

Shisha Consumption in Cotonou: Epidemiological Profile, Sanitary Consequences and Associated Factors

Aguemon Badirou^{1,*}, Adouknpè Ferdinand², Damien Barikissou Georgia³, Elegbede Fidélia O¹, Awédé Bonaventure⁴

¹Public Health Unit, Faculty of Health Sciences, University of Abomey-Calavi, Republic of Benin

²National Laboratory of Narcotics and Toxicology, Faculty of Health Sciences, Republic of Benin

³Population and Health Department, Center for Training and Research in Population, University of Abomey-Calavi, Cotonou, Republic of Benin

⁴Human Physiology Unit, Faculty of Health Sciences, Republic of Benin

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Abstract Introduction: Consumption of shisha is an increasingly popular form of smoking among young people around the world. This study aimed to determine the epidemiological profile of shisha consumers in Cotonou as well as socio-demographic associated factors with this practice. **Methods:** A cross-sectional survey was conducted in Cotonou from May to November 2020 among shisha consumers. The sample size was 427. Non-probability convenience sampling with exhaustive selection of all consumers willing to participate in the study was performed. A questionnaire and an interview guide were administered to active and passive consumers respectively. A few samples of substances consumed by means of the shisha were collected and then analysed by Thin Layer Chromatography (TLC). **Results:** The mean age of the respondents was 22.38 years \pm 6.40. The sex ratio (Male/Female) was 9.6. 55.3% of those surveyed began to use shisha between the ages of 15 and 25. They were mostly students (59.5%) with a low monthly income. Up to 70% of respondents have already sought medical assistance for symptoms like cough (36.84%), chest pain (32.33%), sore throat (27.83%), and abdominal burns ((3.0%). About 28% of respondents claim to become nervous after consumption. Substances such as tobacco (35%), cannabis alone (24%), cannabis/marijuana (18%), cocaine (16%), and alcohol (7%) have been identified in

the products consumed. **Conclusion:** This investigation highlighted consumption of illicit drugs with shisha and the negative socio-health impacts linked to the consumption of shisha. The drug regulatory authorities should improve the control of shisha consumption in Benin especially among adolescents and youth.

Keywords Shisha, Chromatography, Illicit Drugs, Attributable Symptoms, Cotonou

1. Introduction

Tobacco use is a major public health problem. According to a World Health Organisation (WHO) estimate for 2019, approximately 1.1 billion people worldwide smoke [1]. Nearly 5 million people die each year worldwide due to diseases caused by tobacco use [2]. Tobacco is consumed mainly in smoked and smokeless forms. Shisha is one form of smoking tobacco. Shisha consumption reaches about 100 million people in secondary schools [3]. The use of shisha has increased significantly over the last decade, mainly due to its improved taste, lack of regulations and social acceptability as a safer option than cigarettes. There are many toxicity

concerns associated with its use. In Africa, specifically in Benin, the prevalence of shisha was 13.86% among students in 2018 [4]. In order to better understand the factors associated with this consumption and to know the profile of shisha consumers and related consequences, we conducted a survey in the city of Cotonou at shisha consumption places. This study aimed to determine the epidemiological profile of shisha consumers in Cotonou as well as socio-demographic associated factors with this practice.

2. Study Area and Methods

2.1. Study Area

The survey was carried out in the 13 districts of the city of Cotonou (in restaurants and shisha bars and other specific places of consumption) and at the National Laboratory of Narcotics and Toxicology where psychoactive substances detection was done.

2.2. Methods

Type and period of study

A cross-sectional survey was conducted from July to October 2020.

Study population

The study population was consumers of chichia. The selection criteria were: i) have consumed shisha at least once in their life, ii) aged 10 years old or more and iii) be visited in restaurants, and shisha bars or others places of chichi consumption.

Sampling and sample size

It was a non-probability sampling. The exhaustive selection of all active and passive users willing to participate in the study was done. The sample size was based on the number of respondents.

Data collection: tools and technique

A semi-directive validated questionnaire was used to collect the information. Samples of the substances consumed as well as the consumption tools were collected for analysis in the laboratory. Before data collection a pre-test of the questionnaire and laboratory technics was done.

Variables

The dependent variable was the notion of recent or former shisha use and the independent variables were socio-demographic information, data on knowledge, attitudes, and practices about shisha, psycho-social and health characteristics.

Data processing and analysis

The data were analysed using Epi-info version 7.2.2.6. Socio-demographic characteristics and the prevalence of shisha consumption was described. For the bivariate analysis, the link between shisha consumption and socio-demographic variables was tested. For this purpose, Pearson's χ^2 test was used at the threshold of α equal to 5%. The substances collected was analysed at National laboratory of drugs and toxicology. Thin Layer Chromatography (TLC) analysis of the sampled substances was performed for their identification.

3. Results

Socio-demographic Characteristics

A total of 427 people were enrolled in the study. The mean age was 22.38 ± 6.40 years. The extremes were 10 years and 45 years. In our series, the respondents were predominantly male with a sex ratio of 9.6. The most represented professional category was students (59.5%). Most of the respondents were Beninese (90.6%). They were mostly single (63.9%). Most of the subjects had a low monthly income, less than or equal to 40,000 XOF (Table I). With regard to the age at which they started using drugs, 35.6% of the users started at less than 15 years, 55.27% between 15 and 25 years and only 9.13% after 25 years.

Knowledge of the Chemical Composition of Shisha

Among the respondents, 313 (73.3%) have a good knowledge of the content of the substances that make up shisha. The association of stimulants and disruptors were the contents most mentioned (50.8%), followed by disruptors only (28.4%). Table 2 shows the respondents' perceptions on the nature of the different classes of psychoactive substances which composed shisha.

Table 1. Socio-demographic characteristics of respondents, Cotonou, 2020

Variables	Frequency (n)	Proportion (%)
Age (years)		
10-24	298	69.8
25-34	109	25.5
≥ 35	20	4.7
Sex		
Male	387	90.6
Female	40	9.4
Profession		
Student	254	59.5
Civil servant (public and private)	69	16.2
Craftsman and Trader	104	24.4
Nationality		
Beninese	387	90.6
Others	40	9.4
Ethnicity		
Yoruba/Nago	103	24.1
Dendi/Bariba	78	18.3
Fon and related parties	246	57.6
Religion		
Muslims	160	37.5
Christian	231	54.1
Others	36	8.4
Marital status		
Single	273	63.9
Married or partnered	145	34.0
Divorced or separated	8	1.9
Widowed	1	0.2
Type of household		
Monogamous	199	46.6
Polygamous	228	53.4
Size of Household		
≤3	207	48.5
>3	220	51.5
Monthly income (XOF)		
<20,000	130	30.4
20,000–40,000	136	31.9
>40,000	161	37.7

Table 2. Psychoactive substances present in shisha according to respondents, Cotonou, 2020.

Psychoactive substances	Participants perception	
	Yes n (%)	No n (%)
Stimulants		
Tea	37 (8.7)	390 (91.3)
Coffee	50 (11.7)	377 (88.3)
Amphetamine	16 (3.7)	411 (96.3)
Cocaine	145 (34)	282 (66.0)
Disruptors		
Tobacco	169 (39.6)	258 (60.4)
Alcohol	167 (39.1)	260 (60.9)
Cannabis	52 (12.2)	375 (87.8)
Depressants		
Heroin	15 (3.5)	412 (96.5)
Morphine	11 (2.6)	416 (97.4)
Tramadol	34 (8.0)	393 (92.0)

Shisha Composition and Sites of Consumption

According to the respondents, the psychoactive substances consumed through shisha were most related to a mixed composition of shisha by added tobacco (35%), cannabis alone (24%), alcohol (7%), cannabis/marijuana (18%) and cocaine (16%). The frequent places where shisha was consumed were shisha bars and nightclubs (51.1%) as well as gaming centres or friends' homes (42.4%), at home (5.4%), and in the car (1.2%).

Harmful Effects Attributed to Shisha Consumption

About 70% of the respondents presented symptoms that required a medical consultation after shisha consumption. They attributed these symptoms to shisha consumption. The symptoms were sore throat (27.83%), chest pain (32.33%), cough (36.84%) and abdominal burning (3.0%).

Practices on Shisha Consumption and Places of Purchase

The age range of initiation to shisha consumption among the respondents was between 15 and 25 years.

Moreover, 35.60% of the respondents were initiated to shisha consumption at a very young age (under 15). The majority of participants reported that they regularly use shisha (58.3%), the most of them with friends (83.1%), and preferably in the evening (84.3%). Shisha is sold either in shisha bars or in oriental shops. The majority of participants were aware of the health risks associated with shisha consumption (75.2%), (Table 3).

Negative Perception and Sanitary Consequences Linked to Shisha Consumption

Among the participants to the study, 53% perceived that Shisha was more dangerous than smoking and 48.7% declared that they can stop using shisha if necessary.

Of the respondents, 60% think that the shisha consumption can lead to lung, mouth and throat cancers and 24% the lung infection. 70% of the participants declared that they presented symptoms which need medical visits after shisha consumption. The main symptoms they cited were cough (37%); thoracic pain (32%); throat pains (28%), and abdominal burns (3%).

Table 3. Practices of shisha consumption, Cotonou, 2020

Variables	Frequency (n)	Proportion (%)
Mode of operation		
Alone	41	9,6
With family	31	7,3
Friends	355	83,1
Rate of consumption		
Regularly (Weekly)	249	58,3
Occasionally	131	30,7
Rarely	47	11,0
Time of consumption		
Morning	11	2,6
Afternoon	56	13,1
Evening	360	84,3
Place of sale		
Shisha bar	232	54,3
Oriental shops	195	45,7
Favourable appreciation		
Smoke (taste, smell, sweetness)	288	67,4
Aesthetics of the machine	17	4,0
Pleasure of sharing in a group	32	7,5
Follow-up a group	22	5,2
Smoking and aesthetics of the machine	33	7,7
Smoking and group sharing	35	8,2
Unfavourable appreciation		
Any comments	13	3,0
Cold smoke	33	7,7
Bulky size of the machine	60	14,1
Negative impact on health	321	75,2
Reason of consumption		
Pleasure/Distracted/Boredom	347	81,3
Family and work problems	49	11,7
Lack of appetite/Staying awake	31	7,2

Factors Associated with Shisha Consumption

Factors statistically associated with shisha consumption were age, gender, occupation, period of shisha consumption, pleasure and displeasure parameters (Table 4a and 4b).

Table 4a. Factors associated to shisha consumption, Cotonou, 2020.

Variables	Shisha consumption		P
	Recent n (%)	Previous n (%)	
Sex			
Female	25 (13.8)	15 (6.1)	0.007
Male	156 (86.2)	231 (93.9)	
Age (years)			
10-24	143 (79.0)	155 (63.0)	0.002
25-34	32 (17.7)	77 (31.3)	
≥ 35	6 (3.3)	14 (5.7)	
Profession			
Student	129 (71.3)	125 (50.8)	<0.0001
Civil servant (public and private)	21 (11.6)	48 (19.5)	
Craftsman and Trader	31 (17.1)	73 (29.7)	
Type of household			
Monogamous	89 (49.2)	110 (44.7)	0.362
Polygamous	92 (50.8)	136 (55.3)	
Size of household			
≤3	90 (49.7)	117 (47.6)	0.659
>3	91 (50.3)	129 (52.4)	
Monthly income (XOF)			
<20,000	60 (33.1)	70 (28.5)	0.746
20,000–40,000	57 (31.5)	79 (32.1)	
>40,000	64 (35.4)	97 (39.4)	
Time of consumption			
Morning	11	2,6	0.006
Afternoon	56	13,1	
Evening	360	84,3	

Table 4b. Factors associated to shisha consumption, Cotonou, 2020.

Variables	Shisha consumption		P
	Recent n (%)	Previous n (%)	
Favourable appreciation			
Smoke (taste, smell, sweetness)	138 (76.2)	150 (61.0)	0.012
Aesthetics of the machine	4 (2.2)	13 (5.3)	
Pleasure of sharing in a group	14 (7.7)	18 (7.3)	
Follow-up a group	5 (2.8)	17 (6.9)	
Smoking and aesthetics of the machine	11 (6.1)	22 (8.9)	
Smoking and group sharing	9 (5.0)	26 (10.6)	
Reason of consumption			
Pleasure/Distracted/Boredom	152 (84.0)	195 (79.3)	0.667
Family/work problems	18 (9.9)	31 (12.6)	
Lack of appetite/Staying awake	11 (6.1)	20 (8.2)	
Unfavourable appreciation			
Any comments	0 (0)	13 (5.3)	0.001
Cold smoke	8 (4.4)	25 (10.2)	
Bulky size of the machine	26 (14.4)	34 (13.8)	
Negative impact on health	147 (81.2)	174 (70.7)	

Chromatographic Analysis of Collected Products

The different product samples collected from consumers and analysed by chromatography allowed the identification of the following psychoactive substances: cannabis, heroin, cocaine, tramadol, shisha flavouring, and paracetamol.

4. Discussion

Limitations

The health consequences of consumption were assessed on the basis of subjective symptoms reported by the consumers after shisha consumption, which required medical advice. These reports alone are not sufficient to effectively explore the health effects of shisha consumption-clinical investigations could be carried out in future studies.

Socio-demographic Characteristics of the Users and the Psychoactive Substances Consumed by Means of Shisha

The average age of the shisha users surveyed was 22.38 ± 6.40 years. Hessami *et al.*, reported in Iran in 2016 a higher average age of 28.01 ± 6.40 [5]. This difference between our study and that of Hessami *et al.*, could be explained by the fact that our study population consisted of subjects aged 10 years and older, whereas that of Hessami *et al.*, consisted of respondents aged 15 years and older. Therefore, it is important to reinforce actions by creating and improving laws related to the consumption of shisha mostly towards the adolescent and youth [6, 7]. Shisha users were predominantly male. Our results corroborate those of several authors. Salih *et al.*, reported a prevalence of 42.5% of male and 27% of female students at the University of Jazon in Saudi Arabia [8]. The work of Primack *et al.*, reported that women were more attracted to the milder flavoured types of tobacco marketed as more social and exotic than shisha flavour [9]. More than half of our respondents (62.3%) had a low monthly income of less than 40,000 XOF. This result could be explained by the fact that more than half of the consumers were students. The main source of income of the latter would come from their parents.

The age range of initiation to shisha consumption among the respondents was between 15 and 25 years. Moreover, 35.60% of the respondents were initiated to shisha consumption at a very young age (under 15). Several other authors found that the age of initiation was within this age range [10, 11]. Shisha is therefore initiated at a young age. In order to protect future generations, it is important to consider actions targeted specifically at youth with regard to shisha consumption.

In the course of the study, 35.1% of the respondents mentioned shisha tobacco with different flavours as the most commonly used substance. These respondents also mentioned other substances such as the mixture of shisha tobacco and cannabis, marijuana, cocaine, and alcohol. Sutfin *et al.*, in 2014 reported that shisha users reported smoking flavoured tobacco, marijuana and hashish through their shisha [12]. Similarly, Abraham *et al.*, in Nigeria in 2019 reported that tobacco in shisha was in some cases replaced or mixed with other drugs such as marijuana [13]. Toxicological analysis of the different substances collected during the study allowed the identification and confirmation of reported substances such as illicit drugs (cocaine, heroin and cannabis), paracetamol and tramadol. The conclusion is that the users of illicit drugs have found, through the shisha, a more discreet way of consuming them without attracting any attention. During the study, the symptoms (sore throat, chest pain, cough, and abdominal burning) attributed to the shisha consumption were common, and less serious than those already reported by the literature. Aslam *et al.*, reported that exposure to shisha smoking is significantly associated with low infant weight, heart rate variations, hyperglycaemia and hypertriglyceridemia and increased risk of carcinoma [14].

Sanitary Consequences of Shisha

People who smoke hookah may be at risk for some of the same diseases as cigarette smokers. These include oral, lung, oesophagus and stomach cancer, the reduced of lung function, the decreased of fertility, heart diseases, and others as already described [15-17].

5. Conclusions

Shisha smoking is quite widespread and is mostly observed among adolescents and youth in Benin. Shisha tobacco was sometimes mixed with, or substituted for, illicit drugs such as cannabis, cocaine and heroin. The Knowledge of shisha harmful effects and chemical composition is not a guarantee of reluctance. Action must be taken to eradicate this phenomenon among adolescent and youth.

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Conflict of Interest

The authors declare that they have no conflict of interests.

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