**Reviewer’s Comments**

Title: **ANTIMICROBIALS SELF MEDICATION AMONG PARAMEDICAL STUDENTS IN A NIGERIAN UNIVERSITY**

**ABSTRACT**

Background/Objective: Self-medication refers to selection and use of medicines by individuals to treat self-recognized illness and symptoms. It is widely practiced globally and often regarded as part of self-care. Though, unlike the other elements of self-care, it acts as a double-edged sword with the ability to do good as well as exposure to hazards because it employs use of drugs. The objective of this study was to assess prevalence of antibiotic self-medication among paramedical students of UsmanuDanfodiyoSokoto, Nigeria.

Methodology: It was questionnaire-based, cross-sectional study involving undergraduate paramedical students in a Nigerian University. Participants were selected by multistage sampling technique and data generated was analyzed using SPSS version 20.

Result: Majority of the respondents were males and singles, 64(68%) and 84(89.4%) respectively. Age ranged 18-25 years for majority of respondents, 87(92.6%). Eighty one point nine percent self-medicate with antimicrobials and penicillin was the most used antibiotic group 58(61.7%), and among the penicillin group, amoxicillin was the commonly used, 17(18.1%). There was no statistically significant association between gender, marital status and course of study with self-medication (X1=0.06, P=0.81; X1=0.028, P=0.87 and X3=2.28, P=0.52 respectively).

Conclusion: A high proportion of self-medication with antimicrobials was observed among the respondents of the study. However there was no statistically significant association of the medication with gender, marital status or course of study.

Keywords: Antimicrobials, Nigeria, Paramedical students, Self-medication, University

Introduction

Self-medication refers to selection and use of medicines by individuals to treat self-recognized illness and symptoms.1It is widely practiced globally and often regarded as a part of self-care. Though, unlike the other elements of self-care, it acts as a double-edged sword with the ability to do good as well as exposure to hazards because it employs use of drugs.2It is much easier, to circumvent the trouble of seeing a medical doctor and the cost involved by self-medication, especially in financial and human resources constrained circumstances such as low and middle income countries. In most parts of the world, it is commonly practiced as over 50% of antibiotics are purchased without prescription.3 Exorbitant costs of health care services, poor accessibility to health facilities, unregulated distribution of drugs, and inequality in the spread of health care services provide fertile grounds for self-medication.4,5 Self medications for whichever purpose poses a serious public health challenge worldwide and contribute immensely to development of deadly antimicrobial resistance irrespective of age or gender.1

The magnitude of antibiotics self-medication is higher with population in developing countries among the young and literates.6, 7 Use of antibiotics for self-medication is considered as a injudicious use of antibiotics.8 Antibiotics resistance which may arise from self-medication currently poses one of the most important health issue globally.9 This is more common in developing countries, where antibiotics are freely purchased without prescription over the counter.10

Reasons for antibiotics resistance are multifaceted which include human factors such as self-medication.11 Socioeconomic status, life styles and easy accessibility to drugs have been shown to influence self-medication.12Widespread use of antibiotics in agriculture as growth promoters and prophylaxis in livestock has been implicated in promoting resistance.13 The consumption of antibiotics via these processes account for 63,000 to 240,000 tons of annual global use and through food chain, resistance can be transmitted from animals to humans. 14, 15

In Nigeria antibiotics are purchased over the counter.16It is however, unfortunately not without attendant dire consequences. These penalties include but not limited to masking symptoms of serious illness, fatal adverse drug reactions, wrong diagnosis, and susceptibility to addiction, risks of under or over dosage and poly pharmacy.2 This is more so, with emerging more worrisome-the antimicrobial resistance. This has started rearing its ugly head years ago.17 If left unchecked, it will take this generation back to pre antibiotics era of course with deadly outcome. This study therefore, aimed at assessing the prevalence of antibiotic self-medication among paramedical students of UsmanuDanfodiyoSokoto as future key players in healthcare delivery.

Setting, Study design and Sampling

UsmanuDanfodiyo University is among the second generation Universities created in 1975. It is located in Sokoto seat of Usmaniyya caliphate. Paramedical students include Nursing, Radiography, Medical laboratory Science and Pharmacy. The first three are located in the College of Health Sciences while the last one is a faculty on its own. The trainings involve preclinical and clinical phases. At the preclinical stage, students are taught mainly basic medical courses,and proceed to the clinical levels at the Teaching Hospital which serves as referral centre for the neighboring states of Kebbi, Zamfara, Kano, Katsina and even Niger republic. The hospital is managed by various cadres of health professionals. The present study is a cross sectional descriptive study.

The respondents were selected by multistage sampling technique as follows:

Stage 1: Respondents were stratified based on course of study into nursing, pharmacy and radiography

Stage 2: Total number of students was obtained from in each department/faculty by their study levels

Stage 3: Total number of respondents to be selected from each department and level by proportionate allocation

Stage 4: Actual respondents who participated in the study from the department/level were selected by sampling interval

Questionnaire design, Validation and Data collection

The semi-structured questionnaire was derived from previous studies (Kasulkar, 2015; Nùnĕz, 2016; Esiet, 2015).18, 19, 16 It was reviewed by experts and testswere carried out for construct and content validity among students of faculty of Medical Laboratory Science. Areas of ambiguity were identified and addressed appropriately before administering. It comprised of 3 sections. Section A, contained questions on demographic characteristics, section B focused on reasons for self-medication and section C showed awareness of hazards associated with self-medication. The questionnaires were distributed to the volunteers and asked to fill collected on the spot by one of the researchers (Fidelis). Those that could not fill promptly were given the next day to complete the questionnaire.

Study Population

Only registered students duly confirmed by the respective administrative offices of the concerned departments were recruited for the survey. Participation in this study was purely voluntary. This was clearly mentioned to the participants.

Statistical Analysis

Crude descriptive statistics was calculated for the components of the questionnaire. We used Chi-square Pearson’s test to ascertain association of antimicrobial self-medications with gender, marital status and course of study. Analyses were based on P<0.05 and SPSS version 20 was used.

Results

One hundred and fifteen questionnaires were administered and retrieved. After data collection, 94 were analyzed, of whom majority were males and singles, 64(68%) and 84(89.4%) respectively. The mean age was 22±0.1 years and most of the respondents’ age ranged 18-25 years, 87(92.6%). As a group, penicillin was the most used antibiotic group, 58(61.7%), and among the penicillin group, amoxicillin was the commonly used and recorded as, 17(18.1%). Respondents using metronidazole accounted for 17(18.1%). On where they purchased drugs, 44(46.8%) bought from Pharmacists’ store while 24(25.5%) from ‘Chemists’ and only 1(1.5%) from street hawkers. The rest obtained drugs from hospital pharmacy and patent medicine stores 7(7.5%) and 18(19.2%) respectively. Headaches, skin rashes and dizziness were the serious adverse effects experienced by the respondents (52.9%) each 17.7% respectively. Association between gender, marital status and course of study with self-medication were recorded. (X1=0.06, P=0.807, df=1; X1=0.028, P=0.868, df=1; X3=2.281, P=0.516, df=3 respectively).

Discussion

A high response rate recorded which could be attributed to spot administration and collection of data. Female respondents constituted minority in our study which differs from the findings of similar works.20, 21 Girl child education is still an obstacle in this part and most part of northern Nigeria and always reflects in enrolments in tertiary level of education and other formal sectors of economy.22

The proportion of respondents who self-medicate with antibiotics observed in this study was quite higher than Southern India and China where it was reported as 39.3 and 47.9% respectively.23, 24 Antibiotics are sold over the counter in Nigeria and may be responsible for the high percentage recorded in the study. This is really worrisome and regulatory bodies saddled with the responsibility of monitoring drugs need to develop a policy frame work to curtail this menace by striking a balance between control and access to antimicrobials to vast majority especially in areas where healthcare manpower is overstretched.

The finding of this studyshowed thatpenicillin as a group was the most commonly used for self- medications. This was in accordance with the observations made by Fadare and Tamuno.25 This may be explained by the fact that Penicillin were among the earlier antibiotic that are still clinically relevant currently because of their broad spectrum antibacterial activities, less side effects, affordability, safety profile and efficacy.26 Among the penicillin group, amoxicillin was the most frequently cited, a finding reechoing reports in previous studies.21, 20, 19Saving money, time and presence of left over drugs as reasons for self-medication were quite higher than 44, 19 and 16% respectively reported in Karachi.27 This may be explained by prevailing economic recession being experienced in the country. A good proportion of participants admit lack of confidence in health care providers prompted them to self-medication which differed from finding in Lagos.28

On the awareness of dangers associated with self-medication, the finding of this study is higher than 51.2% reported in India.29 This is really encouraging and strengthens hope of improved rational drug use as the respondents were the future captains of health care delivery system. It was encouraging that majority of respondents procured their drugs from approved designations. Previous studies in the study area has documented that non-medical students of University tend to purchase their drugs from unauthorized outlets.30

There was no association observed between antibiotic self-medication withgender, marital status or course of study. This finding was different from what was documented earlier that female students were more inclined to self- medication than their male counterpart. [19] [24]

Conclusion

This study has revealed high prevalence of antimicrobial self- medication among undergraduate paramedical students of UsmanuDanfodiyo University. No association was established with the self- medication with gender, marital status or course of study. There is need for any intervention study to stem the tide of self-medication.

Conflict of interest: none

References

1. World Health Organization. The role of pharmacist in self-care and self medication; 2011
2. Hughes CM, McElnay JC and Fleming GF. Benefits and risks of self medication. Drug Safety. 2001;24(14):1027-37
3. Morgan DJ, Okeke IN, Laxminarayan R, Perencevich EN, WeisenbergS.Non-prescription antimicrobial use worldwide: A systematic review. LancetInfect Dis. 2011; 11:692–701.
4. Esimone CO, Nworu CS, Obina PU. Utilization of Antimicrobial agents with and without prescriptions by Out-patients in selected pharmacies in south-eastern Nigeria. Pharm World Sci. 2007;29:655–60.
5. Yousef AM, Al-Bakri AG, Bustajani Y, Wazaify M. Self-medication patterns in

Amman, Jordan. Pharm World Sci. 2008;30(1):24–30.

1. Napolitano F, Izzo MT, Di Giuseppe G, Angelillo IF: Public knowledge, attitudes, and experience regarding the use of antibiotics in Italy. PloS One. 2013, 8 (12): e84177 10.1371/journal.pone.0084177
2. James H, Handu SS, Al Khaja KA, Otoom S, Sequeira RP: Evaluation of the knowledge, attitude and practice of self-medication among first-year medical students. Medical Principles and Practice. 2006, 15 (4): 270-5.
3. Grigoryan L, Burgerhof JG, Haaijer-Ruskamp FM, Degener JE, Deschepper R, Monnet DL *et al*. Is self-medication with antibiotics in Europe driven by prescribed use? J AntimicrobChemother 2007;59(1):152-6.
4. Bell BG, Schellevis F, Stobberingh E, Goossens H, Pringle M. A systematic review and meta-analysis of the effects of antibiotic consumption on antibiotic resistance. BMC Infect Dis 2014;14:13.
5. Olayemi OJ, Olayinka BO, Musa AJ, Evaluation of antibiotic self medication: Pattern amongst undergraduate students of ABU (main campus) Zaria. Journal of Applied Science Research. 2010;2(1):35-38
6. Ramanan L, Adriano D, Chand W, Anita KMZ, Heiman FLW, Nithima S. *et. Al*. Antibiotics resistance – the need for global solutions Lancet 2013;13(12):1057-1098
7. World Health Organization. The Role of pharmacist in Heath Care System; 1998. Available from: <http://www.apps.who.int/medicinedocs/en/d/Jwhozip32e>. [Accessed 29th August, 2017, 18:44]
8. Ventola CL. The antibiotic resistance crisis: part 1: causes and threats. P T. 2015;40(4):277–283.
9. Landers TF, Cohen B, Wittum TE, Larson LE. A review of antibiotic use in food animals: perspective, policy, and potential. Public Health Rep. 2012; 127(1):4–22.
10. Grace D. Review of Evidence on Antimicrobial Resistance and Animal Agriculture in Developing Countries, Evidence on Demand. International Livestock Research Institute. 2015. Available from: [https://www.gov.uk/dfid-research-outputs/review-of-evidence-on-antimicrobial-resistance-and-animal-agriculture-in-developing-countries-201309. Accessed 19:38](https://www.gov.uk/dfid-research-outputs/review-of-evidence-on-antimicrobial-resistance-and-animal-agriculture-in-developing-countries-201309.%20Accessed%2019%3A38) 9th September, 2017
11. Eshiet UI, Essien GE, Effiong GS and Ekwueme C. Self-Medication with Antibiotics amongst Civil Servants in Uyo, Southern Nigeria. Journal of Advances in Medical and Pharmaceutical Sciences 2015;2(3):89-97
12. Aboderin OA, Abdu A, Odetoyin KW, Lamikara A. Antimicrobial resistance in Escherichia Coli strains from urinary tract infections isolates. Journal of the National Medical Association 2009:;101:1268-1273
13. Kasulkar AA and Gupta M. Self medication practices among medical students of a private institute. Indian Journal of Pharmaceutical Sciences. 2015;77(2):178-182
14. Nùnĕz N, Tiasierra-Ayala M and Gil-Olivares F. Antibiotic self medication in University students from Trujillo. MedicinaUniversitaria. 2016;18(73):205-09
15. Suleiman IS and Rubian SS. Antibiotics use with and without prescriptions in Healthcare students. American Journal of Pharmacological Sciences. 2013;1(5):96-99
16. Sarahroodi S, Arzi A, Sawalba AF and Ashtarinezhad A. Antibiotics Self medication among Southern Iranian University students. International Journal of Pharmacology. 2010;6(1):48-52
17. Nmadu G, Avidime S, Oguntade O, Dashe V, Abdulkarim B and Mandara M. Girl Child Education: Rising to the Challenge. African Journal of Reproductive Health Sept 2010;14(3):107-12
18. Kumar N, Kanchan T, Unnikrishna BT, Mithra P, Kulkarni V, Papanna MK, Holla R and Uppal S. Perceptions and practices of self medication among medical students in coastal south India. PLOS one. 2013;8(8):e72247
19. Zhu X, Pan H, Yang Z, Cui B, Zhang D, Ba-Thein W. Self medication practices with antibiotics among Chinese University students. Public Health 2016;130:78-83
20. Fadare JO and Tamuno I. Antibiotic self medication among University medical undergraduates in northern Nigeria. Journal of Public Health and Epidemiology. 2011;3(5):217-220
21. Guqkaeva Z, Crago JS, Yesnogorodsky M. Next step in antibiotic stewardship: Pharmacist –provided penicillin allergy testing. J Clin Pharm Ther 2017;42(2): 509-512
22. Syed J, Hammah A, Rija BR, Sidra N, Mirrah M, Muhammad HJ *et. Al,*Self medication with antibiotics among non-medical University students of Karachi: a cross-sectional study. BMC Pharmacology & Toxicology. 2014;15:74
23. Ogunnowo BE, Olunfulayo TF, Sule SS. Client perceptions of service quality at out- patient clinics of a General Hospital in Lagos, Nigeria. Pan African Medical Journal. 2015;22:68
24. Gupta S. and Singh M. Self medication among north Indian first year undergraduate healthcare students: a questionnaire-based study. Tropical Journal of Medical Research 2016;19(2):162-167
25. Umar MT, Bello SO, Chika A, Jimoh AO and Sabir AA. Attitude of University Students towards Fake Drugs in Sokoto Northwest, Nigeria. International Journal of Innovative Research & Development.2014;3(9): 158-161

Table 1: Antibiotics Usage by Respondents

S/N Antibiotic N(%)

1. Ampicillin + Cloxacillin 12(12.8)
2. Ampicillin 7(7.5)
3. Amoxicillin 17(18.1)
4. Penicillin G procaine 13(13.8)
5. Ciprofloxacin 13(13.8)
6. Metronidazole 17(18.1)
7. Erythromycin 5(5.3)
8. Co-trimoxazole 4(4.3)
9. Tetracycline 4(4.3)
10. Ceftriazone 3(3.2)
11. Chloramphenicol 1(1.1)

NB: Some respondents mentioned more than 1 drug

Table 2….?

Table 3: Responses of Respondents on Reasons for Self-medication

Question Yes N(%) Odds 95%CI lower 95%CI higher

SM with antibiotics last 1 year 77(81.9) 4.529 2.695 7.614

To Save time 77(81.9) 4.529 2.695 7.614

To Save money 52(55.3) 1.238 0.827 1.854

Past successful use 74(78.7) 3.700 2.269 6.034

Left over medicines 43(45.7) 0.843 0.564 1.262

Academic knowledge 75(79.8) 3.947 2.399 6.497

To avoid stress of seeing a doctor 70(74.5) 2.917 1.482 4.618

The drug has worked successfully

In acquaintances before 74(78.7) 3.700 2.269 6.034

No need to consult a doctor for

Minor illness 59(62.8) 1.686 1.113 2.553

Unfavorable attitudes of health

care workers 52(55.3) 1.238 0.827 1.854

Lack of confidence in health

care giver 57(60.6) 1.541 1.022 2.323

Encounter with adverse drug effects

Following self-medication 17(18.1) 0.221 0.131 0.371

Awareness that self-medication

Can be harmful to health 76(80.9) 4.222 2.539 7.019

SM= self-medication