Attitude of the rural population in Senegal to oral health

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Conflicts of interests:

The authors have no competing interests to declare.
ABSTRACT

Objective: The objective of the study was to evaluate the oral health of the rural population and to analyze their attitude to oral health.

Methods: We carried out a descriptive, cross-sectional and analytical survey on 2,254 people living in rural areas. Senegal has 14 similar regions in terms of the size of the rural population. In each region, 160 people were surveyed.

Results: The frequency of oral diseases is high, and fluoride toothpaste, which is inaccessible and unavailable, is often replaced by the chew stick. Dental services are located more than 50 kilometers from the homes of at least 52% of the population. Care is expensive for more than 75% of the population.

Conclusion: An oral health policy focused on rural areas is necessary with the integration of indicators such as the availability and accessibility of fluoride toothpaste, the creation of a minimum service package.

Keywords: Attitude, rural area, periodontal health
INTRODUCTION

Oral diseases are not necessarily life threatening, but they represent a serious public health problem because of their high prevalence, their seriousness, and the public demand for services due to their impact on the individual and on society. According to the WHO, at least 80% of the global population suffers from oral disease, 80% of who live in developing countries such as Africa [1]. These oral diseases are especially linked to unfavorable socioeconomic conditions in disadvantaged social groups. The fight against these diseases makes a significant contribution towards improving the quality of life of populations [2]. It follows a pyramidal organization in 3 levels: central, intermediary (regional) and operational. The 3rd level, operational, consists of health centers, posts and hubs [3]. The latter provide support for rural populations and lack oral health services, located mostly in national, regional and local health centers in urban areas. Thus Senegal has 27 hospitals, 105 health centers and 200 private clinics, all located in urban areas. Rural areas therefore lack oral health services despite the fact that more than half of the Senegalese population (60%) lives there [4]. The oral health services are situated far from the rural population, and the interventions are barely accessible to most communities due to constraints related to their socioeconomic situation. In this context, can we expect to improve oral health in these areas despite the investment in structures in urban areas?

The overall objective of the study was to evaluate the oral health of the rural population and to analyze the attitude of the rural population to their periodontal health.

The specific objectives were to evaluate periodontal health and to analyze the attitude of the rural population to oral health

METHODS

This was a descriptive, cross-sectional and analytical study on a rural population in Senegal. It took place over nine months from March 15 to December 15, 2012.

The size of the sample was calculated according to the Schwartz formula: 

\[ n = \frac{\varepsilon \alpha^2 pq}{i^2} \]
These parameters resulted in a sample of 384 individuals. For more accurate results, we increased the sample size to 400 individuals. To reduce the cluster effect for sex, the sample size was multiplied by 2.5 which gives 1,000 individuals and patient age was multiplied by 3.

In total, the sample size was increased to 2,200 people to reduce the cluster effect. To factor in the potential loss of files, we brought it to 2,254, which is the overall size of our sample.

Senegal has 14 similar regions in terms of the size of the rural population. This is the reason why 160 people were surveyed in each region, which results in a total of 2,254 people.

The study focused on adults of both sexes, aged 18 years or under and living in selected rural communities.

Any person visiting the locality and/or any person living in the locality aged less than 18 years was was excluded from the study.

Data collection was carried out by 3 teams, each made up of 2 dental surgeons and one final year student.

The questionnaire was administered directly.

To determine periodontal health, the Community Periodontal Index of Treatment Need (CPITN) was used. This classified the subjects examined into 5 categories of dental needs in a simple, objective and quick manner. The clinical criteria were the presence of pockets, tartar and bleeding (investigated by the gingival sulcus survey). In descending order of severity, the scores related to periodontal health were noted.

The information to collect concerned:

- Demographics: they concern sex, age and location;
- Periodontal health: this involves examining oral hygiene and periodontal problems which consisted of determining whether or not the gums were bleeding, the possible presence of tartar and the measurement of existing periodontal pockets;

- The attitudes of patients towards oral diseases consisted of collecting their reaction to an oral health problem: consultation with a traditional healer, self-medication, dental clinic attendance and use of preventive measures (toothbrush and chew stick).

Data analysis

The Epi Info version 3.4 software allowed us to make a census of the data. Word, Excel, SPSS software was used for data analysis and table presentations. The results were expressed as a number (n) and percentage (%) for qualitative variables and as a mean for quantitative variables. A comparison of percentages was carried out using the chi-squared test. The significance threshold was set at p<0.05. Two other tests which depend on the chi-squared test were used: Guildford’s Phi coefficient and Cramer’s V.

Phi measures the strength of the relationship between two variables. If Phi = 0: there is no relationship between the two variables, if Phi = 1 the relationship that exists is perfect. The stronger the relationship between the two variables, the closer Phi is to 1. Cramer’s V measures the strength of the relationship between any two qualitative variables. The more V tends towards 1, the stronger the relationship.

RESULTS

Descriptive results

Demographics

Distribution of patients according to sex
The study focused on a population of 2,254 patients, made up of 35.2% men and 64.8% women, with a sex ratio of 0.54.

**Distribution according to age**

The most represented age group was between 18 and 35 years with 51.2%, the 36-65 years group was 39.2% and the group aged over 65 year was 9.6%.

**Distribution according to profession**

The majority of the population (66.4%) was made up of farmers, 11% were middle managers and 22.6% worked in the informal sector.

**Distribution according to the distance between facilities and communities**

More than half of the population (52%) lives more than 50 kilometers from a dental facility.

**Periodontal health**

**Distribution according to periodontal health**

Only 3.2% had satisfactory periodontal health. Half of the population (49.6%) had deep periodontal pockets, however 12.8% had tartar and 2.4% bleeding gums.

**Attitudes and behavior of the population**

**Reaction to a periodontal problem**

Only 13.6% consulted with the dental surgeon in the event of an oral problem, 41.6% self-medicated, 24% called upon a traditional healer and 20.8% were waiting to recover.
Use of preventive measures

Brushing of teeth with toothpaste

More than half of the population (52.8%) had never brushed their teeth.

Use of a chew stick

92% of the population used the chew stick, 53.6% more than twice daily.

DISCUSSION

Study limitations

The remoteness of the sites investigated was a real problem and resulted in significant expenditure in terms of fuel, but also fatigue due to damaged tracks. In addition, the distance between the villages used up a lot of our time.

In the villages, during the day, the majority of men are preoccupied with farm work, fishing, breeding, which represents a bias in terms of the presence of men in our sample.

In addition, the translation of the questionnaire into the local languages caused a problem in terms of understanding the investigated variables.

Descriptive results

Demographics and Gender

Our study sample was made up of 64.8% women and 35.2% men, which gives a sex ratio of 0.54, different to that found in the Senegalese national statistics: 50.8% women and 49.2% men, according to the National Agency of Statistics and Demography.
However, our results are comparable to those found in rural India (47.8% men and 53.2% women) and those obtained in Senegal by Diène (62% women and 48% men), and Gueyé (66.8% women and 33.3% men) [5], [6]. The female predominance in rural areas is partly due to a deficit in investments and unfavorable socioeconomic conditions, which force African men to migrate towards towns in search of better living conditions. This rural exodus affects more men than women and is due to the poverty of rural households [7]. In Senegal, rural households represent 54.7% of the country’s total, with poverty affecting 57.5% of these households [8].

**Age**

The 18-35 years old age group is the most represented in our sample (51.2%). Yet, according to the National Agency of Statistics and Demography (ANSD), 45.5% of the population is made up of people aged between 18 and 65 years. However, people under 25 years represent 64% [9].

These results are supported by a study by Diène on the accessibility of oral care in the region of Thiès: 63% were aged between 18 and 35 years, but also by a study by Gueyé on the town of Fatick with 70% of patients aged between 18 and 38 years (Babacar, 2005), (Gueye, 1999).

Our sample is young reflecting the Senegalese population which, according to the ANSD, is made up of 52.8% of people aged between 15 and 64 years [10].

**Occupations**

More than 66% of the study population (66.4%) was farmers, including livestock farmers and fishermen. This percentage reflects the strong presence of farmers in rural areas with as many as 70-80% [11].
Distance from locality to facility

The localities are very far from dental facilities, unlike in urban areas where, according to Diène, 76% of the population lives less than 5 kilometers from dental services. Access to the latter includes not only the cost of care but also all the other expenses related to transport. The time spent availing of care is also reduced if we take all of these elements into account. These parameters reduce the use of oral health services thereby increasing the inaccessibility of care. Yet since 1978, a number of strategies have been suggested by the World Health Organization to promote oral health in Africa in disadvantaged rural areas [12].

Periodontal health

The prevalence of periodontal disease is high. Indeed, 96.5% has unsatisfactory periodontal health. Furthermore, close to half of the sample has a deep periodontal pocket. This high severity indicates the severity of the disease in rural areas. Periodontal disease has always been prevalent in Africa because, according to a study carried out by Franklin since 1978, it affects 45% of children, 75% of adults between 30 and 40 years and 95% over 40 years [13]. Thus, in rural Morocco, the Democratic Republic of the Congo, Botswana and Ghana, periodontal disease has a prevalence of 88.8%, 88%, 98% and 33% respectively, while in India the figures are between 95 to 100% [14]. Conversely, in Europe, deep periodontal pockets are less severe and represent 7% in British, 10% in Dutch, and 8% in Swedish people [15].

The high prevalence of periodontal disease in Africa is directly linked to poor oral hygiene, a lack of information on oral health, a lack of motivation on the part of patients and in particular a lack of qualified dental staff. The role of malnutrition as well as parasitic infections found in rural Africa also contributes to the development of periodontal pockets.
Attitude

Behavior of the population when faced with a periodontal problem

Only 13.6% of the population attends a dental facility in Senegal. Lo, found the same result (13%) in Cameroon [16]. This low percentage is partly linked to the distance from facilities and the cost of treatment. Among the segment of the population that does not attend a clinic, the percentage that self-medicates (41.6%) and those who visit traditional healers (24%) appears to be high. This results in a high prevalence of oral diseases and resistance related to the abuse and/or inappropriate use of medication such as antibiotics. This table shows that it is important not only to facilitate access to dental facilities but also to develop information, education and communication (IEC) strategies.

Use of preventive measures

In addition to the inaccessibility of toothpaste in rural areas, more than half of the population (52.8%) does not brush their teeth. This may be a major cause of the high prevalence of oral disease found in this study.

In Rwanda and the Ivory Coast, studies by Catussie et al. (1990) and by Yao et al. (2001) showed that the availability of preventive measures as well as their accessibility were the reasons for their high use and the improvement in the oral health of the population [17], [18]. Moreover, the percentage of the population who use a chew stick on a daily basis is very high. And yet oral diseases are still common. The opposite has been found in urban areas where, according to studies by Kane et al. (2000) only 1.3% uses this preventive measure [19]. It is therefore important to review the chew stick method of use within the population. Indeed, this preventive measure meets the requirements of brushing methods. It should be done after every
meal, from the gum to the tooth, followed by rinsing with water at the end. The stick is chewed at one end to emulsify the fibers. This type of brush is rubbed on the teeth and gums.

Epidemiological studies carried out in Rwanda and in Benin show a higher prevalence of periodontal disease in rural areas at 100% and 96.84%, respectively, despite the use of a chew stick [13], [20]. It is therefore important in Africa, not only to advocate the use of a chew stick in rural areas, but also to educate the population on its method of use so that this preventive measure, both available and accessible, can contribute towards improving oral hygiene.

**Analytical results**

**Availing of dental service and age**

The youngest group is 39% less likely to go to the dental clinic compared to the other age groups (Table 1). Young people attach less importance to their health than older people. Yet intercepting diseases in general and chronic diseases in particular should happen from infancy or in adulthood by preventing risk factors. A policy based on youth outreach and training will contribute towards improving the health of the elderly population.

**Distance between health facility and locality**

Distance is a key factor in seeking care (Table 3). People living more than 50 kilometers from facilities are 2.5 times less likely to avail of services compared to others (OR = 2.5). The study showed that the further the facility from the locality, the less the population avail of the facility.

As demonstrated in the results of Bilounga in Cameroon, 30.7% of the rural population does not avail of dental services because of their distance from them.
Relationship between use of preventive measures and oral health

In rural areas, the chew stick is the most used preventive measure and in a way replaces fluoride toothpaste. Indeed, the probability of not using a toothbrush is multiplied by 3 when a chew stick is used (OR = 3.14; SD (2.25 – 4.37) (Table 3)). The chew stick contributes to improving periodontal health because the study showed that the risk of unsatisfactory periodontal health is multiplied by 3 when this preventive measure is not used. This risk is also multiplied by 4 when teeth are not brushed with toothpaste. The latter is a protective factor in dental cavities (OR = 0.26 SD (0.15 – 0.45) (Table 4)).

Among those with satisfactory periodontal health, 43.3% do not brush their teeth. Similarly, for those who have unsatisfactory periodontal health, 39.2% do not brush their teeth. The fact that in the study we found people who brush their teeth and have unsatisfactory oral health (45.80%) shows that the mastery of the technique of brushing may be missing for some people. Similarly, the presence of people with satisfactory oral health (20%) among those who do not brush their teeth proves that brushing of teeth is not the only element to take into account in improving the oral health of the population. Other factors are at play such as genetics (individual susceptibility), lifestyle, environment [21]. Overall, the study showed those who used brushing methods had better oral health than the others (p < 0.01).

Reaction of patients in terms of oral health

Overall, patient reaction is motivated by oral disease. The patient responds primarily to unsatisfactory oral health (p<0.05). Thus, all patients who visit the dental clinic or the traditional healer present with a dental problem. We also found that when oral health is satisfactory, there is no use of the service (0.00%). Systematic visits are not developed in rural areas. Indeed, prevention is not the reason for availing of the service, which is mostly related to the presence of disease. Some authors showed that not only do patients only present when
they have an oral condition, but pain is the most significant reason for presenting [22], [23], [24].

CONCLUSIONS

The prevalence of periodontal disease is very high in rural areas. In Africa, the causes are mainly related to the distance between the locality and dental services, financial difficulties accessing care, the unavailability and inaccessibility of fluoride toothpaste.

To improve oral health in rural areas, efforts should be focused on the implementation of WHO strategies suggested for African countries, which are as follows:

- Primary dental health care,

- The Bamako initiative,

- The WHO’s African Regional Strategy,

- The WHO’s resolution in 2007.
REFERENCES


Analytical results

Table 1. Consultation in the dental clinic/age group

<table>
<thead>
<tr>
<th>Consultation in the dental clinic</th>
<th>Age group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>[18 to 35] years</td>
<td>[36 to 65] years</td>
</tr>
<tr>
<td>Yes</td>
<td>127</td>
<td>145</td>
</tr>
<tr>
<td>Total</td>
<td>1,154</td>
<td>884</td>
</tr>
</tbody>
</table>

Age group: Chi-squared = 14.25, p = 0.001

The 18 to 35 year olds have an odd ratio (visit a dental clinic) that is 0.61 times smaller than the other age groups, in other words the youngest group are 39% less likely to visit the dental clinic than the other age groups.
Table 2. Consultation in the dental clinic/distance between locality and dental clinic

<table>
<thead>
<tr>
<th>Patient who visits the dentist</th>
<th>Distance from dental clinic</th>
<th>Total</th>
<th>%</th>
<th>Distance from dental clinic</th>
<th>Total</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>- 50km</td>
<td>469</td>
<td>43.3%</td>
<td>- 50km</td>
<td>740</td>
<td>32.8%</td>
</tr>
<tr>
<td></td>
<td>+ 50km</td>
<td>271</td>
<td>23.1%</td>
<td>+ 50km</td>
<td>1,514</td>
<td>67.2%</td>
</tr>
<tr>
<td>no</td>
<td>- 50km</td>
<td>613</td>
<td>56.7%</td>
<td>- 50km</td>
<td>1,082</td>
<td>67.2%</td>
</tr>
<tr>
<td></td>
<td>+ 50km</td>
<td>901</td>
<td>76.9%</td>
<td>+ 50km</td>
<td>1,172</td>
<td>32.8%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>1,082</td>
<td>100.0%</td>
<td>Total</td>
<td>2,254</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Distance from locality to facility: Chi-squared = 104.54, p = 0.000, Phi = 0.21

The probability of not going to the dentist is 0.67 when it is more than 50 kilometers from home. Odds ratio for dental clinic distance (- 50km / + 50km) = 2.54 IC (2.1 – 3.0)
Table 3. Use of toothbrush/Use of chew stick

<table>
<thead>
<tr>
<th>Use of toothbrush</th>
<th>Use of chew stick</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>yes</td>
<td>yes</td>
<td>55</td>
</tr>
<tr>
<td>no</td>
<td>yes</td>
<td>127</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>1,189</td>
</tr>
<tr>
<td></td>
<td></td>
<td>883</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2,072</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,244</td>
</tr>
<tr>
<td></td>
<td></td>
<td>1,010</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2,254</td>
</tr>
</tbody>
</table>

Chi-squared = 50.24, p = 0.00, Phi = 0.14

Odds ratio for toothbrush use = 3.14  SD (2.25 – 4.37)

The probability of not using a toothbrush is multiplied by 3 when a chew stick is used.
### Table 4: Chew stick use/Periodontal health

<table>
<thead>
<tr>
<th>Chew stick</th>
<th>Satisfactory periodontal health</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>yes</td>
<td>163</td>
</tr>
<tr>
<td></td>
<td>no</td>
<td>1,999</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>2,162</td>
</tr>
</tbody>
</table>

Chi-squared = 18.34, P = 0.000, Phi = 0.09

Odd ratio for chew stick (0.1 or more) = 3.08         SD (1.79 – 5.29)

The risk of having poor periodontal health is three times greater when a chew stick is not used.