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Epidemiological, Clinical and Lifestyle Profile of Patients Diagnosed with Oral Cancer in Senegal

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Abstract: Oral cavity cancers (OCC) are malignant tumours that develop from tissues of buccal cavities. The objective of this study was to describe the epidemiological, clinical and lifestyle profile of patients diagnosed with OCC in Senegal. A multicentre cross-sectional study of 45 patients was conducted. Patients aged 18 years and older with histologically confirmed lesions of the oral cavity were included in the study. Data were collected on socio-demographic characteristics, clinical and para-clinical aspects, and lifestyle habits of the OCC patients. A survey directly administered to patients was used. Data entry was performed with Epi 7.2 software and descriptive analysis with Stata 17/IC. More than half (55.56%) of the patients were female. The average age was 53.09±16.80 years. The hospital university Aristide Le Dantec accounted for 55.56% of the study participants. More than 4/5 of the patients had come on their own to a consultation for an objective clinical symptomatology. The average size of lesions was 6.66±3.3 centimetres. More than 2/3 were diagnosed in the advanced stage. Less than 40% of patients had a diet rich in fruits and vegetables. Nearly 65% admitted to having oral sexual activity. The data from this study show that the profile of patients diagnosed with OCC is 50 years old, predominantly female, and not a consumer of known risk factors.

Keywords: Epidemiological Profile, Lifestyle, Cancer, Oral Cavity, Senegal

1. Introduction

Oral cavity cancers (OCC) are malignant neoplasms that develop in the tissues of the oral cavity [1] 6th most common malignancy in the world. Approximately 90% of cancers of the oral cavity are squamous cell carcinomas. The annual incidence is estimated to be around 275,000 worldwide and the mortality from these types of cancers is 128,000 deaths per year [2]. In Africa, 14,286 new cases were diagnosed in 2020 [3]. Early-stage OCC has a survival rate of 80% compared to advances stages (T3-T4), which show a rate of 20% to 30% in developed countries [4]. The incidence varies by geographical region, and more than half of cases occur in

developing countries [2]. However, over the past decade, there has been an increase in prevalence in younger and younger individuals [5]. In 2020, the estimated age-standardised rates of oral cavity cancer were 6.0 and 2.3 per 100,000 for males and females respectively [3].

In addition to tobacco and alcohol as traditional factors, diet, chronic irritation, human papillomavirus (HPV) infection and genetic factors have also been noted as risk factors [6]. In addition, there is a possible link with social inequalities, behavioural factors, and lifestyle of populations [7]. Many have shown an alarming lack of awareness of oral cavity cancers, their symptoms, and the importance of early diagnosis. In Africa, particularly in Senegal, OCCs remain unknown to the population and are not controlled by authorities due to the lack of obvious data, particularly the cancer register. The latter would have contained enough information to identify the risk factors for OCC in Senegal. In the literature, tobacco and alcohol consumption remain the main etiological factors of squamous cell carcinoma of the oral cavity [8] even though they are not widely consumed in our country [9]. However, in addition to a variety of suspected risk factors such as chronic irritation, viral infection, occupational exposure and nutrition, certain behaviours have been associated with the development of OCC [10]. The objective of this study was to describe the epidemiological, clinical lifestyle profile of patients diagnosed with OCC in Senegal.

2. Materials and Methods

2.1. Type and Setting of Study

This was descriptive and cross-sectional study of patients at the stomatology department of the Centre Hospitalier Universitaire Aristide Le Dantec, the ORL department of the Centre Hospitalier Universitaire National de Fann, the Odontology department of the Hopital General Idrissa Pouye in Grand Yoff and the ORL department of the Centre Hospitalier Regional El Hadji Amadou Sakhir Ndieguene in Thies.

2.2. Study Population and Selection Criteria

All patients with a histopathologically confirmed oral cancer lesion, consenting; aged 18 years and older were included in this study. Patients with cognitive problems, other severe chronic pathology or extra-oral cancer were excluded from this study. They also had to have cancer located in one of the anatomical sites of the oral cavity according to ICD-10 codes C01-C06, which corresponded to the base of the tongue, mobile tongue, gums, lips, floor of the mouth, hard and soft palate, cheeks, retros molar trigones and vestibules.

2.3. Sampling and Sample Size

The sample size determination was made following calculations of a case-control study where the patients in this study were the cases [11]. After calculation with the stata 17 software, considering a risk of 5% with a power of 80% and with reference to the STEPS 2015 survey in Senegal [9] a theoretical exposure to tobacco of 6% among the controls was considered. According to the WHO, tobacco is the main risk factor for oral cancers (Pare and Joly 217. A risk of 7.5 of having oral cancer when one is a smoker was set with reference to the South African wrk by Pacella [12]. Thus, the sample size was 45 cases and 90 controls, i.e., an allocation of 2 controls for 1 case.

Stratified random sampling was carried out. The 4 arranged recruitment centres each constituted a stratum. The share of the stratum was determined by proportional allocution. In fact, for the year 2019, the information collected reported that 267 cases were confirmed in all 4 study centres. The proportional distribution of these cases was 55.94% for HALD, 21.73% for CHNUF, 11.23% for HOGIP and 1.1% for CH EASNT. The allocution resulted in 25 cases in HALD, 1 case in CHNUF, 5 cases in HOGIP and 5 cases in CH EASNT. Within the strat, all individuals meeting the selection criteria were interviewed until the size set in the site was reached.

2.4. Survey Variables and Collection Procedures

2.4.1. Collection Sheet and Variables Studied

A survey from administered directly to the patients was used. Some information was completed from the medical records. The information collected concerned i) the socio-demographic characteristics of patients: age, sex, marital status, place of origin and distance from treatment centre, ethnicity, level of education, place of residence (urban, rural, outside Senegal), occupation (working, retired, unemployed, socio-economic level of health coverage (mutual insurance/insurance or no insurance; ii) information on the disease: place f diagnosis, reason for first consultation, systematic screening, presence of symptoms, size of tumour, presence of lymph nodes, presence of metastases, histological type and iii) lifestyle: smoking, alcohol consumption, hot tea or coffee, diet rich in fruit and vegetables, spicy diet, age of first sexual intercourse, number of partners and oral sex practice.

2.4.2. Collection Procedures

Before the surveys were conducted, correspondences were sent to the medical authorities of the selected centres to request authorisation. Before the questionnaire was administered, the objectives and importance of the survey had to be explained to the patients and their carers to obtain their consent through an information letter (see appendix). A pre-test was carried out to correct the questionnaire and validate it for implementation. All cases and controls meeting the selection criteria were collected in the selected facilities. It took place from December 10th 2020 to June 26th 2021.

2.5. Strategy for Analysing Survey Data

Data entry was carried out using Epi 7 version 7.2 software. Each theme addressed in the study variables was

studied with indicators. Each indicator was subject to a standard descriptive statistical analysis. STATA/IC 17.0/MAC software was used for univariate analysis.

2.6. Ethical Considerations

The protocol was previously submitted to and validated by the research ethics committee of Cheikh Anta Diop University with the reference CER/UCAD/AD/MSN/43/220.

3. Results

More than half (55.56%) of the patients were active, 28.89% unemployed and 13.33% retired. About marital status, less than 1/5th (17.78%) of the participants in the study were single compared to 68.89% who were married. The Fulani and Wolof were the most representative ethnic groups with 33.33% and 33.33% respectively. Regarding place of residence, 4.44% of patients came from outside Senegal, and 42.22% from rural areas. Only 20% of patients had health insurance or mutual health insurance. As for the socio-economic level, 64.44% of patients had a low socio-economic level ((<100,000 FCFA per month). Most patients were illiterate (37.78%) and those with a higher level were 6.67%. for the distance between the treatment centre and the origin of the patient, 11.11% came from an area less than 10km from the treatment centre and 44.44% of the patients travelled 100-1000km (Table 1).

The Aristide Le Dantec University Hospital (CHUALD) accounted for 55.56% of the participants in the study. Moe than 4/5th (82.22%) of the patients had come on their own to a consultation for an objective clinical symptomatology and 17.78% were referred to the structures. The average time to diagnosis was 64.89 days ±140 with extremes of 8 and 899 days the average lesion size was 6.66±3.3 centimetres with a range of 2-15 cm. more than 1 in 3 patients (35.56%) had adenopathy, with sub-mandibular location in 70% of cases. More than 2/3 (71.11%) were diagnosed as advanced stage even though no metastasis was found. Histologically, 66.67% were squamous cell carcinomas and 28.89% adenocarcinomas (Table 2).

It was found that 6.67% of the patients were alcoholics and 4.44% were smokers. Moe than 73% drank tea. Three out of five of them drank hot coffee every day. In term of nutrition, 37.78%had a diet rich in fruit and vegetables and 40% had a spicy diet. The average age at first sexual intercourse was 22,48 ±6,45 years with a minimum-maximum of 13-40 years. The average number of partners was1.67±1.16 with a minimum-maximum of 1-5 partners. Nearly 65% (64.29%) admitted to having practised oral sex. (Table 3).

Table 1. *Distribution of the study population by socio-demographic data.*

Variables	**Cases**	
	Modalities	**Numbers (%) /// Mean (SD) Min-max**
Gender	Female	25 (55.56)
	Male	20 (44.44)
Age		53,09 (±16.80) 18-83
Social Activity	Unemployed^{+}	13 (28.89)
	Active	25 (55.56)
	Retired	7 (13.33)
Ethnicity	Peulh	15 (33.33)
	Sérère	10 (22.22)
	Wolof	15 (33.33)
	Others**	5 (11.11)
Marital Status	Singles	8 (17.78)
	Married	31 (68.89)
	Others*	6 (13.33)
Residence	Outside Senegal	2 (4.44)
	Rural areas	19 (42.22)
	Urban environment	24 (53.33)
Health insurance	Mutual insurance/Insurance	9 (20)
	No insurance	36 (80)
Socio-economic level	Low <100,000 F CFA	29 (64.44)
	100000≤Medium<500000	16 (35.56)
	High≥ 500000 F CFA	0
Level of study	Illiterate	17 (37,78)
	Arabic	13 (28.89)
	Primary-High school	12 (26.67)
	College	3 (6,67)
Distance from the treatment centre	< To 10km	5 (11.11)
	Between 10 and 100km	19 (42.22)
	Between 100- 1000km	20 (44.44)
	More than 1000km	1 (2.22)

+Unemployed = unemployed + stay-at-home spouses + unspecified. **others: Diola, Bambara…
*Others= divorced + widows/widowers

Table 2. *Distribution of study cases by clinical and histological characteristics.*

Variables	Modalities/ Numbers	Numbers (%) / Mean (SD) Min-max
Structures	CHNU ALD	25 (55.56%)
	CHNU FANN	10 (22.22%)
	HOGIP	5 (11.11%)
	CHR EASNT	5 (11.11%)
Reason of consultation	Reference	8 (17.78)
	Symptomatology	37 (82.22)
Duration of diagnosis (days)	45	64.89 (140) 8-899
Tumour size (cm)	45	6.66 (3.30) 2-15
Ganglion	Yes	16 (35.56)
	No	29 (64.44)
Metastasis	M0	25 (55.56)
	MX	20 (44.44)
Status	Beginner	13 (28.89)
	Advanced	32 (71.11)
Histology	Squamous cell carcinoma	30 (66.67)
	Adenocarcinoma	13 (28.89)
	Others*	2 (4.44)
Differentiation	Poorly differentiated	1 (2.22)
	Well differentiated	8 (17.78)
	Not specified	80

*Cylindromes, adenoid carcinoma

Table 3. *Distribution of the study population according to lifestyles.*

Variables	Modalities / Numbers	Numbers (%) Mean (SD) Min-max
Tobacco	Yes	2 (4.44)
	No	43 (95.56)
Alcohol	Yes	2 (4.44)
	No	43 (95.56)
Tea	Yes	33 (73.33)
	No	12 (26.67)
Hot coffee	Yes	30 (66.67)
	No	15 (33.33)
A diet rich in fruits and vegetables	Yes	17 (37.78)
	No	28 (62.22)
Spicy food	Yes	18 (40)
	No	27 (60)
Age of first sexual intercourse	42	22.48 (6.5) 13-40
Number of partners	42	1.67 (1.16) 1-5
Oral sex practices	Yes	27 (64.29)
	No	15 (35.71)

4. Discussions

4.1. Socio-Demographic Characteristics

Several authors have reported certain socio-demographic characteristics as being associated with oral cancers. The mean age in the study sample was 53.09 ±16.80 years (Table 1). In Spain, a study by Ruiz & al. reported a mean age of 57±13.83 years for cases [13]. These results, which are like and superimposed on those of developed countries, confirm that OCC, most often, affects people in their fifties [14].

A predominance of females (55.56%) was noted in the sample, with a sex ratio of 0.8 male/female. This is close to the results of Dieng & al [15] who found 55.2% women and a sex ratio of 0.8. This female predominance could be attributed to the fact that women are more numerous than men in hospitals and that they are more concerned about their health. Genetic predisposition to cancers in women could also explain it, as shown by Dhanuthai & al [16] on the predisposition of women with mutations in certain carcinogenic genes. Monteil [17] also stated that in VADS cancers, many genetic alterations were identified mutations in the P53 tumour suppressor gene. Regarding occupation, 55.56% of the participants were active people. This result seems to be different from the studies already done in this sense in Morocco, in the private centres of Rabat [1] where most of the patients were unemployed or retired. Similarly, in a retrospective study carried out at the radiotherapy centre in Casablanca, more than 58% of the cancer patients were unemployed [18]. This observed difference may be due to the socio-economic realities of Senegal, which force the elderly to work to support their families, most of whom are destitute.

In terms of ethnicity, Fulani and Wolof were the most representative, 33.33% and 33.33%. in a study conducted in Mali by Diane [19]. the most representative ethnic group was the Bambara (32.9%) followed by the Soninke (17.1%). Also, a study in Northern Nigeria by Adebola & al found 86% Haoussa [20]. These studies have shown that, whether

in Senegal, Mali or Nigeria, the most representative ethnic group in the studies was the majority ethnic group of the population. In addition, there is a probable relationship between ethnicity and cancer [21].

In terms of marital status, 68.89% of the study population were married. This is consistent with Hamdoun's study [1]. It is possible that this predominance of married people is related to the human papilloma virus. Indeed, this virus is also a risk factor for oral cancers. About 18% of women in Dakar have the HPV [22]. In relation to their place of residence, those from rural areas represented 42.22% of the work force. The uneven distribution of health structures at the national level poses a problem of geographical accessibility. There is also a lack of specialised human resources for certain pathologies such as cancer. In addition, the population density in urban areas is 88 inhabitants/km² [23]. This would push rural populations to come to urban areas to access these structures, as Diane attests [19].

In terms of health coverage, only 2% of patients had health coverage. These trends are different from the work of Raymondo & al in Brazil [24] who noted 37.6%health coverage. This difference can be explained by the fact that the majority of Senegalese, even if they are active, work in the informal sector with very limited income. Also, illiteracy, which was 37.38% in this study, is a reason for not having health coverage.

The distance of residence from the treatment center also had a significant impact as most patients came from areas between 100-1000 km away, as corroborated by Berraho's work [25] The fact that the hospitals that were able to make a diagnosis were mostly located in Dakar (the country's capital) and that most patients lived outside the city, could explain the delay in diagnosis and treatment.

4.2. Information on the Disease

The participants were recruited from 4 centres, CHUALD with 36.67% of patients, CHUNF with 33.33% of patients, HOGIP with 13.33% of patients and CHREASNT with 16.67% of patients (table 2). In fact, these centres are the national reference centres for the management or oral cancers. It could be said that almost all the country's EPS3 are located in Dakar.

The most common reasons for consultation (82.22%) were pain, nasal discharge, swelling, ulcerative lesion and trismus. Referrals from the dentist or physician constituted 17.78% of the sample. Indeed, in developing countries, people got health facilities for most cases in the presence of symptomatology of functional discomfort. The clinical manifestations of oral cancers remain different and varied. This underlies the need for proven specialists.

The average tie to diagnosis was about 2 months (64.89±140 days). The poled estimate from the systematic review by Varela-Certelles & al. [26] with the shortest durations (21-22 days) noted in Europe. The small number of specialists in Senegal combined with the limited number of facilities would explain this difference.

The average size of the patients 'tumours was 6.66cm±3.3 ranging from 2 to 15 cm. more than 2/3 of them were in advanced stages. As previous work in Senegal has shown [15, 27-29] Most Senegalese people are slow to visit health facilities for reasons of financial, geographical, and cultural accessibility, resulting in late diagnosis and advanced stages.

The presence of lymph nodes was found in 35.56% of patients. These lymph nodes were located in the sub-mandibular, jugular-carotid, and sub-mental areas. Bousaadani & al. found several palpable lymph nodes in 51% of cases [30]. The multiplicity of adenopathies could be related to the size of the cancer. No metastases were found in the sample. The study by Haseeb & al showed that metastasis depends on the TNM classification of the tumour [31] Metastasis is often diagnosed after late management. Regarding pathology findings, 66.67% were squamous cell carcinomas and 28.89% were adenocarcinomas. Local and global studies concur with the findings. Dieng & al [15] diagnosed 98% of squamous cell carcinomas Dhanuthai & al [16], 80.5%, Diane [19] 55.7%, Leemans & al. [32] 95% and Paré & al [33]. 95%.

4.3. Lifestyle

Alcohol and tobacco intoxication is the traditional and classic etiological factor or oral cancers. Indeed, 4.44% of the patients were smokers and alcoholics (table 3). Our results are lower than those of Ndiaye & al [28] who had 10% of etiology related to alcohol and tobacco use. However, Dhanuthai & al. [16] had found that the most important risk factors were tobacco and alcohol, and their association is potentialized. The same was true of almost all the world literature which showed that main risk factors for oral cancers are tobacco and alcohol consumption [34-35]. To this end, Auperin and Hill [36] State that the best prevention against squamous cell carcinoma is to stop smoking and drinking alcohol. In Senegal, the search for risk factors should be pushed towards genetics and infections such as HPV.

Only 37.78% of the study sample had a high consumption of fruits and vegetables. In fact, their regular consumption would be a potential protective factor against oral cavity cancers as attested by Auperin and Hill [36]. In Mauritania, Baba & al. [37] support the idea by stating that it is important for members of families at risk to know that their vulnerability to oral cancers is reduced with a diet rich in raw fruit and vegetables. Indeed, it has been shown that vitamin deficiencies related to poor diet make every individual vulnerable, especially to avitaminoses A and C. Furthermore, the molecular mechanism of action by which dietary factors may influence the risk of oral cancers are not fully understood. However, the antioxidant power of dietary antioxidants maintains the integrity of the cell membrane and protects DNA from damage [38]. In Senegal, even if vegetables are consumed, they are overcooked and therefore all the vitamins are denatured. The consumption of fruits is not part of Senegalese habits [39].

The age of first sexual intercourse in the study population was found to be 23.39±6.21 years. In France, the median age at first sex has decreased from 18.8 years for men and 26 years for women in the 1950s to 17.2 and 17.6 years respectively in the 2000s [40]. Studies have previously associated an early age

of sexual debut with risky sexual behaviours, including more partners and inconsistent condom use, as well as greater tobacco and alcohol use. Thus, it is possible that this factor represents a marker f riskier sexual behaviour, rather than a biologically relevant etiological relationship [41].

The average number of partners was 1.71±1.21 with a minimum of 1 partner and maximum of 5 partners. These results seem to be reductive compared to the international literature. For example, Veluire & al. [40] stated that the number of partners in France was 11.8 to 11.6 for men and 18 to 4.4 for women, in the UK it is 12.7 and 6.5 for men and women respectively. Studies of sexual behaviour regularly find that men report more sexual partners than women: it turns out that to show their virility men exaggerate when it comes to reporting their number of partners and women with a gene tend to lower this figure. This difference could be explained by the fact that in Senegalese society, religious and cultural beliefs do not allow sexual vagrancy, especially among women.

Regarding the practice of oral sex, 56.67% of the patients admitted to practicing it. A high number of lifetime sexual partners is one of the main risk factors for HPV acquisition according to Baseman & al. [42]. They also found that having four or more lifetime oral sex partners increased the risk of cancers of the oropharynx and base of the tongue was associated with having two sexual partners, compared with one. Similar results have been reported previously [43]. Kreimer & al. [44] showed that recent oral sex with a same-sex partner and the number of sexual partners are associated with HPV in view of these results, only a laboratory blood test of cases and controls could elucidate the relationship between HPV and oral cancers.

4.4. Limitations and Methodological Considerations

The small sample size is a limitation in this study. However, it is the result of an adapted calculation of a case control study. The reasoned choice of targeting the only 4 oral cancer care centres, giving patients meeting the selection criteria of this study the same chance to participate, limited selection bias.

The main problem with the collection of exposure information in this study is related to its retrospective nature. This would lead to an overestimation of the information and therefore an overestimation of the association between exposure and the event of interest.

5. Conclusion

Cancers of the oral cavity fit into the more general framework of cancers of the upper aerodigestive tract, of which they often share the same epidemiological characteristics.

The data from this study shows that the profile of patients diagnosed with OCC is in their fifties, mostly female and non-consumer of known risk factors.

This difference in results compared to the world literature should lead to seeking explanations based on genetic and infectious factors (virus) but also on larger samples.

The evaluation of a faithful profile of cancers of the oral cavity cannot be carried out in the absence of national epidemiological data. Thus the establishment of an epidemiological-clinical register would be essential and would make it possible to report statistics on the incidence, mortality and survival.

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