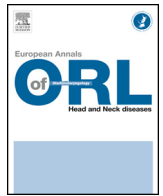




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Original article

Rhinologic signs associated with snuff taking

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ABSTRACT

Objective: To study rhinologic signs associated with nasal tobacco (snuff) intake in Parakou, northern Benin.

Materials and methods: A cross-sectional descriptive comparative study included 300 tobacco snuff takers and 300 subjects who did not use tobacco at all. The sampling technique was a stratified 4-stage random sample for non-users and a convenience non-random sample for snuff takers.

Results: The sex-ratio was 0.92 in non-users and 41.9 in snuff takers. Duration of snuff taking was more than 20 years in 24.3% of cases. The symptoms studied were significantly more frequent in snuff takers than non-users ($P < 0.05$). Snoring was reported by 58.3% of snuff takers, versus 5.7% of non-users ($P = 0.000$). Nasal obstruction and rhinorrhea were reported by respectively 26.3% and 22.7% of snuff takers, versus 6.3% and 5.3% of non-users ($P = 0.000$). Hyposmia was reported by 14% of snuff takers, versus 1.3% of non-users ($P = 0.000$). Anterior rhinoscopy found abnormalities in 81.7% of snuff takers, compared to 10.67% of non-users. Nasal hypertrichosis was more frequent in snuff takers than non-users: 40% versus 5% ($P = 0.000$).

Conclusion: Nasal intake of tobacco is responsible for morbidity in snuff takers compared to non-users of tobacco.

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1. Introduction

It is generally agreed that non-smoked tobacco intake in the form of snuff or of chewing tobacco has harmful health effects, even if less severe than those of smoking [1,2]. The morbidity and mortality associated with snuff taking worldwide are considerable [3]. The harmful effects vary geographically, according to snuff composition, which is regional [1]. Snuff was one of the earliest forms of tobacco use, but has become very rare [4,5], persisting mainly in Asia and Sub-Saharan Africa [6–8], although the number of consumers has been increasing recently in the USA [9]. In northern Benin, snuff taking is common, often for therapeutic reasons or for mystical protection. The present study sought to study the epidemiological characteristics and rhinologic signs associated with snuff taking as practiced in Parakou, northern Benin.

2. Methods

A transverse descriptive comparative study included adults aged ≥ 25 years, of any gender, living in Parakou, northern Benin. Requisite sample size was determined using Schwartz's formula: $n = k\varepsilon^2\alpha P(1-p)/i^2$, with n , sample size; k , cluster effect = 2; α = accepted error risk (5%); ε_α , deviation for corresponding α risk (1.96); i : precision (4%); $P = 6.8\%$ (known prevalence of snuff taking in the neighboring country of Nigeria [10]). This determined a sample size of 304; 2 groups of 300 were therefore constituted: 300 snuff takers, and 300 non-users. The former group were required to have been using snuff for at least 6 months, with no other tobacco use; non-users were volunteers not using tobacco at all. Non-users were selected by stratified 4-stage random sampling from 3 districts of Parakou (clusters); directions, from a departure point in a first housing block, were selected randomly by the pen-spinning method centered on the middle of the district; in each direction, every second housing block was visited, 1 in 4 households were selected, and every second eligible subject per household was interviewed. For snuff takers, places where they tended to meet were identified and users meeting the inclusion criteria were interviewed as convenient. Study data comprised sociodemographic variables (age, gender, ethnic group), reasons for snuff taking, duration of

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Table 1
Ethnic distribution of snuff takers and non-users in Parakou in 2012.

	Snuff takers n (%)	Non-users n (%)	<i>P</i> < 0.0001
Bariba	226 (75.3)	165 (55)	
Dendi	26 (8.7)	54 (18)	
Yoruba	29 (9.7)	42 (14)	
Fon	7 (2.3)	25 (8.3)	
Other	12 (4) ^a	14 (4.7) ^b	
Total	300 (100)	300 (100)	

n: number.

^a Somba (*n* = 4), Yom (*n* = 4), Wama (*n* = 2), Peuhl (*n* = 2).

^b Peuhl (*n* = 4), Yom (*n* = 3), Wama (*n* = 3), Somba (*n* = 2), Kabyè (*n* = 2).

snuff-taking habit, type of snuff taken, and clinical examination results. Survey data were collected by direct interview using a questionnaire, followed by anterior rhinoscopy, entered in the Epi data 3.1.fr application, and analyzed on Epi info 7.2 software. Quantitative variables were reported as mean and standard deviation, and qualitative variables as proportions. Means were compared on Student test, and proportions on Chi² or Fisher exact test. The significance threshold was set at 5%.

3. Results

3.1. Frequency of snuff taking

District interviews revealed that 2 in 20 (10%) of the inhabitants were snuff takers.

3.2. Age and gender

Mean age was 45.94 ± 16.92 years (range, 25–92 years) in snuff takers, and 41.45 ± 15.61 years (range, 25–90 years) in non-users, with no significant difference (*P* = 0.9996). The sex-ratio was 0.92 in non-users and 41.9 in snuff takers.

3.3. Ethnicity

75.3% of snuff takers belonged to the Bariba ethnic group (Table 1).

3.4. Reasons for snuff taking

47 individuals (15.7%) took snuff for pleasure; the other 253 (84.3%) took it as traditional medicine or for mystical protection.

3.5. Type of snuff

45 persons sniffed pure tobacco (15%); 238 (79.3%) blended the tobacco with an unspecified plant or animal substance; the other 17 (5.7%) had no preference.

3.6. Duration of snuff taking

227 snuff takers (75.7%) had been taking snuff for less than 20 years, and the other 73 (24.3%) for more than 20 years, with a maximum of 62 years.

3.7. Clinical signs

Snoring was reported by 175 snuff takers (58.3%), versus 17 non-users (5.7%) (*P* = 0.0000) (Table 2).

Anterior rhinoscopy detected abnormalities in 81.7% of snuff takers, versus 10.7% of non-users. Rhinorrhea was observed in 12.3% of snuff takers, and was systematically bilateral and watery (Table 3).

Table 2
Distribution of signs on interview in snuff takers and non-users in Parakou in 2012.

	Snuff takers n (%)	Non-users n (%)	<i>P</i>
Nasal obstruction	79 (26.3)	19 (6.3)	0.0000
Snoring	175 (58.3)	17 (5.7)	0.0000
Chronic rhinorrhea	68 (22.7)	16 (5.3)	0.0000
Hyposmia	42 (14)	4 (1.3)	0.0000

n: number.

Table 3
Distribution of signs on anterior rhinoscopy in snuff takers and non-users in Parakou in 2012.

	Snuff takers n (%)	Non-users n (%)	<i>P</i>
Inferior turbinate hypertrophy	154 (51.3)	10 (3.7)	0.0000
Nasal hypertrichosis	120 (40)	15 (5.0)	0.0000
Rhinorrhea	37 (12.3)	6 (2.0)	< 0.0001
Mucosal hyperpigmentation	18 (6.0)	0 (0.0)	< 0.0001

n: number.

There were no tumors or suspected malignancies on rhinoscopy.

3.8. Diagnosis

Chronic rhinitis was diagnosed in 227 snuff takers (75.7%), versus 20 non-users (6.7%).

4. Discussion

Snuff taking persists in only a few, mainly developing countries, although there is also renewed interest in the context of the fight against smoking [9,11,12]. Sreedharan reported that snuff taking is widespread in India, with a mean consumption of 1.1–1.2 kg per consumer per year [13]. According to Narake and Gupta, however, incompatibility with a modern lifestyle has reduced the rate of snuff taking to a point where it is no longer a public health issue [14]. With 1 snuff taker for every 10 non-users, the habit is relatively frequent in Parakou in northern Benin. In neighboring Nigeria, a prevalence of 6.8% was reported for 2010 in the north-east of the country [10]. A South African study in 1998 reported prevalence of around 6.7% for smokeless use of tobacco, 80% of which was nasal intake [15]. According to another South African study, snuff takers are predominantly female: 12% versus 3% [16]. India likewise shows female predominance [14]. In Parakou, in contrast, predominance was overwhelmingly male, with a sex-ratio of 41.9. In South Africa, snuff was used by traditional healers in their rituals, and some prescribed it for their patients [17]. In Benin, men used it mainly for treatment and mystical protection. They were members of the Bariba ethnic group, in a significantly higher proportion than that of Bariba in the general non-user population; other ethnic groups were less represented among snuff takers than among non-users (*P* = 0.000). The Bariba are the dominant ethnic group in northern Benin, and are notorious snuff takers.

There have been few scientific studies of the clinical impact of snuff taking, partly due to the relatively small number of users [4]. Snoring was frequently reported by snuff takers: 58.3%, versus 5.7% of non-users in Parakou, which is a significant difference. It may be caused by nasal respiratory mucosa edema induced by the tobacco, narrowing the nasal cavity. 51% of the present snuff takers showed inferior turbinate hypertrophy. In India, Sreedharan et al. reported edema of the turbinate and nasal septum mucosa in 70.1% of snuff takers on nasal endoscopy and in 62.5% of snuff takers who agreed to histologic examination of their nasal mucosa [13]. The main complaint of the Indian snuff takers, in 62.5% of cases, was rhinorrhea with nasal obstruction. In Parakou, 26.3% of snuff takers reported nasal obstruction and 22.7% rhinorrhea. According to

Sreedharan et al. [13], heavy nasal secretion in snuff takers may be due to mechanical nasal obstruction caused by mucosal edema or to reduced mucociliary clearance induced by the tobacco: when the nasal mucosa encounters tobacco, it thickens and secretes excess mucus, paralyzing or destroying ciliary vibration [18]. Hyposmia was more frequent in snuff takers than in non-users in the present study ($P=0.022$). According to Pierre Bonfils, most epidemiological studies report an association between tobacco use and olfactory impairment; exposure to toxic tobacco molecules injures the olfactory neuroepithelium, inducing metaplasia toward a respiratory-type epithelium [19]. Nasal hypertrichosis was likewise more frequent in snuff takers than in non-users: 40% versus 5% ($P=0.0000$). This quantitative increase in nasal hair, defending the respiratory pathways by creating a barrier against dust and foreign bodies, may be mediated by pilosebaceous gland proliferation due to frequent nasal aggression. Most of the present snuff takers showed chronic rhinitis. According to Sreedharan et al. [13], snuff taking in the long term induces a form of chronic rhinitis due to allergic reaction to snuff ingredients and to the development of a kind of drug-related rhinitis caused by the vasoconstrictors contained in tobacco.

There were no tumors in the present series. In 2007, Sreedharan reported a case of malignant nasal vestibule tumor in a woman who had been taking snuff for 30 years, which he believed was the only case of cancer induced by snuff taking to be reported in 2 centuries [20]. In 2011, a case of columellar cancer was reported in a female patient with 16 years' history of snuff taking in Turkey [21]. Numerous human carcinogens have been identified in smokeless tobacco products [22,23]. However, the occasional reports cannot support a formal association between snuff taking and nasal cancer, unlike in the well-established case of chewing tobacco and oral cancer [24,25].

5. Conclusion

Snuff taking as practiced in Parakou is certainly responsible for morbidity in users compared to non-users. No serious pathologies were found, but oncologic risk cannot be excluded and further studies are needed before recommending snuff as a substitution strategy in the fight against smoking.

Disclosure of interest

The authors declare that they have no competing interest.

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