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**Journal of Public Health and Epidemiology**

*Full Length Research Paper*

# Community based health insurance as a viable option for health financing: An assessment of household willingness to pay in Lagos, Nigeria

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The high cost and effect of out of pocket payments for health care on households in developing countries have led to the use of community-based health insurance (CBHI) as a viable alternative for health care funding. The overall objective of the study was to assess the perception and determinants of willingness-to-pay (WTP) for a proposed community based health insurance scheme in urban and rural households in Lagos State. The multi-stage sampling technique was used with 960 household heads enrolled in the study. A pre-tested, semi-structured, interviewer administered questionnaire was used to collect data from the respondents. The contingent valuation method was used to elicit household willingness to enrol and pay for a proposed community based health insurance scheme. Data was analysed using Statistical Package for Social Sciences software (SPSS) version 17. This study revealed that 86.3% of the households in the rural LGA and 78.6% of the households in the urban LGA were willing to pay for the proposed community based health insurance scheme (p=<0.001). The households were willing to pay a mean amount of ₦957.56 and ₦754.83/household/month in the urban and rural area respectively (p<0.001). The paper concludes by emphasizing the high willingness among households to participate in the proposed hypothetical CHBI scheme. This highlights its prospects of increasing access to quality health care in Lagos especially amongst vulnerable low-income households.

**Key words:** Willingness to pay, community based health insurance, health financing, contingent valuation.

## INTRODUCTION

The World Health Organisation (WHO) estimates that annually about 100 million people are driven into poverty attributable to catastrophic health expenditure (World Health Organization Geneva, 2003). A major number reside in developing countries in Sub Saharan Africa (SSA) with weak health care systems and lack of

health insurance schemes (Carrin et al., 2005; World Health Organization, 2005). Access to healthcare is drastically limited for poor households by their low purchasing power due to their earnings and expenditure patterns (World Health Organization, 2000).

Expenditure on health care is sufficient to tip households into poverty causing them to forego consumption of other items that are necessary for their wellbeing such as food or education (Onoka et al., 2010). This is considerably worse in rural areas due to their low standard of living and limited accessibility to quality health care services as a result of the absence of funding for health care in the form of insurance schemes (World Health organization, 2002). Episodes of illness usually require payment at the time of occurrence and this restricts access and impoverishes households (OECD/W.H.O., 2003).

Though varied health financing options have been identified in Nigeria, health financing is still quite disproportionate in both urban and rural communities with a higher impact of the effects of inequitable budgetary health expenditure allocation in rural areas due to severe constraints in the budgets and maldistribution of resources (Olaniyan and Lawanson, 2010). Payments for health care can be so exorbitant in comparison to household income thereby resulting in "financial catastrophe" for individuals or households causing them to cut down on necessities (World Health Organization, 2000).

Globally, about 150 million people suffer financial catastrophe because of out-of-pocket expenditure on health services (WHO, 2016). Healthcare spending is considered catastrophic, if the out-of-pocket healthcare expenses incurred are large relative to the resources available to the household and this disrupts the household's standard of the household. Hence in Nigeria where prepayment mechanisms play a limited role in health financing, households are at risk of incurring exorbitant health care expenditures when members fall ill (Ibukun and Komolafe, 2018).

Nigeria's health financial arrangement has shifted from health provision by government as a normal good towards a competitive market where a greater proportion of health services are provided by ability to pay through out-of-pocket expenses (often referred to as user fees) (Ataguba et al., 2013).

Furthermore, excessive reliance on out-of-pocket payments for health reduces utilisation of these services and exacerbates the inequitable access to quality health-care which further exposes households to the financial risk of spending during health events. This risk is unacceptable due to the availability of effective and affordable health financing schemes to address the impact of out-of-pocket spending on health in poor resource settings (Onwujekwe et al., 2010).

Health financing through taxation or social health insurance is recognized as an effective tool for achieving universal health coverage with adequate financial protection against unexpected healthcare expenditure (Carrin et al., 2005). Risk-pooling is a core characteristic of these mechanisms which enables the provision of health services based on need and not the ability to pay for health services. Despite the existence of viable alternate health financing options, achieving a successful health care financing system in Nigeria continues to be a challenge. Nigeria's total health expenditure (THE) as a percentage of the gross domestic product (GDP) was 3.7% in 2014 which is well below the recommendation in the world health report of public health spending of about 6% of GDP which would limit out-of-pocket payments and therefore cause the incidence of catastrophic health expenditure to be negligible (World Bank, 2017).

In 2014, Public health expenditure (PHE) as a percentage of GDP accounted for 0.9% in 2014 when compared to private health expenditure which accounted for 74.9% of total health expenditure; the bulk of which was from out-of-pocket expenditure (World Bank, 2017). In Sub-Saharan Africa, the functional health insurance schemes cater to the formal sector who constitute a reduced proportion of the population (Shimeles, 2005) and so do not cover the informal sector predominantly made up of rural dwellers, low-income earners or small-scale business owners. Majority of these individuals are left to access health care through out of pocket expenditure, which in many instances limits the use of health care services (Shimeles, 2005). There is therefore a need for alternative health financing methods that include the direct involvement of communities so as to capture these vulnerable individuals (Carrin and Criel, 2003). In Nigeria, inability to pay out of pocket costs for health care services by many of the poor limits access to health care services. However the establishment of a community-based health insurance scheme targeted to overcome the barrier of health cost and increase access to health care has received limited acceptance and uptake among households in Nigeria (Carrin and Criel, 2003).

Community based health insurance (CBHI) has been advocated as an effective means of protecting the poor in Nigeria from the catastrophic burden of financing health services (Riman, 2012). CBHI is defined as health insurance in which individuals, families, or community groups finance or co-finance costs of health services (Adinma and Adinma, 2010) however the coverage of CBHI is quite low with schemes only existing in a few communities catering to less than 1% of the population (National Health Insurance Scheme (NHIS), 2011).

If implemented, CBHI has the potential to address the problem of inadequate funding of the health system. There have been several studies on health financing and CBHI; however few have offered an insight on the willingness to pay for CBHI and little is known about the

factors that influence the knowledge, perception and decisions to enrol in health insurance schemes. Also due to a lack of real world experience on community based health insurance among the population, willingness to pay (WTP) for health insurance by means of contingent valuation (CV) methods can be used to measure directly what individuals would be willing to pay for a hypothetical health insurance package (Asfaw et al., 2008).

In general, willingness to pay data are rarely collected or used as part of designing health insurance schemes in developing countries and this can cause low enrolment rates in CBHI schemes (Arkin-Tenkorang, 2001). In situations where high enrolment rates exist, there is a high drop-out rate due to lack of evidence on willingness to pay before take-off of these schemes (Brown and Churchill, 2000; Onwujekwe et al., 2009). Willingness to pay studies have the ability to provide information to facilitate the design and implementation of an insurance scheme. Assessing the demand for community based health insurance as a viable form of health care financing by households can provide important lessons and recommendations that would aid the design, implementation and uptake of this scheme which would invariably lead to increased access to quality health care in rural and urban areas in Lagos (Donfouet and Makaudze, 2011).

The aim of this study was to assess and compare the perception and willingness to pay for a proposed community based health insurance scheme among households in urban and rural LGAs in Lagos and provide recommendations of appropriate action towards advocating for the CBHI scheme in Lagos towards Universal Health coverage.

## MATERIALS AND METHODS

This comparative cross-sectional study was conducted in Lagos State, located in the South west region of Nigeria. Lagos State is divided into 20 Local Government Areas (LGAs) of which 16 comprise the urban LGAs and the remaining four LGAs (Badagry, Ikorodu, Ibeju-Lekki and Epe) are classified as rural LGAs. One Urban and rural LGA each was selected from each group by simple random sampling using the balloting method. The Local Government Areas (LGA) selected were Surulere and Ikorodu constituting an urban and rural LGA respectively. The study was conducted in the two different settings to assess geographical influence on household perception and willingness to pay for CBHI.

A multistage sampling technique was used to select the respondents. A total of 960 households were enrolled in the study with a minimum sample of 480 households drawn from each LGA. The heads of households or the most senior member of the household from the selected households was interviewed and included all persons aged eighteen or above and were permanent residents of study area.

A pre-tested, semi-structured, interviewer administered questionnaire was used to collect data from households. The questionnaire was adapted from the contingent valuation: a user's guide and from other published literature (Onwujekwe et al., 2010; Carson, 2000). The questionnaire was translated into Yoruba to suit the local language in the study area. A grading system based on the responses of the respondents from six statements was used to assess the perception of the respondents about CBHI with each of them having 3 options of high, medium or low. A bidding technique was used to elicit respondents' willingness to pay for the proposed CBHI scheme. The willingness to pay instrument used the contingent valuation method (CVM) to evaluate the WTP for CBHI amongst the households as previously used in many studies (Soyibo et al., 2009; The World Bank, 2013; Mays and Smith, 2011). The CVM questions are either open-ended or discrete (Soyibo et al., 2010). The respondents were asked to state their maximum WTP for the benefit in the open-ended CVM which is typically conducted using the so called "bidding game". The bid is conducted in a similar fashion to an auction, whereby a first bid is made to a respondent with the respondent either accepting or rejecting the bid. This answer leads to the bid being adjusted until the respondent's maximum WTP is reached. The questionnaire also included the valuation scenario; which is the most important part of the CV survey.

To ensure a valid study, the guidelines for the contingent valuation analysis were followed (Ichoku and Fonta, 2009). The scenario of a CBHI scheme was presented to the respondent, describing in detail the scheme, the criteria for membership, and the potential benefits. Thereafter they were asked whether they would be willing to pay for the proposed bid. The bids were three different amounts presented to the respondent in decreasing order. The start bid amount was chosen based on the amount that was used in the pilot schemes in Lagos state. The second and third bids were chosen and modified from that used in the literature (Donfouet and Makaudze, 2011).

The hypothetical CBHI was explained in details to the respondent including the benefit package, financing mechanisms and the terms of conditions before enquiring about their WTP. This was followed by asking each respondent if they were willing-to-join in the CBHI scheme individually or with their household. The bidding game was used to ascertain the premium each respondent would willingly pay for the hypothetical scheme for a household with a maximum of four children. The interviewer randomly set an amount as a starting bid and asked if the respondent was willing-to-pay. If the respondent agreed to pay this random fee, the interviewer would raise the bid and again question their willingness-to-pay. The interviewer would progressively raise the bid until the respondent expressed unwillingness-to-pay.

However, in the event that the respondent expressed unwillingness-to-pay the starting bid, the interviewer would lower the bid and repeat the enquiry continuing until a figure is reached (including zero) that the respondent was willing to pay. Ethical approval for this study was obtained from the ethics and research committee of the Lagos University Teaching Hospital. Informed written consent was taken from all the respondents, and confidentiality and anonymity were ensured.

Data entry and analysis was done using the Statistical Package for Social Sciences software (SPSS) version 17. Results were expressed with 95% confidence intervals and statistical significance was set at a p-value of ≤0.05 for all comparisons. A grading system based on the responses of the respondents was adopted to assess the perception of the respondents about CBHI. Comparison between the two groups was used to examine for geographic differences. Data were examined for links between key dependent variables with socio-economic status and geographic location of the respondents.

## RESULTS

Table 1 shows that in the overall sample of 960, respondents in the urban and the rural LGA were mostly

Table 1. Demographic characteristics of respondents.

| Variable | Frequency (%) | | $\chi^2$ | df | p-value |
| --- | --- | --- | --- | --- | --- |
| | Urban | Rural | | | |
| **Age (years)** | | | | | |
| 18-29 | 65(13.5) | 63(13.1) | 2.78 | 4 | 0.689 |
| 30-39 | 14(29.4) | 135(28.1) | | | |
| 40-49 | 149(31.0) | 142(29.6) | | | |
| 50-59 | 80(16.7) | 90(18.8) | | | |
| >60 | 45(9.4) | 50(10.4) | | | |
| Mean age | 43.17±13.37 | 47.22 ±11.31 | t=5.66 | | 0.809 |
| | | | | | |
| **Sex** | | | | | |
| Male | 321(66.9) | 349(72.5) | 3.87 | 1 | 0.049* |
| Female | 159 (33.1) | 131(27.3) | | | |
| | | | | | |
| **Marital status** | | | | | |
| Single | 30 (6.3) | 22 (4) | 12.34** | | 0.010* |
| Married | 393 (81.9) | 391 (81.5) | | | |
| Separated | 23 (4.8) | 20 (4.2) | | | |
| Divorced | 6 (1.3) | 0 (0) | | | |
| Widowed | 28 (5.8) | 47 (9.8) | | | |
| | | | | | |
| **Household size** | | | | | |
| 1-3 | 123(25.6) | 110 (22.9) | 4.24 | 2 | 0.120 |
| 4-6 | 255 (53.1) | 289 (60.2) | | | |
| >7 | 102 (21.3) | 81 (16.9) | | | |
| Mean household size | 4.8 ± 2.1 | 5.0±2.0 | t=1.82 | | 0.110 |
| | | | | | |
| **Estimated household income per month(₦)** | | | | | |
| <5000 | 23 (4.8) | 308 (64.2) | 44.42** | | <0.001* |
| 5000-10000 | 91 (19.0) | 87 (18.1) | | | |
| 10001-20000 | 116 (24.2) | 65 (13.5) | | | |
| 20001-30000 | 83 (17.3) | 15 (3.1) | | | |
| >30000 | 167 (34.8) | 5 (1.0) | | | |

**Fishers exact test.

within age range 40-49 years (31 and 29.6% respectively) with a mean age of 43.17+13.37 and 47.22±11.31 years respectively. A large proportion of the household heads in the two groups were males (66.9 and 72.5% in the urban and rural LGAs respectively). A large proportion of the respondents in the urban (81.9%) and in the rural (81.5%) were married and similarly majority of household heads in the urban (66%) and the rural (70.8%) were male There were within group differences but the distribution was similar in terms of demographic characteristics between households in the urban and rural LGA.

The respondents were divided in their perception of community based health insurance (Table 2). The rural households had a high perception of the potential ability of CBHI to make health care more affordable compared with urban households (48.8 vs. 40.0%). The perceived potential of CBHI to increase access to affordable health-care was medium among the urban households (47.3%) and rural households (54.4%). The perceived potential to improve household health consumption patterns was also medium among the urban households (45.6%) and the rural households (53.3%).

The perception of CBHIs potential to improve quality of health services given in health care institutions was medium in 51.0% of the urban and 49.6% of the rural households. There was also a medium perception of the potential of CBHI to ensure constant drug availability at

**Table 2.** Perception of community based health insurance among the respondents.

| Variable | Urban | Rural | $\chi^2$ | df | p–value |
|---|---|---|---|---|---|
| | Frequency (%) | | | | |
| **Perceived ability of CBHI to make health more affordable** | | | | | |
| Low | 75 (15.7) | 64 (13.4) | 18.49 | 3 | <0.001* |
| Medium | 210 (43.8) | 182 (37.9) | | | |
| High | 195 (40.6) | 234 (48.8) | | | |
| **Perceived potential of increasing access to affordable healthcare** | | | | | |
| Low | 87(18.1) | 53 (11.1) | 25.34 | 2 | <0.001* |
| Medium | 227 (47.3) | 261 (54.4) | | | |
| High | 166 (34.6) | 166 (34.6) | | | |
| **Perceived potential to improve household health seeking behaviour** | | | | | |
| Low | 82 (17.0) | 70 (14.6) | 12.53 | 2 | 0.002* |
| Medium | 219 (45.6) | 256 (53.3) | | | |
| High | 179 (37.3) | 154 (32.1) | | | |
| **Potential to improve quality of services provided by** | | | | | |
| Low | 69 (13.4) | 76 (15.8) | 20.18 | 2 | <0.001* |
| Medium | 245 (51.0) | 238 (49.6) | | | |
| High | 166 (34.6) | 166 (34.6) | | | |
| **Potential to ensure constant availability of drugs at facilities** | | | | | |
| Low | 89 (18.6) | 116 (24.2) | 21.13 | 2 | <0.001* |
| Medium | 209 (43.5) | 245 (51.0) | | | |
| High | 181 (37.7) | 119 (24.8) | | | |
| **Perceived confidence in committee managing pooled funds in community** | | | | | |
| Low | 228 (47.5) | 146 (30.4) | 42.49 | 2 | <0.001* |
| Medium | 146 (30.4) | 283 (59.0) | | | |
| High | 106 (22.1) | 51 (10.6) | | | |

**Fishers exact test.

facilities among the respondents in the urban (43.5%) and majority of the rural (51%) households. Majority of the respondents in the urban (47.5%) had a low perception of their funds being pooled and managed by community and a medium level of perception amongst the rural (59.0%). A higher proportion of the rural respondents (86.5%) were willing to pay for the hypothetical community based health insurance scheme compared to the urban (73.8%) respondents. (Table 3) The difference between the two groups was found to be statistically significant (p=<0.001).

Majority of respondents in the rural (84.6%) and the urban (91.3%) were willing to pay a starting bid monthly premium of ₦900 per household (Table 4). Of respondents who refused the first bid, an equal proportion among the rural and urban LGA respondents (100% each) also refused a second bid premium of ₦850 per month. At a third bid of ₦750, 19.4% in the urban and none of the respondents in the rural were willing to pay. This difference was not statistically significant between the two groups. Of those who declined the first, second and third bids in Table 5, the

**Table 3.** Respondents' willingness to pay for a hypothetical CBHI package for their household.

| Variable | Urban | Rural | $\chi^2$ | df | p-value |
| --- | --- | --- | --- | --- | --- |
| | Frequency (%) | | | | |
| Willing to pay for CBHI | 354 (73.8) | 415 (86.5) | 24.32 | 1 | <0.001* |
| Not willing to pay for CBHI | 126 (26.2) | 65 (13.5) | | | |

*p<0.05 = statistically significant.

**Table 4.** Respondents' willingness to bids (₦900, ₦850 and ₦750) as premium for their household in the proposed scheme.

| Variable | Urban | Rural | $\chi^2$ | df | p –value |
| --- | --- | --- | --- | --- | --- |
| | Frequency (%) | | | | |
| **WTP the starting bid of ₦900** | | | | | |
| Yes | 285 (84.6) | 373 (91.3) | 75.21 | 1 | <0.001* |
| No | 68 (15.4) | 42 (8.8) | | | |
| | | | | | |
| **WTP the second bid of ₦850** | | | | | |
| Yes | 0 (0) | 0 (0) | 0.407** | | 0.519 |
| No | 68 (100) | 42 (100) | | | |
| | | | | | |
| **WTP third bid of ₦750** | | | | | |
| Yes | 14 (19.4) | 0 (0) | 1.42** | 1 | 0.229 |
| No | 54 (80.6) | 42 (100) | | | |

*p<0.05 = statistically significant. **Fishers exact test.

average maximum amount respondents were willing to pay as monthly household premiums in the urban and rural households was ₦506.67±179.15 and ₦437.33±271.15, respectively. However the difference in the two groups was not statistically significant (Table 5). Majority of the rural respondents (66.7%) were willing to pay less than ₦250 in comparison to 39.3% of the urban while majority of the urban households (42.6%) were willing to pay a premium between ₦251 and ₦500 when compared to 22.2% of the rural respondents. This difference was statistically significant.

In Table 6, when asked how high a premium the respondent would be willing to pay in the event of inflation, a higher proportion of the respondents in the urban (57.7 %) and the rural (69.0 %) were willing to pay ₦501 – 1000. The mean amount reported by the respondents that they would pay while putting inflation into consideration was ₦975.56 ± 408.45 in the urban and ₦754.83±498.99 in the rural. The difference in the means was statistically significant (p=<0.001).

## DISCUSSION

From this study, data showed that majority of head of households in both settings were male which is common in most African household settings as the decision making in most settings is done by the men and is con-sistent with the Nigeria demographic and health survey 2013 (National Population Commission (NPC), 2013).

The mean household spend on health in the last quarter was ₦4832.35±1615.69 and ₦4234.17±1565.65 in the urban and rural areas which is approximately 17.9 and 43.3% of their household income respectively. This signifies catastrophic health expenditure among the rural households as a major proportion of the income (exceeding 40%) was spent on their health as indicated by the World Health Organisation's as catastrophic spending (Puteh and Almualm, 2017). Majority of the households in the urban (81.9%) and rural (91.3%) areas used cash as form of payment for their health care and they likewise coped with this out-of-pocket payments which is consistent with literature where about 90% of health expenditure in Nigeria is from out-of-pocket payments (Velenyi, 2005).

In this study, there was a low level of utilization of health insurance with only 4% in the urban and 2.5% in the rural utilising health insurance which is similar to the health insurance coverage in Niger at less than 5%, Stoermer et al. (2012) further affirming the paucity of health insurance mechanisms and high level of out-of-pocket spending in Nigeria. Perceptions' relating to

**Table 5.** Maximum amount respondents were willing to pay (those that refused the bids) for household.

| Variable | Urban | Rural | $x^2$ | df | p –value |
|---|---|---|---|---|---|
| | Frequency (%) | | | | |
| **Maximum amount willing to pay for households (₦)** | | | | | |
| 0 – 250 | 27 (39.3) | 26 (66.7) | 8.15** | | 0.012* |
| 251 – 500 | 31 (42.6) | 12 (22.2) | | | |
| 501 – 750 | 11 (18.0) | 4 (11.1) | | | |
| Mean + standard deviation | 510.00±107.24 | 420.85±254.92 | t=1.33 | | 0.187 |
| | | | | | |
| **Final maximum amount willing to pay for households (₦)** | | | | | |
| 0 – 200 | 23 (30.7) | 9 (38.9) | 10.05** | | 0.024* |
| 201 – 400 | 10 (13.3) | 24 (44.4) | | | |
| 401- 600 | 24 (32.0) | 8 (11.1) | | | |
| 601- 800 | 14 (18.7) | 1 (5.6) | | | |
| 801-1000 | 4 (5.3) | 0 (0) | | | |
| Mean + standard deviation | 506.67±179.15 | 437.33±271.15 | t=0.95 | | 0.354 |

**Fishers exact test.

**Table 6.** The premium all respondents were willing to pay for their household per month in case of inflation.

| Variable (₦) | Urban n=354 Freq (%) | Rural n=415 Freq (%) | $x^2$ | df | p –value |
|---|---|---|---|---|---|
| < 500 | 142 (29.6) | 49(10.2) | 64.80** | | 0.001* |
| 501 – 1000 | 277 (57.7) | 331 (69.0) | | | |
| 1001 -1500 | 54 (11.3) | 82 (17.1) | | | |
| 1501 – 2000 | 4 (0.8) | 15 (3.1) | | | |
| 2001 – 2500 | 1 (0.2) | 2 (0.4) | | | |
| 2501 – 3000 | 2 (0.4) | 1 (0.2) | | | |
| Mean ± standard deviation | 975.56±408.45 | 726.83±498.99 | t=8.37 | | <0.001* |

*p<0.05 = statistically significant. **Fishers exact test.

insurance schemes, scheme providers and the community attributes play a major role in household decisions to join or enrol and remain in the scheme.[36] In this study the respondents in both urban and rural local government areas had a good perception of the CBHI scheme.

Price including premium and registration fees and the benefits of the scheme are factors that are significantly associated with enrolment and retention in the scheme. In this study, 43.8% of the respondents in the urban and 48.8% in the rural areas perceived that CBHI had the ability to make healthcare more affordable for them. Studies have shown that enrolment decreases if the price of the premiums is perceived to be high (Jehu-Appiah et al., 2011).

Despite the potential of CBHI as a viable healthcare payment option, there were disparities in the premium that the respondents were willing to pay for the hypothetical scheme. About 73.8% of the urban households and 86.5% of rural households were willing to pay for community-based health insurance scheme. The high WTP rates in the rural area in this study is similar to what was found in north central Nigeria (Banwat et al., 2010) were the willingness to pay in a rural community was 93.6%. The higher WTP for the scheme in the rural areas may be as a result of lack of access to quality health care in their communities as compared to the urban centres thereby raising their interest in a programme that has the potential to improve their access to quality health services (Shitu, 2010).

In addition South West rural households are accustomed to having their money managed by financial groups and associations. In addition, stronger earning power in the urban setting may lead to low WTP thereby resulting in the belief that incidental health user fees

would be affordable. It is expected that urban households would have a higher willingness to pay for CBHI based on literacy and level of income however the reverse was the case.

Similar to this study, lower WTP was also reported in an urban community in south west Nigeria were the willingness to pay was 51.6% (Usman, 2013). However contrary low WTP in rural setting was found in a study conducted in Eastern Nigeria where it reported that less than 7% of rural households were willing to pay for CBHI, with higher WTP rates in urban households (Onwujekwe et al., 2010).

In this study considering the premiums that households were willing to pay monthly, the mean WTP among the rural household heads was found out to be ₦542.19±317.67 (3.4±1.98 USD) for individual enrolees per month and ₦754.83±498.99 (4.72±3.12 USD) per household per month while in the urban households it was found to be ₦555.23±221.01 (3.5±1.38 USD) per person per month and ₦957.56±408.45 (5.98±2.55 USD) per household per month. Similar WTP estimates were seen in Ilorin, Kwara where the researchers reported a mean amount each person would be willing to pay at ₦591.6 ± 302.6 (3.48±1.78 USD) per person per annum for CBHI in a community with an average household size (Babatunde et al., 2012). The mean amount that the respondents were willing to pay as a premium for individual and household enrolees was higher among the urban respondents.

Household heads in the urban (73.8%) and the rural (86.5%) were willing to pay for the proposed scheme. This shows the recognised value of the scheme and its potential to increase access to quality health services for households, without having to pay at the point of service. Hence, this scheme could be embraced in urban and rural areas of Lagos and has the potential to protect Lagos households from health risks.

## CONCLUSIONS AND RECOMMENDATION

This study demonstrates a high willingness to participate in the scheme hence the potential for community-based health care insurance schemes in Lagos. The lessons learned would provide a useful model to accelerate implementation of CBHI schemes in Lagos and would make future schemes more successful. The population would however require increased advocacy and campaign on the concept of alternative health financing options to sensitize households and communities on community-based health insurance and its advantage to individuals and families in Lagos. This would encourage their involvement in and uptake of the scheme. The Government can also lend technical support to the communities managing and running these schemes to strengthen their capacity.

## LIMITATIONS

This is a "willingness to pay" study with a hypothetical health care package and so may not reflect absolute reality. The introduction of the scheme in the study area will benefit from further studies to assess satisfaction and provide information on individual and household preferences.

## CONFLICT OF INTEREST

The authors have not declared any conflict of interests.

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*Full Length Research Paper*

# Superstitious knowledge of the phenomena of teeth eruption in rural area of Ferlo in Senegal

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**Teeth are physiological phenomenon that appears in child and who begins around 6 to 8 months after birth. The aim of this work was to study superstitious knowledge of the phenomena of teeth eruption in the mothers peulhs of Ferlo in Senegal. The research method was a descriptive and qualitative study; comprising questioning the mothers of children in the phase of active teeth eruption by structured, semi-structured interviews and focus groups. Information collected were related to the signs and symptoms of teeth, the superstitions associated with the dental age of eruption, the first type of tooth on the arcade, the rhizalyse and the practices of oral hygiene in the child. Data were analysed manually and presented in framed and of verbatims. From the findings, it is seen that fever, the diarrhoea, the vomiting and the dribbles constituted the principal signs. The native or neonatal tooth and the use of the stick rub-tooth to clean the teeth in the evening and the phenomenon of rhizalyse were related to superstitious interpretations. Programs of information and communication would make it possible to better sensitize the populations to optimize the good practices in the children in active phase of teeth eruption.**

**Key words:** Knowledge, superstitions, teeth, child, mother, Senegal.

## INTRODUCTION

Teeth are a physiological phenomenon which appears in the child and begins around 6 to 8 months after birth. It consists of arcade which expose them in the mouth. It is not expressed only on the oral cavity but on the organization in entirety. Moreover, the studies on the relation between the teeth and the general state of a child have lasted for more than 5000 years (Owais et al., 2010). The recent studies carried out in the world through Canada, Australia, the USA or Brazil show a narrow

association of some symptomatologies with the phase of teeth in the child (Hulland et al., 2000).In the study of Coreil (Harnet, 1978) 35% of the questioned pediatrists estimated that there exists an association between the diarrhoea and the eruption of the teeth.Nonetheless, these signs are understood and interpreted in different ways by the mothers.In the Western countries like France, the mothers have a certain illustration of teeth (Harnet,1978). In spite of the level of intellectual

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development, a good part of them cannot quote the whole of expressed clinical teeth but also made recourse to the therapeutic mixed one. The work of Owais (2010) eloquently proves it that nearly 75% of the participants wrongly allotted fever, diarrhoea and sleep disorders, to teeth. In Africa, this same report persists on the rare studies published (Okeigbemen, 2004; Yam et al., 2002). Diouf et al., exploring the sociocultural determinants and oral health in Ferlo at the 18 years old individuals and more, through a quantitative and qualitative approach, evoked an insufficiency of knowledge in keeping with oral health and the recourse of the populations to the tradipraticians for the assumption of responsibility of the health problems (Diouf et al., 2013). In the same order of idea, Dieye (2004) showed in a study of the syndrome of eruption of the temporary teeth in children of the commune of Saint Louis in Senegal, that 18 symptoms can be highlighted in the dental push in the child. He concluded, in addition, that the health workforces still were not often solicited in the treatment of the symptoms of the dental eruption. So in urban area, where the access to the care is supposed easier, this phenomenon of teeth is badly apprehended, it does not remain less in the campaigns, in rural environment; the problem can be more important. The aim of this work was to study superstitious knowledge of the phenomena of teeth eruption by the mothers in peulhs of Ferlo, Senegal.

## METHODOLOGY

### Type and scope of study

This was a qualitative study that took place in the Great Green Wall (GGW) area in the Ferlo, in eastern central Senegal in the locality of Widou. The Great Wall is a project that involves the integrated development of plant species and extends from Dakar to Djibouti. The Senegalese portion is 500km long with a wide band of fifteen kilometers (Pan-African Agency, 2010). The area of the Great Green Wall is composed mainly of Peulh populations with the main activities of nomadic breeding and trade. The choice of this environment is justified by the existence of environmental changes, anthropogenic actions, and a peulh population attached to its culture.

### Recruitment of participants

The individuals selected for the directive and semi-directive interviews were recruited and had to be mothers over the age of 18. Mothers had to have at least one child in temporary dentition and thus probably had the opportunity to know their child's teething experience. As for the mothers participating in the focus group, their choice was reasoned and based on experience; knowledge and level of responsibility within the family. For the interview, twenty people were listened to; considering that the level of saturation would be reached, that is to say that from this size the collected information would be repeated in other people. Two focus groups were organized according to age groups (18 to 35 and 36 years

and above) with six mothers of children under five years of age (active dentition period) per group.

### Collection procedure and variables

The information collected included signs and symptoms of dentition, superstitions associated with age of dental eruption, the first type of tooth on the arch, rhizalysis and oral hygiene habits in children. The collection of these data was done by a dentist assisted by a socio-anthropologist, both assisted by an interpreter speaking French and the local language. Prior to the actual survey, exchanges were organized for standardization and fidelity in the translation of the questions asked. This collection took place within ten days, from August 10 to 20, 2014. During this collection, in addition to the papers, pens and pencils used to record the questions and answers, a digital camera made it possible to film the sessions, to photograph some practices and record the speeches.

### Data analysis

The data was processed by the manual method of selecting, condensing, categorizing, and organizing the information using linguistic or numeric codes. The raw data has been broken down into verbatim or boxed notes. A triangulation of information from the interview and the focus group was carried out for their analysis.

### Ethical considerations

People were informed about the purpose and objectives of the study in order to obtain their free consent. A motivation and teaching session on hygiene and scaling was offered if necessary to the mother and her child at the end of the interview.

## RESULTS

The results summarize the information obtained after triangulation of three techniques of collection which were: structured interview, semi-structured interview and the focus group.

### Signs and symptoms of teeth

The dental eruption considered as a manifestation of the growth in the child, was known populations of Ferlo. Some signs and symptoms which accompany it were evoked. The majority of the mothers having taken part in the talks, mentioned fever, diarrhoea, vomiting and dribbles as principal signs. Certain mothers insisted on the term "reached of malaria" to summarize the symptoms. The "refusal to nurse itself" was also underlined among the signs for this period.

### Superstitions

At these populations, the baby tooth is the object of superstitions. Indeed, the children with native or neonatal teeth will be the wise ones, marabouts or "Borom

"A young girl of 7 has persistences of the 4 incisors mandibulaires and whose parents refused extraction. Her mother claimed that the teeth would fall by itself or she would remove it by hand after increased mobility".

**Figure 1.** Dental persistence.

xamxam" meaning scientists for certain mothers while others think "that they will be man-eaters if they are not dealt with on the mystical level". Still, certain people regarded the phenomenon as the return in of a deceased grandfather. Thus, the arcade where the dental eruption is carried out in first intention, of the sociological beliefs were made in the jawbone. For example, it is known as:

*"if a child makes his first eruption with the jawbone, it is necessary protected. Since it could be the object of target of the assemblers of trees (bad spirits), which will want to regard it as one as of theirs"*.

As regards the dental rhizalyse or "Fokh", it was not controlled perfectly by these populations. Many ideas or considerations were put in obviousness to explain this phenomenon: "replacement of teeth to the image of the generations of families, problem of resistance of the teeth compared to food hard to consume at adulthood, environmental problems and duration of life or expectancy". Moreover, no mother considered it necessary to bring her child for an extraction of baby tooth. They declared that the teeth fell naturally or it is themselves which "removed them with the hand when they are movable" (Figure 1).

Once the tooth is removed, most mothers preferred to throw it with special precautions. This mother of about thirty year reported that:

*"When a tooth of child is removed, one puts it in a piece of fabric. One adds to it some grains of millet which one will throw in the forest. These grains will push and give new, thus new tooth also will push instead of that fallen without difficulty".*

At the populations of Widou, some methods and

instruments were used to take care of the teeth of their children. Moreover some mothers who have infants tried to inculcate some oral hygiene education to them. They made recourse to the toothpick or stick rub-tooth, brushing, using charcoal or only water to clean the teeth. The stick rub-tooth remained by far the instrument used more in view of medicinal virtues that their grandfathers thought them. However, this stick was to be used only a day before to support the death of a relative. For certain mothers, it is the father and for others the mother (Figure 2).

**DISCUSSION**

The dental eruption called in popular speech "dental pushes" in the children is a subject of important concern for the parents. All the children pass, usually towards 6 months of age. The list of the signs and the symptoms allotted to the eruption of the first long teeth and is varied, vague and even complex. The history of the opening of the teeth is a good example of absurd conclusions which can result from a prescientific approach of the disease, as it exists still, with the theory of moods and homeopathy (Poncet, 2000). Philosophers of the past as Hippocrates allotted to the opening of the teeth a set of minor symptoms, like itchings of the gum or the diarrhoea. Several of these symptoms are always in the list of what the parents allot to the eruption of the teeth. Due to the bad knowledge of human physiology of the time, the infants were regarded as being extremely vulnerable to any disturbance of their nervous system and the most important consequences were allotted to the eruption of the new teeth, including death (Philippe, 2011). Furthermore, in the African popular belief, the "traditional scientists" allude to apocalyptic phenomena in

Toothpick

**Figure 2.** A 12 year old child with a toothpick stick.

the mouth of the child and whose consequences are felt as well as the local level at general. They add that if the mothers could apprehend the heaviness of the burden of the child for this period, they would be less enthusiastic to give birth to infants.

The physiological process recognizes that the tooth leaves while crossing the bone and the gum, often preceded by a small mass. There can occasionally be the eruption of a larger cyst, and the area can appear somewhat bluish and swollen during approximately a few days before the emergence of the tooth. The total process takes approximately 2 years, with an average tooth which appears each month until the 20 teeth of the child are present in mouth.

In this study, majority of the mothers points the fever, diarrhoea, vomiting and "refusal to nurse itself" as principal signs. Certain mothers insisted on the term "reached of paludism" to summarize the symptoms. According to the study of Wake et al. (1999), bearing the perception of the parents, salivation and mordillement were quoted by 77% of the families. The scientific work of Macknin et al. (2000) and Lloyd (1996) had described these signs and had even evoked a behavioral problem of the child who is often agitated. The baby tooth, although involving a behavioral disorder in the child at the time of his eruption, can be associated with superstitions when it is native or neonatal; according to whether it makes its eruption with the mandible or the jawbone. It appears that these superstitions can be at the origin of favour more than that of dental pathologies. The parents are apprehensive with regard to the children as one regarded either as scientists or as man-eaters. Yam (1990) found these evil interpretations in other ethnos groups of Senegal (Wolof, Sérère), where the newborn with teeth "will be excluded from the company".

For fear of curses, these children were even often killed in Africa (Baumgart et al., 2006). Among advantageous interpretations, one can quote the example of Alexandre the Large one, Louis XIV, Mirabeau in Occident and Africa de Sourou Migan Apithy (statesman dahoméen) (Yam, 1990).

However, these teeth are generally temporary, having made an early eruption; but they can also be supernumerary teeth, called teeth déciduales (Moulis et al., 2002). Their etiology remains often unknown. However, a surface position of the germ or a hereditary factor could be the cause. As regards the rhizalyse or physiological resorption of the roots commonly called "fokh", the mothers estimated that the teeth fell themselves and that one should not act even for an expert (modern or traditional) consultation (Figure 1). These multiple considerations could be explained by the lack of information, the anchoring and the integration of the natural laws in the daily practices instead of resorting to a consultation at the time of dental health problems. A former study in the zone had also mentioned a very low level of elimination of illiteracy in the population with children who had often left the school to the profit of pastures (Barro, 2014). Moreover, when the tooth falls by itself or removed by a relative, it will be cloth-lined with grains of millet and pier in the bush to allow the germination which should correspond to perfect eruption of the replacing tooth.

In Ferlo, certain equipment or instruments used for the hygiene of the mouth and the teeth was quoted. Indeed oral hygiene is defined like a set of practices, making it possible to eliminate the dental plaque which is formed naturally and permanently on the surface of the teeth. Even if the access to the brush with tooth and the cosmetic toothpastes is not very easy in rural area, most

mothers used the brush with traditional toothpaste or toothpick, called stick rub-tooth by hook (Bitte, 2010). Concurrently to this instrument, the charcoal and the water of drilling were also used especially at the evening to avoid the superstitious evil events such as the death of a relative. In 1965, Dupin noted that in a good amount of areas of Black Africa, the personal hygiene was respected, the care and the cleanliness of the mouth was also (Dupin, 1965). Beyond its cultural significance, its therapeutic or preventive virtues are well put in obviousness. Already in 1976, Schmid in USA evoked the effectiveness of the toothpick compared to the control of plate on the lingual or palatine faces of the teeth in comparison to the brush with tooth (Schmid et al., 1976). That means that the traditional methods, to a certain extent, constitute an important alternative for a satisfactory health buccodentaire of the populations.

## Conclusion

The knowledge of mothers on teeth in Ferlo is associated with superstitions. The native or neonatal tooth and the use of stick rub-tooth to clean the teeth in the evening were related to superstitious interpretations, in discredit of a good health buccodentaire. Programs of information and communication would make it possible to better sensitize the populations to optimize the good practices of children in teethp hase.

## CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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