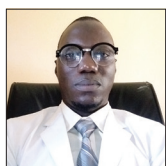


Research Article

Knowledge of cancrum oris among Nigerian university students: A cross-sectional study

Sulaiman Umar¹, Kanchan Devi²

¹Department of Nursing Science, College of Health Sciences, Federal University Birnin Kebbi, Kebbi, Nigeria, ²Department of Medical Surgical Nursing, Satish Chandra Pandey Memorial (SCPM) College of Nursing and Paramedical Sciences, Gonda, Uttar Pradesh, India.



***Corresponding author:**

Sulaiman Umar,
Department of Nursing Science,
College of Health Sciences,
Federal University Birnin
Kebbi, Kebbi, Nigeria.

numarsulaiman91@gmail.com

Received: 27 December 2023
Accepted: 28 February 2024
EPub Ahead of Print: 17 October 2024
Published:

DOI

10.25259/JGOH_44_2023

Quick Response Code:



ABSTRACT

The objectives of this questionnaire-based cross-sectional study were to assess the knowledge of cancrum oris (CO) among Nigerian university students and to find a statistically significant association between their levels of knowledge of CO and their selected socio-demographic variables. A stratified sampling technique was used to select 56 nursing students at the Federal University Birnin Kebbi, Nigeria. This study was conducted between October 4, 2022, and November 4, 2022, with a 96.4% response rate, and was asked to complete the self-structured knowledge questionnaire related to CO. The results showed that the majority of the respondents were aged 25 years and above; females comprised 61.5% of the participants, while only 36.5% were married. The study results revealed that 15 (28.8%) had good knowledge, the majority 31 (59.6%) had average knowledge, and only 6 (11.5%) had poor knowledge regarding CO. Therefore, the $H_{0.1}$ hypothesis was rejected, while $H_{1.1}$ hypothesis was accepted. The result shows that there was a statistically significant association between their level of knowledge of CO and their selected socio-demographic variables, such as marital status (single), Chi-square = 6.37, $P = 0.04$. Hence, the $H_{0.2}$ hypothesis was rejected, while the $H_{1.2}$ hypothesis was accepted. The majority of the respondents had average knowledge, and there was a statistically significant association between their levels of knowledge of CO and their selected socio-demographic variables such as marital status (single).

Keywords: Knowledge, Cancrum oris, Nigerian University, Students, Cross-sectional study

INTRODUCTION

Cancrum oris (CO), also known as Noma Disease (ND), is an ancient but overlooked and poorly understood preventable disease affecting the most deprived populations globally. Cancrum oris is a speedily progressing infection of the oral cavity. It is associated with a reported 90% mortality rate within weeks after the early stage if left untreated.^[1] Cancrum oris is generally defined as the disease that starts with gingival ulceration and rapidly destroys part of the face within a few days. From its presence in Europe in the Middle Ages, Cancrum oris is now found almost exclusively in “developing” countries, especially in Sub-Saharan Africa, Asia, and Latin America. It is known for its high mortality rate, which the World Health Organization (WHO) estimates at 80 to 90% during the acute stage.^[2]

However, the WHO has estimated that 770,000 individuals living with cancrum oris, the global relative incidence of cancrum oris has been estimated at 140,000 new cases annually, with a mortality rate as high as 90%.^[3] It generally affects children and infants in low-income countries.^[4] In Northwest Nigeria in 2018, 3,300 out of every 100,000 children in the 0–15 year age group were estimated to

This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-Share Alike 4.0 License, which allows others to remix, transform, and build upon the work non-commercially, as long as the author is credited and the new creations are licensed under the identical terms.

©2024 Published by Scientific Scholar on behalf of Journal of Global Oral Health

have any stage of cancrum oris at the time of the survey. For the past 21 years, the Nigerian Ministry of Health has run a special program for the management of this disease at the Noma Children's Hospital in Sokoto State, in the north-western part of the country.^[5] Only 15% of children survive the acute stage, and its disease burden was calculated to be a loss of one to ten.^[3] It affects hundreds of thousands of children annually, disfiguring them, leaving them with permanent disabilities, and sometimes taking their lives.^[6] Moreover, recent discoveries in the inquiry of cancrum oris microbiology have shown a polymicrobial interaction between intra-oral commensal microbes and extra-oral opportunistic microorganisms as the most likely causative agents of the disease. Although cancrum oris is almost exclusive to young children between 2 and 6 years, it has been shown to have an impact on individuals across all age groups, advancing through distinct clinical phases and stages, beginning at the reversible and seemingly inconsequential necrotizing gingivitis/edema phases, to the grotesque gangrenous stage connected with extensive soft and hard tissue necrosis, and an elevated mortality level of 90% in individuals not receiving treatment.^[7] Cancrum oris is a non-recurrent oro-facial necrotizing infection and is non-communicable, affecting mainly malnourished, debilitated children in remote rural areas and poverty-stricken communities in sub-Saharan African and Asian countries. It may also affect Human Immunodeficiency Virus (HIV) seropositive immunosuppressed individuals and occasionally HIV seronegative, impoverished, malnourished individuals of any age, anywhere globally.^[8]

In addition, according to the WHO, cancrum oris comprises five sequential "phases/stages:" (1) necrotizing gingivitis, (2) edema, (3) gangrene; (4) scarring; and (5) sequelae. This WHO staging of cancrum oris is contentious, resulting in diagnostic confusion and misjudgment of the number of cancrum oris cases stated in epidemiological studies. We, therefore, suggest an easier, more practical, and scientifically valid two-stage classification comprising only (1) acute cancrum oris and (2) arrested cancrum oris.^[9] At the recently concluded Cancrum Oris Research Day, a renewed call for the WHO to identify and include cancrum oris as one of the diseases that have been ignored was accompanied by the identification that research into all elements of cancrum oris has experienced a decline over time or remained completely lacking specifically that addresses the fundamental scientific inquiries of the etiology, pathophysiology, and underlying processes of the disease.^[4]

In addition, two recent Nigerian studies assessed that disease prevalence ranged from seven cases per 1000 children aged between one and 16 years (2003) to 9–6.4/1000 children (2003). A study from 2019 estimated that the period incidence of Noma from 2010 to 2018 was 1.6/10,000 of the population at risk in Nigeria.^[10] Hence, the investigator felt

that there was a need and desire to carry out a study to assess the knowledge regarding cancrum oris among Nigerian university students: a cross-sectional study. The purpose of this questionnaire-based cross-sectional study was to assess the knowledge of cancrum oris among Nigerian university students and to find a statistically significant association between their levels of knowledge and their selected sociodemographic variables.

Research hypotheses

H_{1,1} There was significant knowledge of cancrum oris.

H_{1,2} There was a statistically significant association between their levels of knowledge of cancrum oris and their selected socio-demographic variables.

MATERIALS AND METHODS

The research design used for the study was a questionnaire-based cross-sectional study design to assess the knowledge of cancrum oris among Nigerian university students and to find a statistically significant association between their level of knowledge and their selected socio-demographic variables. Ethical approval has been obtained from the Department of Nursing Science, College of Health Sciences, Federal University, Birnin Kebbi, Kebbi, Nigeria, Ref. No.: DNS/FUBK/005.

A stratified sampling technique was used to select 56 nursing students at the Federal University Birnin Kebbi, Nigeria. The sample size of this study was 56 respondents who were selected from the target population, which is nursing students at Federal University Birnin Kebbi, Nigeria. 400 and 500 nursing students at Federal University Birnin Kebbi, Nigeria; those who are willing to participate and those who are available during data collection were included in the study. 400 and 500 nursing students who are not studying at Federal University Birnin Kebbi, Nigeria; those who are not willing to participate in the study; and those who are not available during data collection are excluded from this study.

The researcher prepares a questionnaire to collect data from female biochemistry students. The tool used for the research was a self-structured knowledge questionnaire, which was prepared to assess the knowledge of cancrum oris. The tool was formulated based on the clinical experience of the investigator, an extensive library search, a review of literature, and the consultation of experts. The instrument for data collection was a self-structured questionnaire to suit the research objectives. The questionnaire consisted of sections A and B.

Section A consisted of demographic variables of students including six items such as age, gender, marital status, level

of study, ethnicity, religion, area of residence, and sources of information regarding cancrum oris. Section B consisted of a self-structured knowledge questionnaire on cancrum oris. There were 20 knowledge questions; each question had multiple choices with four options (a, b, c, and d). Each correct option (answer) was given a score of one mark, while wrong answers and unanswered scored zero. The maximum score was 20. The level of knowledge score was interpreted as good, average, or poor. The data was collected from the respondents using a self-structured questionnaire; the analysis was done using descriptive and inferential statistics with the aid of IBM-SPSS version 21.0; frequency and percentage distribution tables analyzed simple criteria. A Chi-square test was used to find out the association between their levels of knowledge of cancrum oris and their selected socio-demographic variable.

RESULTS

It is shown in Table 1 that, $\leq 45\%$ is representing poor, $\geq 50 < 75\%$ is representing average, and $\geq 75\%$ is representing good level of knowledge of cancrum oris. Tables 1, 2, 3 & 4 reveal detailed statistics regarding the variables, frequency and percentage of the subjects in the study.

Associations between sociodemographic variables and the level of knowledge of cancrum oris is shown in Table 4. Regarding age, there is no significant association between age and level of knowledge (Chi-square = 7.17, $P = 0.13$). Gender is not significantly associated with the level of knowledge (Chi-square = 2.01, $P = 0.37$), while marital status has a significant association with the level of knowledge (Chi-square = 6.37, $P = 0.04$). Single individuals exhibit higher knowledge levels compared to married individuals. The level of study does not significantly affect the level of knowledge (Chi-square = 1.78, $P = 0.41$). Ethnicity as well is not significantly associated with knowledge level (Chi-square = 7.52, $P = 0.48$). Religion does not significantly impact the level of knowledge (Chi-square = 0.06, $P = 0.97$), and so does area of residence (Chi-square = 1.27, $P = 0.53$). Finally, the source of information of cancrum oris does not significantly affect knowledge level (Chi-square = 3.67, $P = 0.72$).

DISCUSSION

Justin conducted a study on an online cross-sectional study among dental and medical students in Nigeria. Data were collected using a knowledge questionnaire. The findings

revealed that 300 respondents completed the study. About 51.3% (154) had less than satisfactory knowledge about Noma. Respondents also had satisfactory knowledge of nutrition and good oral hygiene in Noma prevention (79.7%, 239, 83.3%, 250, respectively).^[10] In another study conducted by Baratti-Mayer *et al.*, on the sociodemographic characteristics of traditional healers and their knowledge of cancrum oris. A descriptive survey was conducted in three regions of Mali. The findings showed that the majority were illiterate (66.3%), which was associated with older age ($P < 0.001$). Although they treated all types of disease, only 10.5%

Table 2: Percentage distribution of respondents' sociodemographic variables (n=52).

S No.	Variables	Frequency	Percentage
1.	Age		
	16–18 years	-	-
	19–21 years	3	5.8
	22–24 years	23	44.2
2.	25 years and above	26	50.0
	Gender		
	Male	18	34.6
	Female	32	61.5
3.	Marital status		
	Single	32	61.5
4.	Married	19	36.5
	Level of study		
5.	400 level	31	59.6
	500 level	20	38.5
6.	Ethnicity		
	Fulani	5	9.6
	Hausa	26	50
	Igbo	2	3.8
	Yoruba	8	15.4
7.	Others	11	21.2
	Religion		
8.	Islam	41	78.8
	Christianity	10	19.2
9.	Area of residence		
	Rural	7	13.5
	Urban	43	82.7
10.	Source of information regarding Cancrum-oris		
	Health workers	23	44.2
	Family and friends	6	11.5
	Social media	6	11.5
	School	13	25.0

Table 1: Level of knowledge score.

Level of knowledge	Score	Percentage
Good	15–20	≥ 75
Average	10–14	$\geq 50 < 75$
Poor	0–9	≤ 45

Table 3: Respondents' level of knowledge of cancrum oris.

S. No.	Level of knowledge	Score range	Frequency	Percentage
1.	Poor	$\leq 45\%$	6	11.5
2.	Average	$\geq 50 < 75\%$	31	59.6
3.	Good	$\geq 75\%$	15	28.8

had some knowledge of Noma, with regional differences ($P < 0.001$).^[11]

The key findings of this study revealed that the sociodemographic variables showed that the respondents are between 16 and 18 years, 19 and 21 years, 22 and

24 years, and ≥ 25 years, which accounted for 0 (0.0%), 3 (5.8%), 23 (44.2%), and 26 (50%), respectively. The majority 32 (61.5%) are females, whereas 18 (34.6) are males. A significant portion of 32 (61.5%) of the participants are married, while 18 (34.6%) are not. According to the level of study, 31 (59.6%) are from the 400 level, while 20 (38.5%) are from the 500. 26 (50.0%) of the respondents are Hausa, followed by 11 (21.2%) other minority tribes; 8 (15.4%) are Yoruba; 5 (9.6%) and 2 (3.8%) are Igbos. In terms of religion practice, 41 (78.8%) practice Islam, and 10 (19.2%) practice Christianity. Minority 7 (13.5%) of the respondents are residing in rural areas, while more than two-thirds 43 (82.7%) are from urban areas. Regarding sources of information, 23 (44.2%) had their sources from health workers, 13 (25.0%) from school, 6 (11.5%) from social media, family, and friends. The study results revealed that, out of 52 (100%) of the respondents, 6 (11.5%) had a “Poor” level of knowledge, while the majority, 31 (59.6%), exhibited an “Average” level of knowledge [Figure 1], and

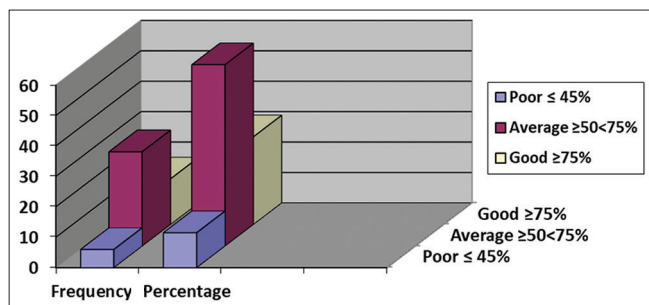


Figure 1: Bar Chart showing frequency and percentages of the respondent's level of knowledge of cancrum oris.

Table 4: Association between the levels of knowledge of the respondents with their selected socio-demographic variables.

Socio-demographic variables	Level of knowledge						Chi-square	P-value
	Poor		Average		Good			
	F	%	F	%	F	%		
Age								
16–18 years	0	0	0	0	0	0	7.17	0.13
19–21 years	0	0	3	5.77	0	0		
22–24 years	1	1.92	12	23.07	10	19.23		
25 years and above	5	9.62	16	32	5	9.61		
Gender								
Male	3	5.77	12	23.08	3	5.77	2.01	0.37
Female	3	5.77	18	34.64	11	21.15		
Marital status								
Single	1	1.92	20	38.46	11	21.15	6.37	0.04
Married	5	9.62	10	19.23	4	7.69		
Level of study								
400 level	4	7.69	16	30.77	11	21.15	1.78	0.41
500 level	2	3.85	14	26.92	4	7.69		
Ethnicity								
Fulani	0	0	2	3.85	3	5.77	7.52	0.48
Hausa	4	7.69	15	21.92	7	13.46		
Igbo	1	1.92	1	8.85	0	0		
Yoruba	0	0	6	11.55	2	3.85		
Others	1	1.92	7	13.46	3	5.77		
Religion								
Islam	5	9.62	25	48.08	11	21.15	0.06	0.97
Christianity	1	1.92	6	11.54	3	5.77		
Area of residence								
Rural	0	0	4	7.69	3	5.77	1.27	0.53
Urban	5	9.62	26	50	12	23.08		
Source of information regarding Cancrum oris								
Health workers	2	3.85	13	25	8	15.39	3.67	0.72
Family and friends	1	1.92	4	7.69	1	1.92		
Social media	1	1.92	5	9.62	0	0		
School	2	3.86	7	13.46	4	7.69		

only 15 (28.8%) had a “Good” level of knowledge. Therefore, the null hypothesis ($H_{0.1}$) was rejected, while the alternate hypothesis ($H_{1.1}$) was accepted. This is not in alignment with a study conducted by Mujtaba *et al.*, on Knowledge, Attitude, and Practices of Primary Health Care Workers toward ND in Sokoto. The results revealed that, out of 251 participants, 210 (83.7%) were aware of Noma. The total scores recorded in both the knowledge and attitude/practice domains were 75% and 78%, respectively.^[12]

The result shows that there was a statistically significant association between their level of knowledge of cancrum oris and their selected sociodemographic variables, such as marital status (single), Chi-square = 6.37, $P = 0.04$. Hence, the null hypothesis ($H_{0.2}$) was rejected, while the alternate hypothesis ($H_{1.2}$) was accepted. This is in alignment with a study conducted by Baratti-Mayer *et al.*, on the sociodemographic characteristics of traditional healers and their knowledge of Noma. A descriptive survey was conducted in three regions of Mali. The findings showed that, among the 770 traditional healers invited to participate, The majority were illiterate (66.3%), which was associated with older age ($P < 0.001$). Although they treated all types of disease, only 10.5% had some knowledge of Noma, with regional differences ($P < 0.001$).^[11]

CONCLUSION

The results revealed that the majority of the respondents had average knowledge, whereas the minority had poor knowledge of cancrum oris. There was a statistically significant association between their level of knowledge of cancrum oris and their selected socio-demographic variables, such as marital status (single). Based on the study findings, the researcher recommends that a similar study be conducted on the knowledge of cancrum oris among nursing students in different settings and use a large sample size for the generalization of the findings.

Ethical approval

Ethical approval has been obtained from the Department of Nursing Science, College of Health Sciences, Federal University, Birnin Kebbi, Kebbi, Nigeria. With Ref. No.: DNS/FUBK/005, dated 7 Feb. 2023.

Declaration of patient consent

Patient’s consent not required as there are no patients in this study.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

Use of artificial intelligence (AI)-assisted technology for manuscript preparation

The authors confirm that there was no use of artificial intelligence (AI)-assisted technology for assisting in the writing or editing of the manuscript and no images were manipulated using AI.

REFERENCES

1. Farley E, Mehta U, Srour ML, Lenglet A. Noma (cancrum oris): A scoping literature review of a neglected disease (1843 to 2021). *PLoS Negl Trop Dis* 2021;15:e0009844.
2. Kagoné M, Mpinga EK, Dupuis M, Moussa-Pham MA, Srour ML, Grema MS, *et al.* Noma: Experiences of survivors, opinion leaders and healthcare professionals in Burkina Faso. *Trop Med Infect Dis* 2022;7:142.
3. Issa AH, Ousmane KA, Issa EO, Shen J, Douma MD, Ibrahim AS, *et al.* Influencing factors for social acceptance of Noma (Cancrum oris) patients in Niger: A hospital-based cross-sectional study. *Health* 2023;15:326-48.
4. Ogbureke KU. Noma: A neglected area for research. *J Dent Res* 2022;101:1424-9.
5. Isah S, Amirtharajah M, Farley E, Adetunji AS, Samuel J, Oluyide B, *et al.* Model of care, noma children’s hospital, Northwest Nigeria. *Trop Med Int Health* 2021;26:1088-97.
6. Mpinga EK, Srour ML, Moussa MA, Dupuis M, Kagoné M, Grema MS, *et al.* Economic and social costs of noma: Design and application of an estimation model to Niger and Burkina Faso. *Trop Med Infect Dis* 2022;7:119.
7. Bello SA, Adeoye JA, Oketade I, Akadiri OA. Estimated incidence and prevalence of noma in north central Nigeria, 2010-2018: A retrospective study. *PLoS Negl Trop Dis* 2019;13:e0007574.
8. Khammissa AG, Lemmer J, Feller L. Noma staging: A review. *Trop Med and Health* 2022;50:40.
9. Feller L, Lemmer J, Khammissa RA. Is noma a neglected/overlooked tropical disease? *Trans R Soc Trop Med Hyg* 2022;116:884-8.
10. Justin UL, Osamende EG, Opeyemi OV, Akwang UG. Knowledge, attitude and perception of Noma among medical and dental students in Nigeria. *Niger J Med Dent Educ* 2023;5:21-2.
11. Baratti-Mayer D, Daou MB, Gayet-Ageron A, Jeannot E, Pittet-Cuenod B. Sociodemographic characteristics of traditional healers and their knowledge of Noma: A descriptive survey in three regions of Mali. *Int J Environ Pub Health* 2019;16:4587.
12. Mujtaba B, Omotayo SA, Braimah RO, Taiwo AO, Jaafar R, Abubakar AB, *et al.* Knowledge, attitude, and practices of primary health-care workers toward Noma disease in Sokoto. *Dent Med Res* 2022;10:24-8.

How to cite this article: Umar S, Devi K. Knowledge of cancrum oris among Nigerian university students: A cross-sectional study. *J Global Oral Health*. doi: 10.25259/JGOH_44_2023