2008 and Russell, 2004).

To determine changes in proportions incurring significant financial impacts (SFIs) in poor households, a set of sensitivity analyses were conducted amongst patients belonging in the lowest income category. The household monthly income was varied in 10,000 Tshs increments from the median value within the category while holding all other values constant. Therefore, the household monthly incomes were varied from the median value (50,000 Tshs) to the upper limit of the income category (100,000 Tshs) and the proportions expected to experience SFIs calculated for each income level.

Statistical differences in proportions were compared using chi-square tests. All analyses were conducted using SPSS for Windows, Version 20; statistical significance was set at $p < 0.05$. Approval for this study was obtained from Ethical Committee of the Muhimbili University of Health and Allied Sciences (2015-06-12/AEC/Vol. IX/108). Ethical permission to conduct this study in regional hospitals was obtained from the regional administrative secretaries of the respective regions.

Results

A total 636 patients were approached, of which 489 (70.0%) utilized out of pocket payments and were included for analyses. However, 66 questionnaires were either incorrectly filled-in or had several missing values and were omitted from further analyses. Therefore, responses from 423 patients were analyzed giving this study a response rate of 86.5%. The mean age of the patients was 29.8 years (SD 10.4) and ranged from 18 to 73 years. Slightly more than half of the patients were female (54.3%) and 43.6% had primary level of education. About one-third (30%) of the patients were escorted by another adult to the clinic.

Age, sex, education and monthly household incomes were not shown to be associated with utilization of either tooth extraction or filling services. Most of the patients reported to dental clinics due to toothache and the most widely

expected treatment was tooth extraction. Nevertheless, in dental clinics offering restorative care proportion of patients expecting to receive restorative care was higher. Similarly, attendees in clinics which offered restorative care had more patients that reported to have had previous tooth fillings and to assess the status of their teeth favorably, as compared to those that attended clinics without restorative services (Table 1).

Overall treatment fees had an interquartile range from 5,000 Tshs to 10,000 Tshs. Only 7.1% of the patients that attended the dental clinics received a tooth-filling. However, there were significant differences in median treatment fees between those that received tooth fillings and those that had tooth extractions. Whereas the median tooth extraction fees were 5,000 Tshs those for tooth filling were 15,000 Tshs. Small proportion (2.6%) of the patients were prescribed any investigations, the median fees were also some of the highest, at 15,000 Tshs (Table 2).

About a half (51.7%) of the total treatment time costs were attributed to waiting times in the clinics. The waiting times in the clinics ranged from 15 minutes – 6 hours 45 minutes with the median waiting time being 2 hours and 30 minutes. Total indirect costs contributed 20% of the total costs incurred by patients (Table 2).

About half (54.7%) of the patients would experience significant financial impacts as a result of their utilization of dental services. However, these impacts were observed in higher proportions amongst households with low levels of income. The vast majority (92.2%) of patients belonging in the lowest income category would experience significant financial impacts. Sensitivity analyses revealed that even if the income level of the lowest income group would be doubled up to 100,000 Tshs, the proportion of patients experiencing significant financial impact would be 50.0% (Figure 1).

Discussion

The patient costs for utilization of dental services can be considered high, with half of the patients in this study expected to experience significant financial impacts as a result of their utilization. Direct and indirect costs contributed four-fifths and one-fifth of total treatment costs, respectively. Studied dental services were not uniformly available across the dental facilities.

The SFI measure has been used in health research to quantify ability to pay and affordability of health services. It has previously been utilized amongst patients and households dealing with chronic illnesses such as TB, HIV and others (Aspler *et al.*, 2008), but not in dentistry. However, it has been considered a useful proxy of the burden of

cost and ability to pay for health services using reported incomes of the examined subjects. The bulk of the studies utilize the catastrophic health expenditure (CHE) measure (Su *et al.*, 2006; Xu *et al.*, 2007; Van Minh *et al.*, 2013; Bernabé *et al.*, 2017; Wagstaff *et al.*, 2017). By its definition, CHE employs a much more stringent criterion compared to our calculated SFI, requiring households to have expended more than 40% of their annual non-food expenditures (Xu *et al.*, 2007).

The finding that about half of all participants would incur significant financial impacts as a result of utilization of dental services is disconcerting. It implies either an existence of high fees for dental services, low household income levels or a combination of these factors. Previous research by Brinda *et al.*, (2014) based on Tanzanian population revealed that 18% of the households experienced catastrophic health expenditures, primarily as a consequence of out-of-pocket payments for health services. Having low income levels has been independently associated with increased likelihood of utilizing out-of-pocket payment for healthcare (McIntyre, 2001). Conforming to findings from the Tanzanian household survey (2013), a high proportion of respondents in this study reported to originate from households with low levels of monthly incomes. Accordingly, SFIs were mostly clustered around these households, with the wealthier households remaining largely unaffected. The financial expenditures associated with dental service utilization were collected at the point of, and during service provision, eliminating possible recall bias. Thus, the calculated impacts can be considered to reflect the actual situation within the studied population.

Possible limitations of the SFI measure is that large proportion of the Tanzanian population is informally employed and thus have unstable incomes with frequent fluctuations. Further, significant proportion of its population are subsistence farmers, consuming the food that they grow (Tanzania basic demographic profile, 2014). Nevertheless, there are significant difficulties associated with measuring of household consumptions especially in low and mid income settings. Therefore, average household monthly incomes were used as a proxy for overall consumption in this study. In consideration of this, the measure of household income might be an under-estimate of the overall household consumption. However, considering the unavailability of better measures of consumption, household incomes were considered appropriate for the purposes of quantifying the financial implications of dental service charges on the household economies. Additionally, piloting the study tool revealed that making the response option to the question: “What is your average monthly household income” a categorical response with ranges of incomes rather than an open ended one resulted into much higher response rates. The provision of ranges possibly allowed

the respondents to take into consideration the fluctuations of household incomes when providing their estimates, and was thus used as the variable to deduce average household incomes.

The observed differences in the availability of tooth filling services at similar levels of healthcare facilities is exemplary of structural inequalities in health as suggested by Watt (2007). Inequalities in oral health are considered to be differences in oral health that are both avoidable and unfair within the society. In this case, entire groups of people are selectively and regionally excluded from benefitting from tooth filling services; which have been shown to lead to oral health-related quality of life, despite them being available elsewhere at the same level of health facilities within the same society. The effects of this disparity are likely to disproportionately affect the poorest members of this society more. Unlike their better-off counterparts, they have fewer options and means to seek these services elsewhere. (Watt *et al.*, 2015)

Patients that received tooth filling treatment paid approximately three times more than those that received tooth extraction treatment. Subsequently, the proportion of patients that received tooth filling services was very low. Previous studies support the finding of patients' perceived high cost of filling services in Tanzania as a barrier towards their utilization (Kikwilu *et al.*, 2009; Nyamuryekung'e *et al.*, 2015). A previous population survey in this setting revealed that close to three-quarters of all that reported oral symptoms did not seek dental services with treatment cost being the most frequently cited reason for non-attendance (Kikwilu *et al.*, 2008). Indeed, paying for dental services has been shown to increase the likelihood for households to experience significant health expenditures in low-income settings (Bernabé *et al.*, 2017). Nevertheless, data analyzed for this study was from patients in a low-income setting that had already made the decision to incur out of pocket costs for dental services. Therefore, they either considered themselves able to sustain the cost, or could not postpone the treatment any longer.

Another limitation of this study was non-inclusion of medication fees in the calculation of direct costs. Usually, treatment fees are expected to also cover the costs for prescribed medication in studied facilities; subject to availability of the such medication in the hospital pharmacy. However, health facilities in this setting experience recurrent medication stock-outs and only a fraction of all prescribed medications are regularly stocked in the hospital pharmacies. Hence, outpatients frequently have to purchase their medications in private pharmacies. Due to the wide variability in prescribing patterns, purchasing behaviors and prices of medication, they were not included in current cost calculations. Furthermore, usage of over-the counter medication is widely prevalent in Tanzania and is

the preliminary course of action upon experiencing of illness to large proportions of the population. However, we also did not inquire on costs due to self-medication prior to reporting to the hospital due to their current illness. A multi-country study by Bernabé *et al.* (2017) showed that buying medication over the counter had a similar effect to that of hospital admission. This further highlight the role of medications as a significant source of health expenditures. Therefore, the currently calculated direct costs and financial impacts might be considered as conservative estimates of the actual costs incurred.

Indirect costs were shown to play significant role in the overall cost of accessing dental services in this setting. Travel costs constituted slightly more than half of the total indirect costs. Previous population-based survey elucidated that travel costs were the reason for non-attendance to dental clinics for up to 15% of the respondents, despite them having oral pain (Kikwilu *et al.*, 2008). Indirect costs have been considered to be substantial barriers in obtaining dental treatment. This particularly affects people living in rural areas; where accessing of dental services might involve extensive travel and social arrangements (Curtis *et al.*, 2007). Thus, it is very likely that participants from rural areas within this study incurred greater indirect costs than their urban counterparts. Residents from rural areas are comparatively less wealthy than their urban counterpart. Therefore, not only will they incur greater indirect costs, but the consequences of such expenditure will also have a greater negative effect on their economies. Unfortunately, due to the difficulties and ambiguities in rural/urban categorization within this setting, current study did not inquire on residency status of the patients.

About one third of all patients were escorted to the hospital by at least one adult. Therefore, the overall productivity loss and indirect costs extend to other family members of the patient. Waiting times were also long; in some instances, exceeding six hours. Accordingly, waiting time was the second highest incurred indirect cost. Currently, Tanzania does not employ an appointment system for public dental services; all dental treatment is considered as “emergency” and utilizes a first come- first serve basis. Perhaps the introduction of appointment systems within this setting might serve to minimize experienced indirect costs due to waiting times.

Dental service utilization leads to significant financial impacts to many of the households in this setting. Increasing the rate of prepayment for health services and reduction of income inequality may help to mitigate these negative effects. Health policy targeted at the poorest segment of the population with the aim of decreasing the observed health inequality is needed.

References

- Aspler, A., Menzies, D., Oxlade, O., Banda, J., Mwenge, L., Godfrey-Faussett, P., *et al.* (2008): Cost of tuberculosis diagnosis and treatment from the patient perspective in Lusaka, Zambia. *International Journal of Tuberculosis and Lung Disease***12**, 28–35.
- Bernabé, E., Masood, M. and Vujcic, M. (2017): The impact of out-of-pocket payments for dental care on household finances in low and middle income countries. *BMC Public Health***17**, 1–8.
- Brinda, E.M., Andrés, A.R., Andrés, R.A. and Enemark, U. (2014): Correlates of out-of-pocket and catastrophic health expenditures in Tanzania: results from a national household survey. *BMC international health and human rights***14**, 5.
- Curtis, B., Evans, R.W., Sbaraini, A. and Schwarz, E. (2007): Geographic location and indirect costs as a barrier to dental treatment: a patient perspective. *Australian Dental Journal***52**, 271–275.
- Helmchen, L.A and Lo Sasso, A.T. (2010): How sensitive is physician performance to alternative compensation schedules? Evidence from a large network of primary care clinics. *Health economics***19**, 1300–1317.
- Kandelman, D., Arpin, S., Baez, R.J., Baehni, P.C. and Petersen, P.E. (2012): Oral health care systems in developing and developed countries. *Periodontology 2000***60**, 98–109.
- Kikwilu, E. and Mandari, G. (2001): Dental caries and periodontal conditions among primary school children in Morogoro municipality, Tanzania. *East African medical journal***78**, 152-156.
- Kikwilu, E.N., Frencken, J.E., Mulder, J. and Masalu, J.R. (2009): Barriers to restorative care as perceived by dental patients attending government hospitals in Tanzania. *Community dentistry and oral epidemiology***37**, 35–44.
- Kikwilu, E.N., Masalu, J.R., Kahabuka, F.K. and Senkoro, A.R. (2008): Prevalence of oral pain and barriers to use of emergency oral care facilities among adult Tanzanians. *BMC oral health***8**, 28.
- Mashoto, K.O., Astrøm, A.N., David, J. and Masalu, J.R. (2009): Dental pain, oral impacts and perceived need for dental treatment in Tanzanian school students: a cross-sectional study. *Health and quality of life outcomes***7**, 73.
- McIntyre, D. (2001): Learning from experience – Health care financing in Low and mid-income countries. *Geneva: Global Forum for Health Research*.
- Minh, H. Van, Kim Phuong, N.T., Saksena, P., James, C.D. and Xu, K. (2013): Financial burden of household out-of-pocket health expenditure in Viet Nam: Findings from the National Living Standard Survey 2002-2010. *Social Science and Medicine***96**, 258–263.
- Mosha, H.J. and Scheutz, F. (1993): Perceived need and use of oral health services among adolescents and adults in Tanzania. *Community dentistry and oral epidemiology***21**, 129–32.
- Nyamuryekung'e, K.K., Lahti, S.M. and Tuominen, R.J. (2015): The relative patient costs and availability of dental services, materials and equipment in public oral care facilities in Tanzania. *BMC oral health***15**, 74.
- Petersen, P.E. (2003): The World Oral Health Report 2003: continuous improvement of oral health in the 21st century--the approach of the WHO Global Oral Health Programme. *Community dentistry and oral epidemiology***31**, 3–23.
- Su, T.T., Kouyaté, B. and Flessa, S. (2006): Catastrophic household expenditure for health care in a low income society: a study from Nouna District, Burkina Faso. *Bulletin of the World Health Organization***84**, 21–27.
- United Republic of Tanzania. (2013): [Household Budget Survey, 2011/12]. National Bureau of Statistics: <http://nbs.go.tz/nbstz/index.php/english/statistics-by-subject/household-budget-survey-hbs/367-household-budget-survey-main-report-2011-12>
- United Republic of Tanzania. (2014): [Basic demographic and social-economic profile report Tanzania mainland]. National Bureau of Statistics:

https://www.tanzania.go.tz/egov_uploads/documents/TANZANIA_MAINLAND_SOCIO_ECONOMIC_PROFILE_sw.pdf

Wagstaff, A., Flores, G., Hsu, J., Smitz, M.F., Chepynoga, K., Buisman, L.R., *et al.* (2017): Progress on catastrophic health spending in 133 countries: A retrospective observational study. *The Lancet Global Health*, 169–179.

Watt, R.G. (2007): From victim blaming to upstream action: tackling the social determinants of oral health inequalities. *Community dentistry and oral epidemiology***35**, 1–11.

Watt, R.G., Listl, S., Peres, M. and Heilmann, A. (2015): Social inequalities in oral health: from evidence to action.

World Bank Group. (2018): [Tanzania World Bank Report]. World Bank:
<http://data.worldbank.org/country/tanzania>

World Health Organization. (2007) *Everybody's business--strengthening health systems to improve health outcomes: WHO's framework for action*.

Xu, K., Evans, D.B., Carrin, G., Aguilar-Rivera, A.M., Musgrove, P. and Evans, T. (2007): Protecting households from catastrophic health spending. *Health Affairs***26**, 972–983.

Table 1: Characteristics of the study population (n = 423) by dental provider service profile (*p-values for chi-square test*)

Variable	Restorative services absent n (%)	Restorative services present n (%)	p- value
Age			
18-24 years	101 (39.5)	53 (33.5)	
25-34 years	88 (34.4)	65 (41.1)	
35-44 years	40 (15.6)	24 (15.2)	
45+ years	27 (10.5)	16 (10.1)	.541
Sex			
Male	123 (47.7)	69 (42.6)	
Female	135 (52.3)	93 (57.4)	.359
Education			
Primary	117 (45.2)	66 (41.0)	
Secondary	105 (40.5)	68 (42.2)	
Tertiary	37 (14.3)	27 (16.8)	.647
Household income			
<100,000 Tshs	140 (54.9)	78 (50.3)	
110,000 – 250,000 Tshs	68 (26.7)	35 (22.6)	
260,000 – 500,000 Tshs	26 (10.2)	21 (13.5)	
510,000 – 750,000 Tshs	10 (3.9)	12 (7.7)	
760,000 – 1,000,000 Tshs	8 (3.7)	8 (5.2)	
>1,000,000 Tshs	3 (1.2)	1 (0.6)	.318
Presenting complaint			
Toothache	245 (94.6)	146 (89.6)	
Gum disease	3 (1.2)	3 (1.8)	
Others	11 (4.2)	14 (8.6)	.151
Expected treatment			
Tooth extraction	232 (89.6)	115 (71.9)	
Tooth filling	10 (3.9)	25 (15.6)	
Periodontal treatment	0 (0.0)	1 (0.6)	
Consultation	12 (4.6)	12 (7.5)	
Others	5 (1.9)	7 (4.4)	.000
Restored tooth			
None	243 (94.6)	129 (81.6)	
At least one	14 (5.4)	29 (18.4)	.000
Perceived status of teeth			
Poor	211 (81.5)	113 (70.6)	
Good	48 (18.5)	47 (29.4)	.014

Table 2: Median and interquartile ranges (IQR) for direct, indirect and total costs (n = 423).

Variables	Patients reporting cost	
	n (%)	Median (IQR)
DIRECT COSTS		
Investigation fees	11 (2.6)	15,000 (10,000 – 20,000)
Overall treatment fees	423 (100)	10,000 (5,000 – 10,000)
Tooth extraction fees	336 (79.4)	5,000 (5,000 – 10,000)
Tooth fillings fees	30 (7.1)	15,000 (10,000 – 22,000)
Total direct costs		10,000 (5,000 – 10,000)
INDIRECT COSTS		
Transportation costs	409 (96.7)	1,200 (800 – 2,200)
Value of overall treatment time	366 (86.5)	589.4 (265.9 – 1437.8)
Value of return travel time	387 (91.5)	218.3 (98.2 – 603.2)
Value of waiting time	366 (86.5)	304.7 (138.7 – 727.1)
Total indirect costs		2,202.3 (1,184.3 – 1,437.8)
TOTAL COSTS		11,081.2 (6,921.3 – 13,537.7)

Figure 1: Variation in significant financial impacts (SFIs) and household monthly income amongst participants in the lowest income category

