https://www.inosr.net/inosr-experimental-sciences/
Kajura
INOSR Experimental Sciences 12(2):104-118, 2023.

International Network Organization for Scientific Research ISSN: 2705-1692
https://doi.org/10.59298/INOSRES/2023/2.8.1000

Determinants Impacting the Use of Antibiotics Among Patients Visiting the Dental Clinic at Kampala International University Teaching Hospital in Bushenyi-Ishaka Municipality, Western Uganda

Kajura Geofrey

Faculty of Clinical Medicine and Dentistry Kampala International University Western Campus Uganda

ABSTRACT

The primary objective of this investigation was to identify the factors influencing the usage of antibiotics among patients seeking care at the Dental Clinic within Kampala International University Teaching Hospital, situated in Bushenyi-Ishaka Municipality, Western Uganda. The study employed a cross-sectional hospital-based survey, gathering data between February and July 2022. This design enables the collection of specific parameters at a single point in time. Analyzed data was presented through tables and figures, illustrating frequencies and proportions. For continuous variables, univariate analysis was conducted, presenting measures of central tendency (such as mean, median, and mode) and measures of dispersion (like range, interquartile range, and standard deviation) for various independent variables. The study revealed that financial constraints were cited by patients and health center nurses as a significant factor causing delays in seeking dental care and occasionally resulting in non-attendance at the dental department. From interviews, patient-related factors emerged, including knowledge about oral health services, awareness of services offered in dental clinics, perceived necessity, fear, anxiety, and access to oral health services. Consequently, the study recommended an enhancement in oral health education initiatives, particularly leveraging media channels, due to a shortage of community oral health personnel. The aim is to extensively educate the population about preventing oral diseases and the appropriate timing for seeking oral health services, enabling individuals to make well-informed decisions regarding their oral health.
Keywords: Antibiotics, bacterial infections, Dental Clinic, Oral health.

INTRODUCTION

The discovery of the first antibiotic by Alexander Fleming in 1928 made a sudden and great change in the therapy of bacterial infections and reduced mortality and morbidity from microbial diseases. It became the leading weapon in the treatment of bacterial infections [1]. Antibiotics are the most commonly prescribed drugs in many developed and developing countries. Antibiotics are one of the most cost-effective, lifesaving medicines and contribute to the extended lifespan of humankind [2]. However, the effect of antibiotics is compromised by the rapid escalation of antibiotic resistance, which, combined with the paucity of development of new antibiotics (or antibiotic combinations) with novel modes of action is considered a major global threat [3, 4]. World Health Organization (WHO) estimated that 80% of antibiotics are used in the community, of which about 20–50% are used inappropriately. A systematic review showed that inappropriate use of antibiotics was common, especially in developing countries with poor healthcare systems. Inappropriate use of antibiotics

can result in bacteria resistant to antibiotics in the community [5, 6]. The global increase in antibiotic resistance is threatening and potentially reversing the advances made against infectious diseases [7, 8]. Two million people acquire serious infections with bacteria that are resistant to one or more of the antibiotics designed to treat infections in the United States each year [9]. It further estimated that more than half of all medicines are prescribed, dispensed, or sold inappropriately, and half of all patients fail to take medicines prescribed to them correctly, in relation to this, of the world's seven billion people 77% live in developing countries 28% to 49% have little or no access to basic pharmaceutical drug availability [10]. Inappropriate antibiotic use encompasses use that is not in accordance with international treatment guidelines, including but not limited to taking antibiotics without a prescription, not completing the course, taking an insufficient dose, taking antibiotics for wrong indications, and sharing antibiotics [11]. Infections caused by bacteria, especially antimicrobial-resistant bacteria are associated with an increased risk of mortality and increased economic burdens [12, 13]. One of the main drivers for the increase in antimicrobial-resistant bacterial infections is antimicrobial drug use [14]. It is estimated that antimicrobial resistance (AMR) including antibiotic resistance could cause 10 million deaths a year by 2050 if the appropriate steps are not taken soon [15]. The consequences of these are projected to be most severe in low and middle-income countries (LMIC), especially Africa where the infectious disease burden is high and alternative antibiotics are often unavailable or costly [16]. A patient's decision to seek healthcare or use antibiotics is influenced by contextual factors, like access and distance to appropriate healthcare providers, income and the general economic circumstances of users, and the cultural norms that have developed around medicine use over a period of time Samuel [17]. In addition, studies found that inappropriate use of antibiotics was associated with different factors: culture, gender, educational status, residency, marital status, age, number of children, health insurance and unsatisfaction with the health care services, and storing antibiotics at home [18, 19]. WHO therefore recommended the involvement of the community in tackling antibiotic resistance through improving access to medical services, reducing unnecessary use of antibiotics, taking a full course of treatment, not sharing medications with other people, and not keeping part of the course for another occasion [5]. Globally, approximately half of the patients in hospitals received inappropriate antibiotic treatment [20]. In Africa, nearly 86.4% of antibiotics are used and dispensed by health workers without a prescription while about, 85.9% of Injectable antibiotics are inappropriately used by health workers in sub-Saharan Africa [21]. In East Africa, Uganda particularly 78% of antibiotics were overprescribed and misused by the health workers [22]. Antibiotic use is a selective driver for the emergence of drug-resistant organisms [23]. The dilemma of antibiotic use, commonly termed 'the tragedy of the commons', is that both appropriate and inappropriate use of antibiotics promote resistance. Antibiotic prescriptions have been shown to be associated with increased risks of resistance in individual patients in a systematic review and analysis [24]. One of the contributors to resistance is patient attitude and practices towards the utilization of antibiotics. Data about antibiotic utilization at Kampala International University Teaching Hospital (KIU-TH) is lacking. This research, therefore, seeks to determine factors influencing the utilization of antibiotics among patients attending the Dental Clinic at Kampala International University Teaching Hospital, Bushenyi-Ishaka Municipality, Western Uganda.

METHODOLOGY

Study design

The study adopted a cross-sectional hospital-based survey. The cross-sectional study design entails the collection of information on the individual study parameters at a single point in time between February and July 2022. It provides a basis for describing the status of phenomena at a fixed point in time and does not allow for inference of changes and trends of the same over time.

Area of Study

The study was carried out in Kampala International University Teaching Hospital which is found along Mbarara-Kasese road, in Bushenyi-Ishaka Municipality South-western Uganda. Kampala International University Teaching Hospital, a private hospital in partnership with the government of Uganda for a program that runs the free treatment policy. The hospital's location lies approximately 360 kilometres (220 mi), by road, southwest of Kampala, the largest city in the country. The coordinates of the hospital are: 0° 32' 29.04"S, 30° 8' 25.80" E (Latitude: 0.5414; Longitude: 30.1405). The hospital has a private and a public wing with total bed capacity of about 1000. The 5 major disciplines present are: Internal medicine, Obstetrics/Gynecology, Surgery, Psychiatry and Pediatrics. There is a total of 250 beds. On a daily basis, the hospital has over 100 in-patients and 150 out-patients. The hospital serves a population of about 2 million people. The scope is wide as many patients come from even the neighboring Kigali, Rwanda. It has special clinics for example Mother child health, Mental Health Clinic (MHC), ophthalmology, dental, Ear, Nose and Throat (ENT), Radiology, and Dermatology, which work throughout the week.

Study population

Patients attending dental clinic at Kampala International University Teaching Hospital, Bushenyi-Ishaka Municipality, Western Uganda.

Inclusion criteria

Patients consenting to participate in the study

Exclusion criteria

Voluntary withdraw from the study.
Patients who did not have consented to participate in the study

Sample size determination

The sample size was calculated using the probability sampling formula by Fischer et al. [25] i.e.

$N= Z^2pq/d^2$

Where, n = sample size, when the population size is greater than 10,000.

z = Standard normal deviation, i.e. 1.96, set at 95% confidence level.

p = 50%

q = 1- p= expected non-prevalence

d = Desired degree of accuracy

If the value of p = 50% =0.05

$n = z^2 p (1- p) / d^2$

$= 1.96^2 \times 0.5(1- 0.5) / 0.05^2$

$= 3.8416 \times 0.5 \times 0.5 / 0.0025$

= 384

Sampling procedures

A consecutive sampling technique was used to sample the study participants whereby a patient coming in and meeting the inclusion criteria was enrolled into the study.

Data collection methods and management

Primary data was obtained using a structured questionnaire administered in English and Runyankole languages. The investigator introduced himself to the prospective participants and read to individual participants the consent form, the title and the purpose of the study as well as the rights of the participants throughout the study. Patients at the dental clinic who consented to participate in the study were given questionnaires to fill out on their own so that they could answer the questions privately and therefore feel secure in terms of confidentiality. The investigator recorded all the questionnaire serial numbers. This was done to ensure data quality as the data was entered into the coding box.

Data analysis

Analyzed data was presented in tables and figures showing frequencies and proportions. Univariate analysis was done for continuous variables to report measures of central tendency like mean, median, and mode measures of dispersion like the range, and interquartile range and measures of variance like standard deviation for various independent variables. For categorical variables, data presentation was through well-summarized "2 by 2" tables that show frequencies (percentages) and totals. For continuous and categorical data, bar graphs, histograms, and pie charts were used where suited to present the data. Data was analyzed using STATA version 11. Analysis of data was by simple linear and logistic regression as well as multiple linear and logistic analyses for continuous and categorical variables respectively. Pearson chi-square χ^2 or Mantel hazel, logistic regression analyses will be applied to determine associations. The level of significance was present at 5%. Odds Ratios (ORs) with their respective 95% confidence intervals were used to assess for statistical associations and p-values of less than 0.05 were considered statistically significant.

Quality control

To ensure quality work, the inclusion and exclusion criteria were strictly adhered to and data forms were double-checked for completeness by the principal investigator.

Ethical considerations

Permission to conduct this study was sought from the Kampala International University Research Ethics Committee and Institution Review Committee. The study was granted an ethical clearance certificate. Participants were enrolled and requested to sign consent after a thorough explanation of the purpose of the study, the risks involved, and the use of data to be collected. Numbers instead of names were used in all the questionnaires and laboratory forms.

RESULTS

Socio-demographics of the respondents

Table 1: Socio-demographics of the respondents

Age	Frequency	Percentage
34-38	35	4.2
49-53	50	10.5
54-58	54	14.8
59-64	88	16.2
65-69	93	26.3
69 and above		27.8
Total	**334**	**100**
Marital status		
Single	15	4.5
Married	200	59.9
Divorced	119	35.6
Total	**334**	**100**
Religion		
Catholic	120	35.9
Protestant	140	41.9
Islam	60	17.9
Other Religion	14	4.2
Total	**334**	**100**
Level of education		
Primary level	215	64.4
Secondary level	100	29.9
Tertiary institution	19	5.9
Total	334	100
Occupation		
Trader of any kind	120	35.9

Daily laborer	20	5.9
Driver	150	44.9
Construction worker	44	13.3
TOTAL	**334**	**100**

Most of the participants were between the ages of 69 and above (27.8%) while few were between 34-38 (4.2%). This implies tooth decay mostly affects older people. Most of the participants were married (59.9%) unlike 4.5% of participants were single. The findings implied that participants who were involved in the study were married.

Most of the respondents were protestants (41.9%) followed by Catholics (35.9%), Muslims (17.9%) and other religions with 4.2%. For the case of education level, most of the respondents had attained primary level (64.4%), Secondary level (29.9%), Tertiary institution (5.9%) and none of the respondents had not attained education. Most, of respondents 150 (44.9%) were drivers, 120 (35.9%) were traders, 44 (13.3%) were construction workers unlike 5.9% were daily laborers. In relation to the above objectives, other related questions were asked to the respondents and the results were summarized below in figure 1-2.

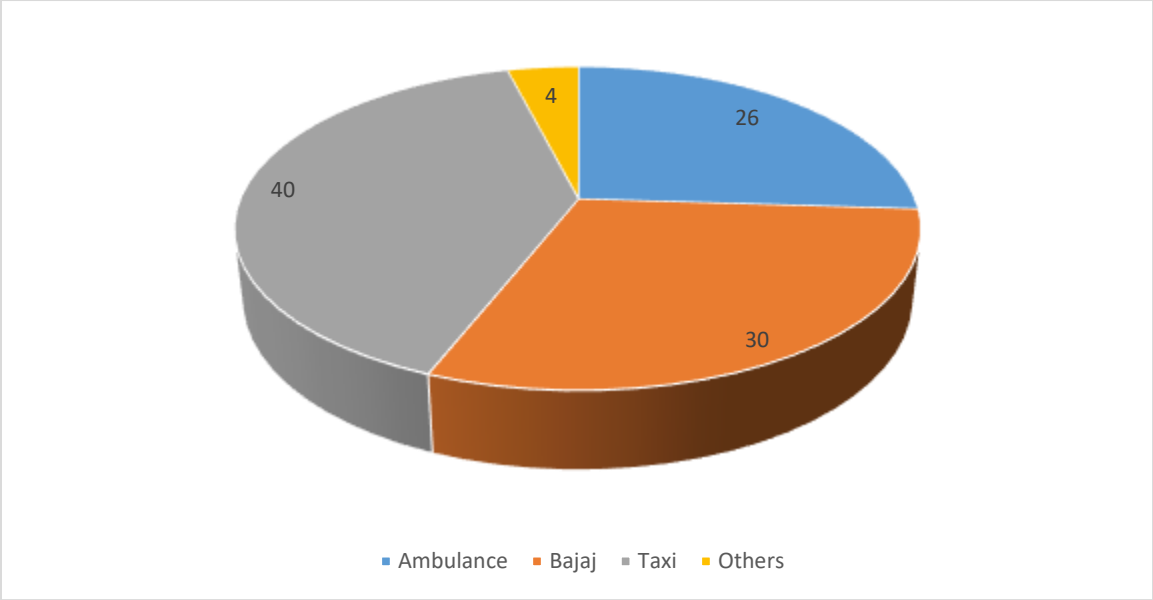

Figure 1: Mode of transport to the health center

Most of the respondents (40%) used taxis, (30%) used Bajaj (Bodaboda), (26%) used ambulances unlike others (4%) used other means of transport.

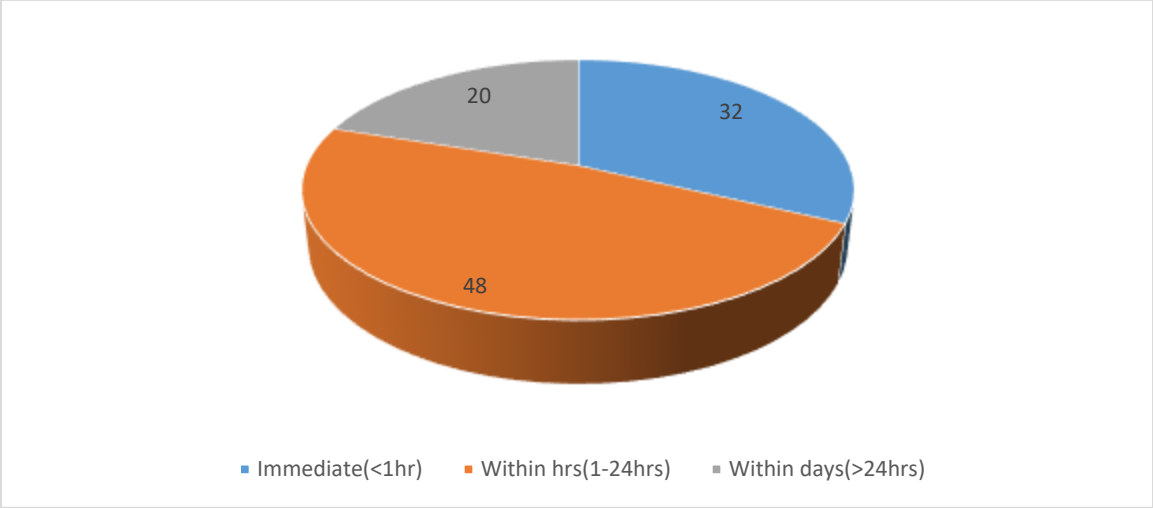

Figure 2: Time to arrive at the institution (health center) after injury

The majority (48%) reached the health center within hours (1-24hrs) unlike a few (20%) had reached within days, that is more than 24 hours.

The rate and patterns of acceptability and adherence to antibiotics among patients attending dental clinic

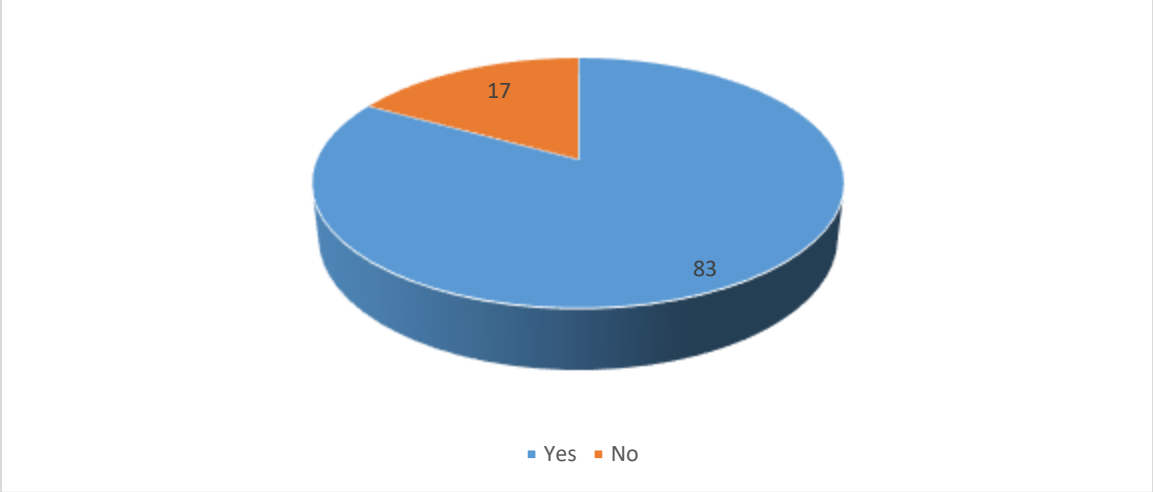

Figure 3: Respondents' awareness of the examples of antibiotics

The majority 83% of respondents knew some examples of antibiotics unlike 17% did not know. One participant pointed out that midwives and nurses are able to hand out prescriptions for antibiotics without thinking about the consequences of their actions.

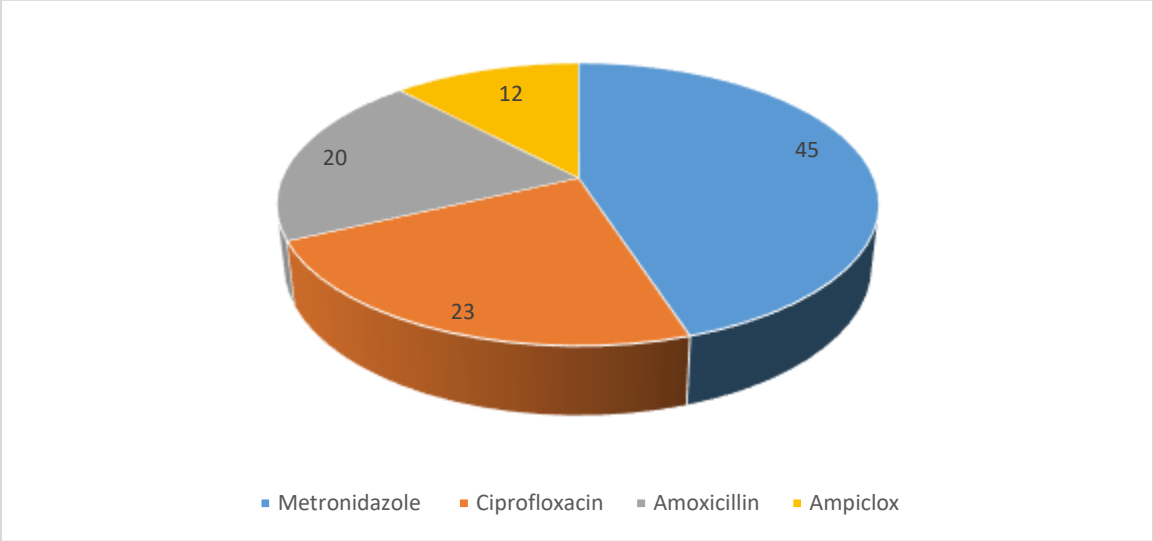

Figure 4: Examples of antibiotics

According to the findings, 45% of participants showed that Metronidazole is an antibiotic, 23% cited Ciprofloxacin, and 20% cited Amoxicillin unlike 12% cited Ampiclox.

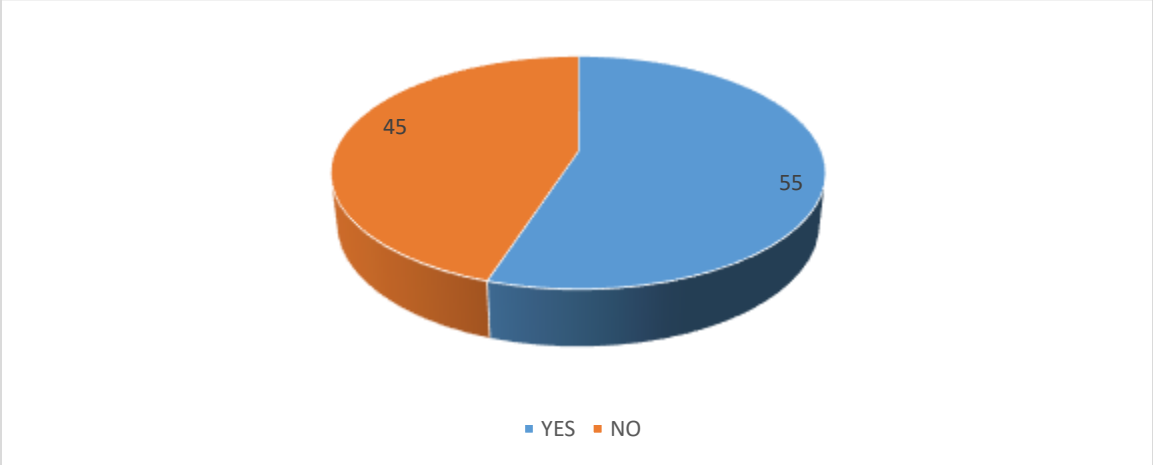

Figure 5: Whether herbs are as effective as antibiotics

Most of 55% of participants showed that herbs are as effective as antibiotics, unlike 45% who did not agree. Herbs can be antibiotics, too. A small sampling study of 58 Chinese plants found that 23 had antibacterial properties and 15 had antifungal properties. A 2014 study found that an herbal therapy was just as effective as a chemical antibiotic in treating a small intestine bacterial overgrowth disorder.

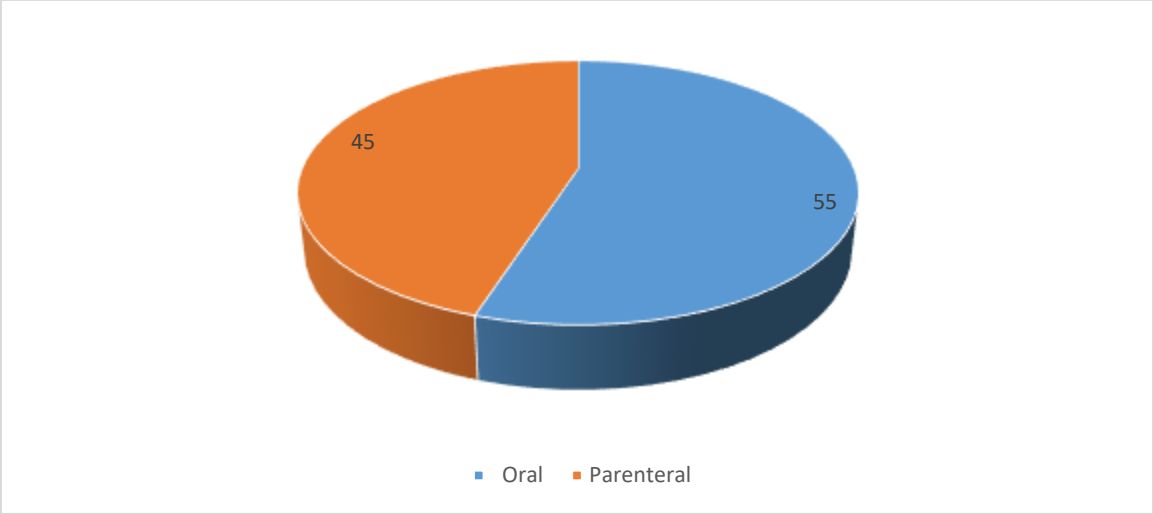

Figure 6: Types of antibiotics

From the study findings, 55% cited Oral antibiotics while 45% cited parenteral antibiotics On the examples of oral antibiotics they included, Penicillins and its derivatives, Cephalosporins, Macrolides, Tetracycline and its derivatives.

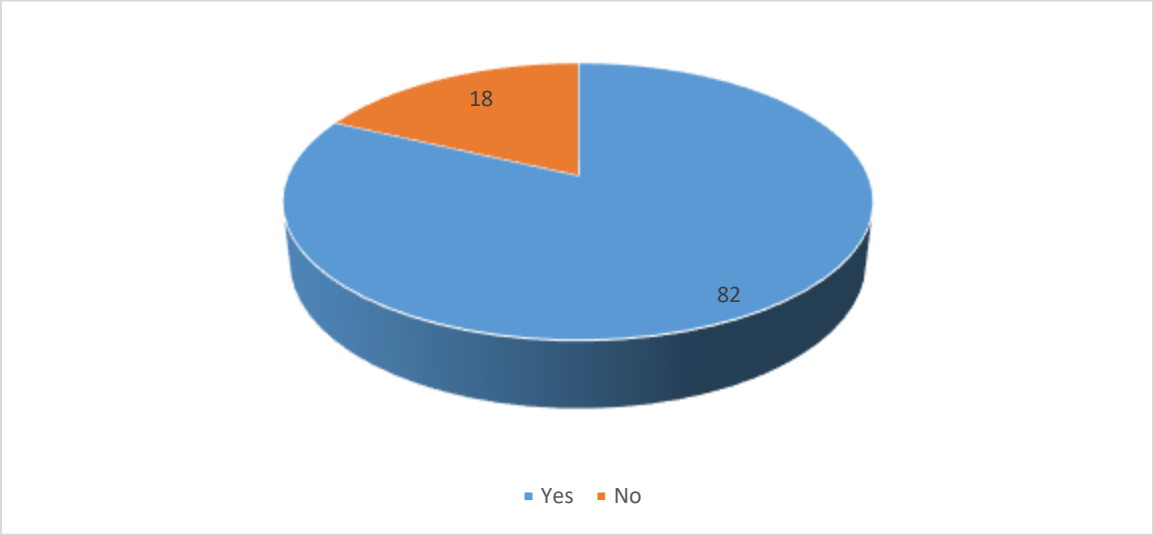

Figure 7: Oral antibiotics are as effective as parenteral

The majority 82% of participants agreed unlike 18% disagreed. Oral antibiotics were as effective as parenteral because of the absence of cannula-related infections or thrombophlebitis, a lower drug cost, and a reduction in hidden costs such as the need for a health professional and equipment to administer intravenous antibiotics.

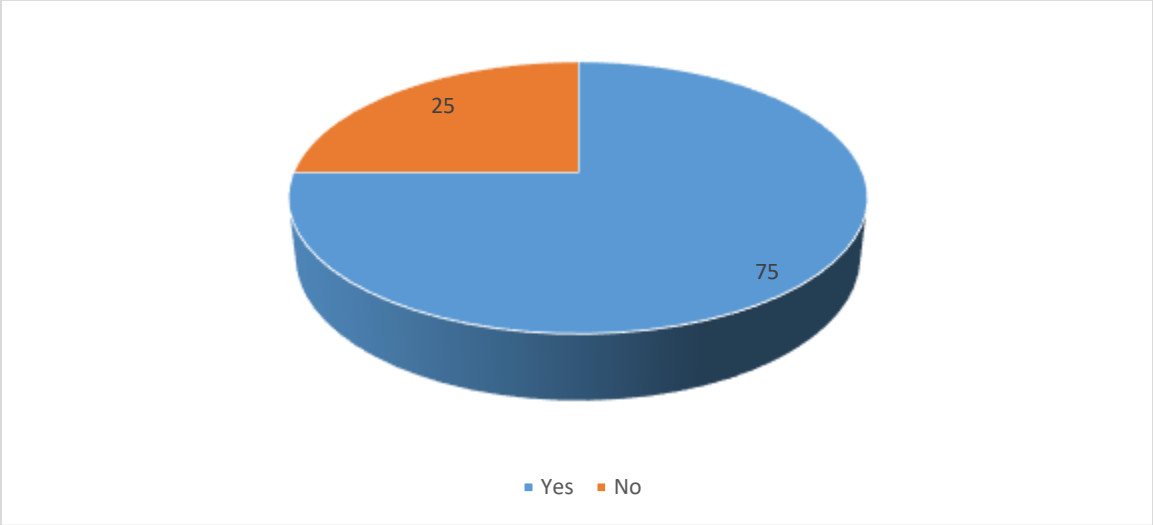

Figure 8: If given antibiotics are you likely to finish the dose prescribed by the doctor?

Most 75% of participants could finish the dose as prescribed by the doctor unlike 25% who could not finish the dose.

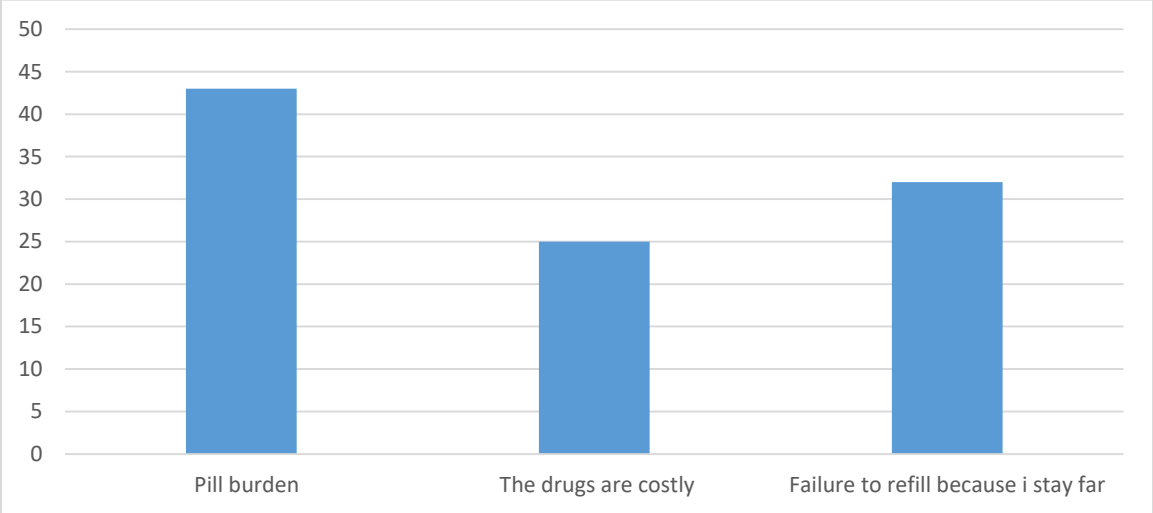

Figure 9: Reasons for not finishing antibiotics dose

Of those who could not finish the dose, 45% revealed that pill burden was the reason why they could not finish the dose, followed by 32% who showed that they failed to refill because they stayed far while 25% showed that drugs were costly. In an interview with some doctors they argued that if treatment stops too soon, and you become sick again, the remaining bacteria may become resistant to the antibiotic that you've taken.

The patient factors influencing utilization of antibiotics among patients attending dental clinics.

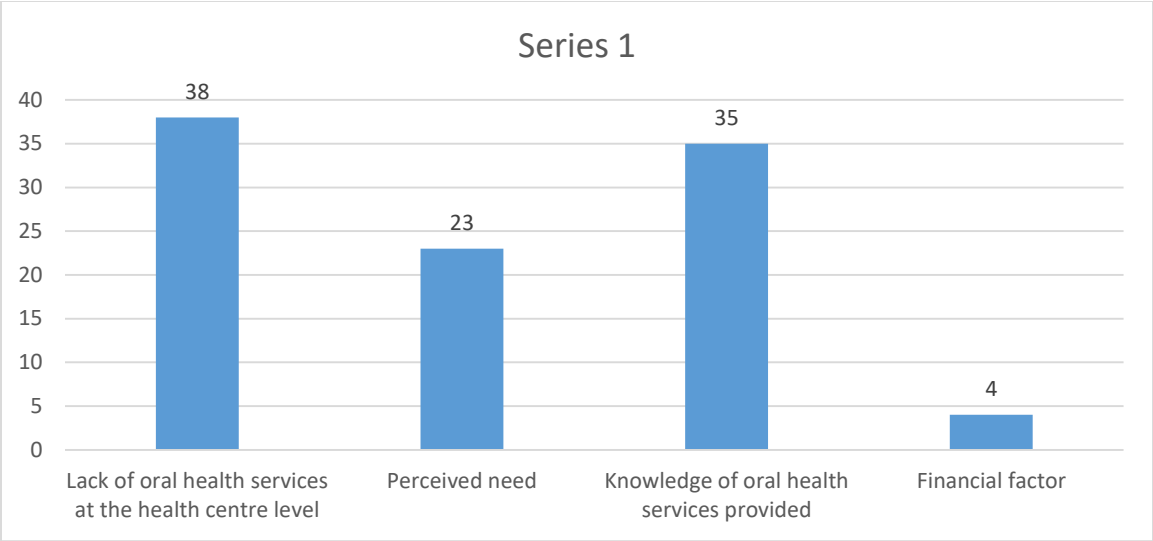

Figure 10: The patient factors influencing utilization of antibiotics among patients attending dental clinic

Most participants 38% showed that fear and anxiety was patient factors influencing the utilization of antibiotics among patients attending dental clinic, 23% cited perceived need, and 35% cited knowledge of oral health services provided unlike 4% cited financial factor. In an interview, "Some people are scared of injection because it is so painful, some of them have not experienced it but they are told by other people that it is very painful" (patient 2). Some are saying they do not want to go to the dentist because when you are removing the teeth they are feeling pain and some teeth can be broken. Most oral diseases are not very serious in the beginning and many people do not see the reason for going to the dentist unless they are in pain. Participants mention this as one of the factors that delayed dental treatment seeking. This is supported by the fact that all participants interviewed were there because of pain either in their teeth or other part of the mouth. When there is no pain then people do not take it as a problem, when we decide to come is because the pain is so severe" "People think that when there is no pain there is no need to go to see a dentist but when they are in pain it forces them to go to the hospital" Most dental services are located at the center of the district so people who are from far places have to pay a lot of transport money as well as for the services at the hospital. "People are not able to come to the doctor because of financial reasons. They don't have money for transport and for paying at the hospital for dental services".

Healthcare factors influencing utilization of antibiotics among patients attending dental clinic

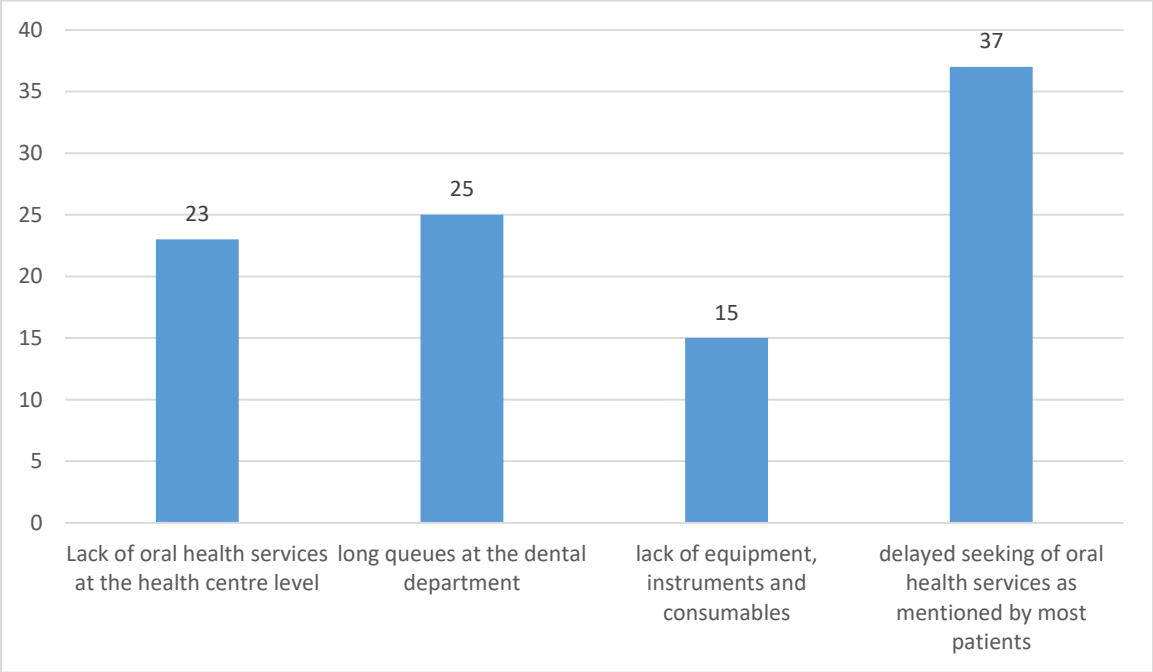

Figure 11: Healthcare factors influencing utilization of antibiotics among patients attending dental clinic

Most of the participants 37% showed that delayed seeking of oral health services, 25% showed that long queues at the dental department were the factor influencing utilization of antibiotics among patients attending the dental clinic, 23% showed that lack of oral health services at the health center level unlike few of 15% participants showed that lack of equipment, instruments, and consumables was also among the factors influencing utilization of antibiotics among patients attending dental clinic. In an interview with some participants. "Like when I have a hole in the tooth I will visit the dentist, but if there were just stains I will just ignore it and say I will visit the doctor later because the dentists are not that accessible. We don't have a dentist in all health facilities so we have to go far from where we live. When the tooth has a hole it will be painful and that's what I don't want because if you are wasting more time having a hole you will actually have to remove the tooth; normally people don't come to the dentist when the tooth is not painful. "Dental services are not everywhere in the country and so the queues are very long and after lunch, they don't work" "We don't have many dentists in the country and there are many people who want to get the services and the dentists are not enough" "People have to be early in the morning, even if it is not 8 o'clock they have to be early so that they can access the services. If not coming early they already know that they will be going back home without getting any treatment. It is not very easy, like I have said we don't have dentists in the villages, we have a dentist a little bit far away. You have to take some taxis, so it won't be that easy to go to the clinic that early.

DISCUSSION

The rate and patterns of acceptability and adherence to antibiotics among patients attending dental clinic

Most of the 75% of participants could finish the dose as prescribed by the doctor, unlike 25% who could not finish the dose. The findings are in line with a study to assess the inappropriate use of antibiotics and its associated factors among urban and rural communities of

Bahir Dar City Administration, Northwest Ethiopia showed that 27% of the respondents discontinued their antibiotics once the symptoms subsided [5].

The patient factors influencing utilization of antibiotics among patients attending dental clinic

In the present study, some of the patients and health center nurses mentioned the financial situation as one of the factors contributing to the delayed seeking of dental services and sometimes nonattendance to the dental department. Transport fare and user fees were highlighted as the main financial factors encountered. The lack of dental clinics in health centers forces people to pay a lot of money for transport to get dental services at the hospitals which are located in the center of the district. User fee for dental treatment is subsidized by the government but due to economic status, many people are not able to afford even small user fees for dental services. In the face of a global economic downturn particularly in a developing country like Uganda, it is not surprising that the cost of dental treatment is of much concern. The findings are in line with dental treatment obtained on pay for service basis as a barrier compared to the one offered under insurance and subsidy scheme, as seen in a study done in Nigeria [27].

Healthcare factors influencing utilization of antibiotics among patients attending dental clinic

In the present study patients reported mixed experiences of dental visits, some positive and others negative. Some patients mentioned having experienced bad attitudes and unfriendly behaviors from oral health staff and others experienced a lack of or inappropriate way of communication. Patients were explicit about the fact that such bad experiences were contributing to the patients 'poor attendance at the dental department and discouraging patients from seeking oral health services, especially in public hospitals. Other patients reported from their experience that generally oral health personnel handle people very well. But literature also shows that poor attitudes of dental personnel are not unusual, and have been associated with increased fear and anxiety in patients [28]. This is supported by the study, which was conducted to assess public attitudes toward dentists and dental services, where the author stated that public attitudes towards dentists and dental services determine whether people seek dental care [21].

CONCLUSION

Patients' factors that emerged from interviews included knowledge of oral health services and services provided in the dental clinics, perceived need, fear and anxiety, and access to oral health services. Health system factors included the attitude of oral health personnel, ineffective communication, availability of services, waiting time in the facilities, and financial cost. Under socio-economic factors, although there were differences in levels of education, occupation, and income among participants it did not show any obvious relationship as a barrier to utilization of oral health. The results showed that the most important factors that emerged from the interviews and contributed to the barrier of oral health service utilization were perceived to be need, fear, and anxiety, long waiting times due to high workload, and lack of oral health services in health centers. Financial factors, lack of equipment, instruments and consumables, personnel attitude and ineffective communication, and far dates of appointment were less important factors that emerged from the interviews.

Recommendations

Due to the shortage of community oral health personnel, the program together with the health education department should strengthen the use of media for extensive oral health education on prevention of oral diseases and the right time to seek oral health services to cover many people so that people can make informed decisions. Due to the lack of oral health personnel in health centers, nurses in the health centers are expected

to provide oral health education, and diagnose and manage simple dental cases; therefore, the oral health program should prepare guidelines on how to go about training and supervision to help them carry out these functions. At the moment, most outreach visits focus only on oral health education and screening of oral diseases, neglecting oral disease management due to the lack of mobile dental units caused by procurement logistics at the district level. The Oral Health Program together with the procurement department should come up with a procurement plan to cater for these items from the central level. Inclusion of oral health material in the school curriculum from preschool to tertiary level especially in teachers training college to make sure teachers are more comfortable teaching students oral health material. This could be done by working together with the Ministry of Education. To reduce the issue of stockouts of dental consumables, and shortage of dental instruments and equipment the oral health program should put in place a system that monitors the usage of consumables and standardization of the dental units and other equipment in all district hospitals, together with a proper maintenance plan. The oral health program should facilitate resource mobilization to carry out research for evidence-based planning.

REFERENCES

1. Bamagous, G. A. Patterns of prescription and inappropriate medications use in elderly patients of Makkah community in Saudi Arabia. 2020; 14(11), 386–394. https://doi.org/10.5897/AJPP2020.5191.
2. Rao, V. V, Jhaveri, N., Nayak, K., Jyotsnanjali, T., Khamar, P., & Vadera, H. Compliance of antimicrobial drug therapy in patients with dental periapical abscess. Natl J Physiol Pharm Pharmacol. 2019; 9(7): 668-673. https://doi.org/10.5455/njppp.2019.9.0518418052019.
3. Byonanuwe, S., Nzabandora, E., Nyongozi, B., Pius, T., Fajardo, Y., & Ssebuufu, R. Bacterial pathogens and their susceptibility to antibiotics among mothers with premature rupture of membranes at a teaching hospital in western Uganda. *Journal of Medical Care Research and Review*, 2020; *3*(7), 386-394.
4. Bbosa, G. S., Mwebaza, N., Odda, J., Kyegombe, D. B., & Ntale, M. Antibiotics/antibacterial drug use, their marketing and promotion during the post-antibiotic golden age and their role in emergence of bacterial resistance. Health, 2014. 2014; 410-425.
5. Gebeyehu, E., Bantie, L., & Azage, M. Inappropriate Use of Antibiotics and Its Associated Factors among Urban and Rural Communities of Bahir Dar City Administration, Northwest Ethiopia. PloS One, 2015 ; 10(9), e0138179–e0138179. https://doi.org/10.1371/journal.pone.0138179.
6. Asogwa, F. C., Okoye, C.O.B., Ugwu, O. P. C., Edwin, N., Alum, E. U. and Egwu, C. O. Phytochemistry and Antimicrobial Assay of *Jatropha curcas* Extracts on Some Clinically Isolated Bacteria - A Comparative Analysis. *European Journal of Applied Sciences,* 2015; **7**(1), 12-16. DOI: 10.5829/idosi.ejas.2015.7.1.1125.
7. Kakooza, S., Muwonge, A., Nabatta, E., Eneku, W., Ndoboli, D., Wampande, E., ... & Mutebi, F. A retrospective analysis of antimicrobial resistance in pathogenic Escherichia coli and Salmonella spp. isolates from poultry in Uganda. *International Journal of Veterinary Science and Medicine*, 2021;*9*(1), 11-21.
8. Ssajjakambwe, P., Bahizi, G., Setumba, C., Kisaka, S., Vudriko, P., Atuheire, C., ... & Kaneene, J. B. (2017). Milk hygiene in rural southwestern Uganda: prevalence of mastitis and antimicrobial resistance profiles of bacterial contaminants of milk and milk products. *Veterinary Medicine International*, *2017*. 2017:8710758. doi: 10.1155/2017/8710758.

9. Kizito, M., Lalitha, R., Kajumbula, H., Ssenyonga, R., Muyanja, D., & Byakika-kibwika, P. Antibiotic Prevalence Study and Factors Influencing Prescription of WHO Watch Category Antibiotic Ceftriaxone in a Tertiary Care Private Not-for-Profit Hospital in Uganda. Antibiotics (Basel). 2021 Sep 26;10(10):1167. doi: 10.3390/antibiotics10101167.
10. Nguyen, L., Pham, L., Bui, A., Mai, V., Nguyen, N., Le, T., Pham, S., Nguyen, P., Nguyen, T., Taxis, K., Nguyen, T., & Tran, H. Appropriate Antibiotic Use and Associated Factors in Vietnamese Outpatients. Healthcare, 2021 ; 9, 693. https://doi.org/10.3390/healthcare9060693.
11. Afari-asiedu, S., Oppong, F. B., Tostmann, A., Abdulai, M. A., Boamah-kaali, E., Gyaase, S., Agyei, O., & Kinsman, J. Determinants of Inappropriate Antibiotics Use in Rural Central Ghana Using a Mixed Methods Approach. 2020; 8(March), 1–11. https://doi.org/10.3389/fpubh.2020.00090.
12. Asogwa, F. C., Ugwu, O. P. C., Alum, E. U**.,** Egwu, C. O., Edwin, N. Hygienic and Sanitary Assessment of Street Food Vendors in Selected Towns of Enugu North District of Nigeria. *American-Eurasian Journal of Scientific Research*. 2015; **10** (1), 22-26. DOI: 10.5829/idosi.aejsr.2015.10.1.1145.
13. Alum, E., Uti, D., Agah, V., Orji, O., Ezeani, N., P.C., U., Omang, W., Itodo, M.: Physico-chemical and Bacteriological Analysis of Water used for Drinking and other Domestic Purposes in Amaozara Ozizza, Afikpo North, Ebonyi State, Nigeria. *Nigerian Journal of Biochemistry and Molecular Biology*. 2023; 38(1), 1–8 (2023). https://doi.org/10.2659/njbmb.2023.151.
14. Komagamine, J., Kobayashi, M., & Mori, T. Prevalence of and rationale for antimicrobial prescription during ambulatory care visits in Japan: a prospective, multicentre, cross-sectional study. BMJ Open, 2020; 10, e039329. https://doi.org/10.1136/bmjopen-2020-039329.
15. Vu, T., Quoc Dat, V., Hoang, L., Nguyen, T., Ta, T., Nadjm, B., & van Doorn, H. R. Factors influencing choices of empirical antibiotic treatment for bacterial infections in a scenario-based survey in Vietnam. JAC-Antimicrobial Resistance, 2020 ; 2. https://doi.org/10.1093/jacamr/dlaa087.
16. Sarwar, M., Atif, M., Scahill, S., Saqib, A., Qamar-uz-Zaman, M., & Babar, Z.-U.-D. Drug utilization patterns among elderly hospitalized patients on poly-pharmacy in Punjab, Pakistan. Journal of Pharmaceutical Policy and Practice, 2017; 10. https://doi.org/10.1186/s40545-017-0112-z.
17. Fadare, J., Oshikoya, K., Obimakinde, O., Sijuade, A., Afolayan, J., Adeleke, A., Godman, B., & Ojumu, O. Patterns of drugs prescribed for dental outpatients in Nigeria: findings and implications. Acta Odontologica Scandinavica, 2017; 75, 1–11. https://doi.org/10.1080/00016357.2017.1347822.
18. Thiruneelakandan, G., Vidya, S., Vinola, J. S., Jayasudha, S., Babu, V., Selvasundhari, L. & Anthoni, S. A. Antimicrobial activity of silver nanoparticles synthesized by marine Lactobacillus sp against multiple drug resistance pathogens. *Science, Technology and Arts Research Journal*, 2013; 2(4), 05-09.
19. Chirambo, L., Valeta, M., Banda Kamanga, T. M., & Nyondo-Mipando, A. L. Factors influencing adherence to antiretroviral treatment among adults accessing care from private health facilities in Malawi. BMC Public Health, 2019; 19(1), 1382. https://doi.org/10.1186/s12889-019-7768-z.
20. Abu-mostafa, N. A., Al-mejlad, N. J., Al-yami, A. S., Al-sakhin, F. Z., & Al-mudhi, S. A. (2017). A survey of awareness related to the use of antibiotics for dental issues among

non-medical female university students in Riyadh, Saudi Arabia. Journal of Infection and Public Health, 2017 Nov-Dec;10(6):842-848. https://doi.org/10.1016/j.jiph.2017.01.015.

21. Kawuma, R., Chimukuche, R. S., Francis, S. C., Weiss, H. A., Kawuma, R., Chimukuche, R. S., Francis, S. C., Francis, S. C., & Seeley, J. Knowledge , use (misuse) and perceptions of over-the-counter analgesics in sub-Saharan Africa : a scoping review ABSTRACT. Global Health Action, 2021; 14(1). https://doi.org/10.1080/16549716.2021.1955476.
22. Yimenu, D. K., Emam, A., Elemineh, E., & Atalay, W. (2019). Assessment of Antibiotic Prescribing Patterns at Outpatient Pharmacy Using World Health Organization Prescribing Indicators. J Prim Care Community Health. 2019 Jan-Dec;10:2150132719886942. https://doi.org/10.1177/2150132719886942.
23. Kahkashan, I., Farooq, S., & Nazia. Knowledge and practices of dental students of Kashmir regarding antibiotic prescription and development of resistance : A cross-sectional study. European Journal of Molecular & Clinical Medicine. 2021; 8(3), 2811–2818.
24. Kaul, R., Angrish, P., Jain, P., Saha, S., Sengupta, A., & Mukherjee, S. A Survey on the Use of Antibiotics among the Dentists of Kolkata. International Journal of Clinical Pediatric Dentistry, 2018; 11, 122–127. https://doi.org/10.5005/jp-journals-10005-1497.
25. Wiegand, H.: Kish, L.: Survey Sampling. John Wiley & Sons, Inc., New York, London 1965, IX + 643 S., 31 Abb., 56 Tab., Preis 83 s. Biometrische Zeitschrift. 10, 88–89 (1968). https://doi.org/10.1002/bimj.19680100122
26. Godman, B., Egwuenu, A., Haque, M., Malande, O. O., & Schellack, N. (2021). Review Article : Strategies to Improve Antimicrobial Utilization with a Special Focus on Developing Countries Strategies to Improve Antimicrobial Utilization with a Special Focus on Developing Countries. Life (Basel). 2021 Jun 7;11(6):528. doi: 10.3390/life11060528.
27. Fadare, J. O., Oshikoya, K. A., Obimakinde, O. S., Sijuade, A. O., Afolayan, J. M., Adeleke, A. A., et al. Patterns of drugs prescribed for dental outpatients in Nigeria: findings and implications. Acta Odontol Scand. 2017 Oct;75(7):496-506. doi: 10.1080/00016357.2017.1347822.
28. Ocwia, J., Olum, R., Atim, P., Laker, F., Okot, J., Sereke, S., Baluku, J., Kiguli, S., & Bongomin, F. Oral health seeking behaviors of adults in Nebbi District, Uganda: a community-based survey. BMC Oral Health, 2021; 21. https://doi.org/10.1186/s12903-021-01824-5.

CITE AS:Kajura Geofrey (2023). Determinants Impacting the Use of Antibiotics Among Patients Visiting the Dental Clinic at Kampala International University Teaching Hospital in Bushenyi-Ishaka Municipality, Western Uganda. INOSR Experimental Sciences 12(2):104-118. https://doi.org/10.59298/INOSRES/2023/2.8.1000