

OTC Medication use during exams among undergraduates: Insights from a Nigerian Institution

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Abstract

Exam period and academic success are associated with high stress levels which necessitates the use of over-the-counter (OTC) medication by university students as a coping strategy. The study investigated factors influencing OTC use among undergraduates during examination periods in Nigeria. A cross-sectional study was conducted and data was collected using a 22-item questionnaire from 386 undergraduate students. Data was analysed using the Statistical Package for Social Science (SPSS) 23 revealing painkillers, cough and cold medications, and vitamins as commonly used medications. Results suggest an association between family income, gender, level of study, age, and OTC medication use. The study concludes that the use of OTC medication as a self-medication practice is prevalent among undergraduates during the exam periods. Inadequate information about the adverse reactions and related interactions of OTC medications could lead to adverse health consequences. Study recommendations to policymakers include interventions on university campuses to incorporate factors that promote and sustain the rational use of medications and encourage routine public health campaigns on the dangers of medication misuse to form a part of the orientation program for new students and throughout the semester. These measures are particularly, important during exam periods when an increase in academic stress is experienced.

Keywords: *Self-medication, OTC medication, undergraduates, exam periods.*

Introduction

According to the World Health Organization (Ogasarawa & Indonesia, 2000), self-medication is the use of medications to treat self-diagnosed disorders or symptoms. It includes taking leftover medications in medicine cabinets and drawers at home and the purchase of over-the-counter (OTC) medications without a formal prescription, guidance, or even monitoring during the administration of the medication. It is a component of self-care. OTC medications have been described by Assadi et al. (2015) as medications accessible to consumers without a formal prescription from a medical practitioner. Even though self-medication can provide rapid relief of symptoms with a decrease in the number of admissions at hospitals; it poses avoidable risks of drug-drug and or drug-food interactions including antimicrobial resistance (Penagos-Corzo et al., 2024; Alshahrani et al 2019). Convenience and quick relief from minor symptoms as perceived by the students have been described to promote self-medication practices by undergraduates (Itasanmi, 2024; Saeed et al., 2014; Banerjee & Bhadury, 2012).

During the exam period, higher stress levels are experienced by students compared with the stress experienced on regular days in an academic semester; contributing to symptoms such as fever, headaches, and body aches or the disruption of regular sleep patterns necessitating the misuse of OTC painkillers or cough remedies containing diphenhydramine or chlorpheniramine tablets (Alomaim et al., 2023; Almalak et al., 2014). University students, often experience high levels of stress that can adversely affect their academic, emotional, and health outcomes; prompting medication misuse as a coping strategy to alleviate symptoms of the stress (Onuoha & Subair 2013). The multiple stressors that students face include academic stress, constant pressure to succeed, competition with peers, and fears about the future which can result in the loss of study days, impaired academic performance, and poor quality of life (Orayj 2021; Franke et al., 2011).

Different authors have posited that students who are residents in university hostels perceive minor health issues as not requiring professional medical attention and therefore resort to self-medication with OTC medication. Residing in university hostels involves living with friends and colleagues who may share their

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self-medication experiences with peers and colleagues (Shudifat et al., 2024; Petrović et al., 2022). The availability and ease of purchase of OTC medications from campus stalls and tuck shops contributes to such self-medication practices (Shudifat et al., 2024; Ogbodu et al., 2023a; Abdulah et al., 2022).

Studies have reported OTC self-medication practice during the examination period with the majority of students practicing self-care through self-medication due to time and cost-saving reasons (Al-Kubaisi et al., 2022; Assadi et al., 2015). The academic stress experienced by students as they strive to achieve academic excellence remains a motivation for OTC medication use, even without a medical practitioner's prescription. The reasons for such use range from improving concentration to reducing anxiety associated with preparation for semester exams or treating exam-related symptoms such as headache and fever. In light of this, this study explored and described OTC medication use by undergraduates in Nigeria during exam periods, the type of OTC medications used, and the route of administration of the medications.

Materials and Methods

Study setting

The University of Lagos, Nigeria is the study setting. The institution is situated in the Southwest region of the country where a major ethnic group, Yoruba is predominant. Nigeria, a diverse nation is home to over 350 ethnic groups. The three major ethnic groups in Nigeria are the Yoruba in the West, Igbo in the East, and the Hausa/Fulani in the North. The University of Lagos is a public university with disciplines across the sciences, humanities, and arts. It was founded in 1962. It is one of the first five universities created in the country. The university attracts students from all over the country accommodated in 15 halls of residence on campus and private hostels around the campus.

Study population and sampling

Eligible students were all undergraduate students aged 18-23 who registered for the 2017 academic session. The statistics of students living in campus residences for the 2016 academic year is 6,000, and it was used for the sampling (University of Lagos Student Information Handbook 2016).

Male undergraduates are accommodated in six hostels while seven hostels are for accommodation of the female undergraduates. The 6000 students living in campus hostels were allocated in the proportion shown in Table 1 below.

Table 1: Population frame

Residence (Cluster)	Female	Male	Total
King Jaja	-	480	480
Jereton Marirere	-	450	450
Saburi Biobaku	-	420	420
El Kanemi	-	445	445
Sodeinde	-	460	460
Eni-Njoku	-	486	486
Aliyu Makama Bida	450	-	450
Fagunwa	480	-	480
Madam Tinubu	468	-	468
Kofoworola Ademola	490	-	490
Moremi	508	-	508
Queen Amina	520	-	520
Honours	343	-	343
Total	3259 (54.32%)	2741 (45.68%)	6000 (100%)

The participants were selected using two sampling methods: cluster sampling for the hall of residence and stratified sampling for the room selection. The calculation of sample size was done using Slovin's formula based on the hostel residence.

Slovin's formula :

$$[n=N/ \{1+Ne^2\}],$$

Where N is the total number of students resident on campus, n is the sample size and e is the accepted level of error. The e value for this study is 0.05.

$$[n=N/ \{1+Ne^2\}]$$

$$n=2165/ [1+ 2165(0.05)^2]$$

$$n=6000/ [1+ 6000(0.05)^2]$$

$$n=6000/ [1+ 6000(0.0025)]$$

$$n=6000/ [1+ 15]$$

$$n=6000/16$$

$$n=375$$

Therefore, n (sample size) was 375.

However, to allow for potential participant attrition and incomplete questionnaires, a further 0.5% (n=30) of the sample size was added hence 405 (375+30); n=405.

The halls of residence were divided into clusters. For room selection, the total number of rooms was divided by the sample size to arrive at a room interval of 15; 6000/405=14.81; approximated to 15. Thus, every 15th room was selected for the questionnaire administration to the participants. The room numbers in each cluster were inscribed on a sheet of paper and put in a bowl for a ballot, selected randomly for all the hall clusters.

Data Collection

A pre-tested, self-administered questionnaire, formulated based on the concepts of the Precede-Proceed Model [Gielen et al., 2008], was distributed to 400 students, majorly residents of the university campus based on hostel clusters with some participants from private hostels. Completed questionnaires were collected from 386 students, with a response rate of 96.5%. The questionnaire was divided into four sections. Section A consisted of demographic characteristics. Section B consisted of the knowledge about the safety of OTC medication, Section C examined participants' views on the sources of OTC medication during examination periods and Section D examined the personal use of OTC medication during examination periods. The questionnaire was pre-tested at a Polytechnic situated in the same study setting, before the commencement of this study. The internal consistency of the questionnaire was assessed via Cronbach's alpha and yielded a value of 0.86. This value indicates acceptable reliability, suggesting that the questionnaire is suitable for this study as it was found within acceptable limits of 0.7- 0.9 [Tayakol & Dennick, 2011].

Data Analysis

Quantitative data was analysed using SPSS version 23. The relationships between the examined indicators were extrapolated using the Chi-square and Fisher's exact test. A significant statistical level of $p < 0.05$ was set.

Study limitations

The study did not probe the last time the medications were taken by the undergraduate students or the frequency of such use during exam periods rather, the study sought to establish that undergraduate students practice self-medication using OTC medications during examination periods. The study was conducted in a specific geographic location, Southwest Nigeria however, the study setting was concisely described for reproducibility.

Results

The demographic data from the survey is shown in Table 2. In this study a higher female participation was found; 64% (n=247) of females and 36% (n=139) of male participation were recorded. Most participants were of the Christian faith (n=289) and a quarter were first-year students 27.8% (n=107). Over 70% of the participants belonged to the income bracket of N50,000 – N400,000 while participants from affluent backgrounds with an income category of over N1m were just about 10% of the student population.

Table 2: Demographic characteristics of participants (N=386)

Socio-demographic characteristics	Total Number	Percentage (%)
Gender		
Female	247	64.0
Male	139	36.0
Total	386	100
Age (Years)		
16 - 17	48	12.4
18 - 19	117	30.3
20 - 21	118	30.6
22 - 23	63	16.3
Above 23	40	10.4
Total	386	100
Level of study		
Year 1	107	27.7
Year 2	116	30.1
Year 3	80	20.7
Year 4	47	12.2
Year 5	32	8.3
Year 6	4	1.0
Total	386	100
Course of study		
Management and Accounting	16	4.2
Education	85	22.3
Environmental Sciences	13	3.4
Engineering	19	5.0
Natural Sciences	105	27.6
Medicine/Dentistry	51	13.4
Social Science	6	1.6
Agricultural Science	3	0.8
Arts	12	2.9

Socio-demographic characteristics	Total Number	Percentage (%)
Law	8	2.1
Pharmacy	14	3.4
Health Sciences	40	10.2
Others	13	3.1
Total	386	100
Hall Cluster		
Campus Residence	334	84.8
Off-campus private hostel	52	15.2
Total	386	100
Religion		
Christianity	289	75.7
Islam	90	23.3
Others	3	1.0
Total	386	100
Participants' family monthly income		
₦50,000 - ₦100,000	83	21.5
₦100,001 - ₦200,000	105	27.2
₦200,001 - ₦400,000	97	25.1
₦400,001 - ₦1,000,000	58	15.0
Above ₦1,000,000	43	11.2
Total	386	100

Commonly used OTC medications and patterns of use are stated in Table 3. Most of the OTC medications were used orally; and swallowed whole as tablets.

Table 3: Commonly used OTC medication by undergraduates during exam periods

S/N	OTC medication	Therapeutic class	Route of administration
01	Paracetamol tablets	Analgesic	Oral; Swallowed whole as a tablet
02	Paracetamol + caffeine tablets	Analgesic	Oral; Swallowed whole as a tablet
03	Paracetamol + diphenhydramine	Analgesic with sedative action	Oral; Swallowed whole as a tablet
04	Chlorpheniramine	Anti-histamine with sedative properties	Oral; Swallowed whole as a tablet
05	Cough syrup + codeine	Anti-tussive	Oral; Swallowed as a syrup
06	Cough syrup + diphenhydramine	Expectorant plus anti-histamine	Oral; Swallowed as a syrup
07	Caffeine in beverages such as Nescafe	Stimulant	Oral; Licked or taken as a drink
08	Caffeine in energy drinks	Stimulant	Oral; Swallowed as a drink
09	Caffeine in kolanuts	Stimulant	Oral; Chewed
10	Diclofenac tablets	Analgesic	Oral; Swallowed whole as a tablet
11	Herbal supplements	Supplements	Oral; Swallowed whole as a tablet

The indicator analysis of OTC medication use by undergraduates during the exam period is shown in Table 4, with the corresponding p-values and Fischer exact values. At the set significant statistical level of $p < 0.05$, the analysis revealed:

Gender: Marginally significant ($p \approx 0.05$) for Fisher's exact test, possibly a weak association.

Age: showed borderline significance ($0.05 < p < 0.10$), indicating a potential weak association

Course of study: Not significant ($p > 0.05$), suggesting no strong association with OTC medication misuse.

Level of study: showed borderline significance ($0.05 < p < 0.10$), indicating a potentially weak association

Family monthly income: High significance ($p < 0.001$) for Chi-square and Fisher's exact tests, indicating a strong association with OTC medication misuse.

Level of study, Religion, and Age: showed borderline significance ($0.05 < p < 0.10$), indicating potential weak associations that might warrant further investigation.

These results suggest that family monthly income is the strongest predictor of OTC medication misuse among the indicators studied. Gender, level of study, religion, and age show some evidence of association, while the course of study appears unrelated.

Table 4: OTC medication use by undergraduates during the exam period

Indicators	OTC medication use			X ²	df	P-value	Fisher
	No	Yes	Total				
Gender				3.4347	1	0.0638	0.0499
Male	103	36	139				
Female	204	43	247				
Total	307	79	386				
Age (years)				2.9994	1	0.0833	0.0829
16-17	38	14	52				
18-19	101	17	118				
20-21	94	25	119				
22-23	53	12	65				
Above 24	21	11	32				
Total	307	79	386				
Level of study				3.4328	1	0.0639	0.0563
Year 1	93	14	107				
Year 2	87	27	114				
Year 3	65	15	80				
Year 4	32	14	46				
Year 5	27	8	35				
Year 6	3	1	4				
Total	307	79	386				
Course of study				0.2247	1	0.6355	0.4602
Management and Accounting	12	4	16				
Education	43	8	51				

Environmental Sciences	10	3	13				
Engineering	13	6	19				
Natural Sciences	81	8	89				
Medicine/Dentistry	71	14	85				
Humanities/Soc. Sciences	7	1	8				
Agricultural Sciences	4	2	6				
Arts	10	5	15				
Law	5	3	8				
Pharmacy	7	10	17				
Health Sciences	30	8	38				
Others	14	7	21				
Total	307	79	386				
Religion				3.403	1	0.0651	0.0556
Christianity	236	53	289				
Islam	67	26	93				
Others	4	0	4				
Total	307	79	386				
Participants' Family monthly income				14.389	1	0.0001	0
₦50,000- ₦100,000	82	5	87				
₦100,001- ₦200,000	75	29	104				
₦200,001- ₦400,000	65	15	80				
₦400,001- ₦1,000,000	37	17	54				
Above ₦1,000,000	48	13	61				
Total	307	79	386				

The bar graphs of the indicators with associations are shown in Figure 1 – 4 below.

Figure 1 shows the statistical analysis for OTC medication use by gender during the issue. More females (n= 43; 54%) and males (n=36; 46%) used OTC medication during the examination period.

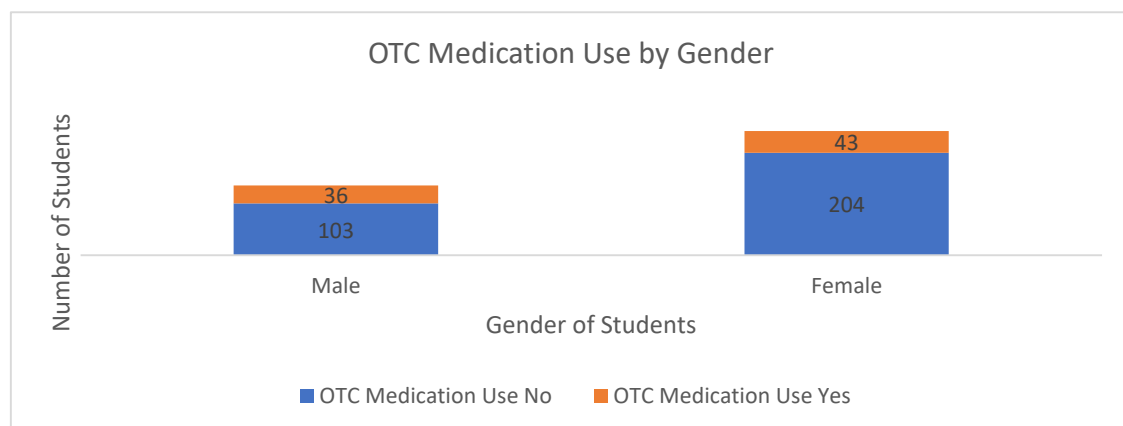


Figure 1: OTC Medication use by gender

The bar chart of medication use during the examination period by age is shown in Figure 2. OTC medication use was more prevalent in age groups 16 – 21 with a decline in misuse observed after age 22.

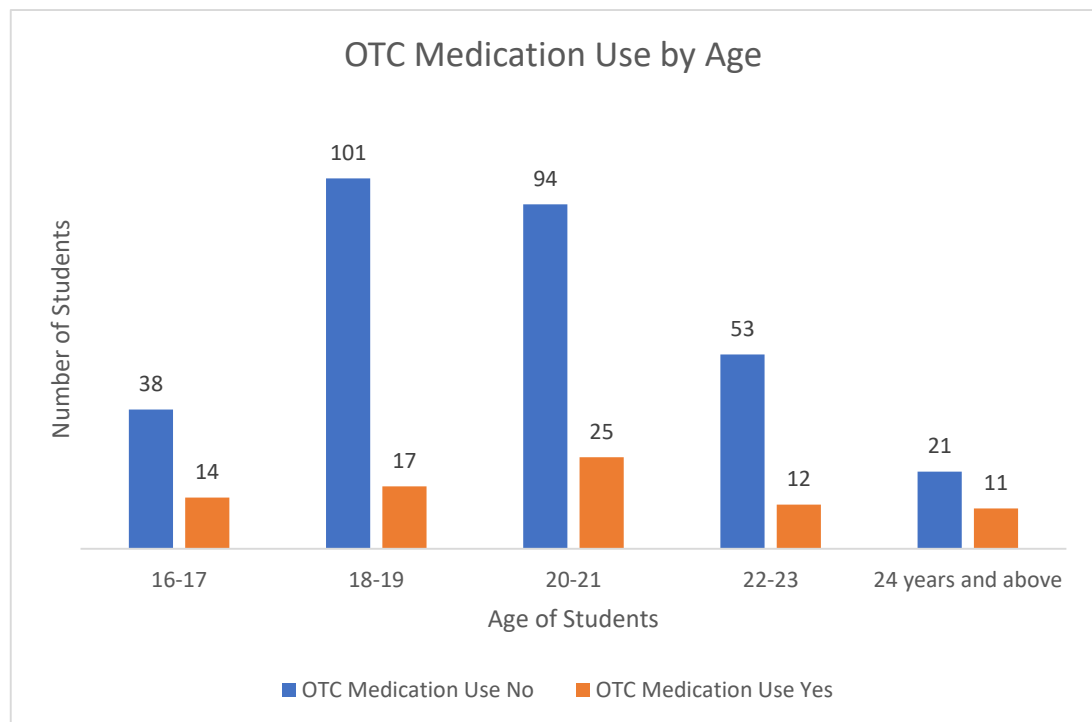


Figure 2: OTC Medication use by age

The bar chart of medication use during the examination period by level of study is shown in Figure 3. An increase in OTC medication use during the examination period was reported from year 1 to year 2 with a decline from year 3 to year 5. The lowest OTC medication misuse was reported in year 5 and year 6 with the highest use recorded in year 2.

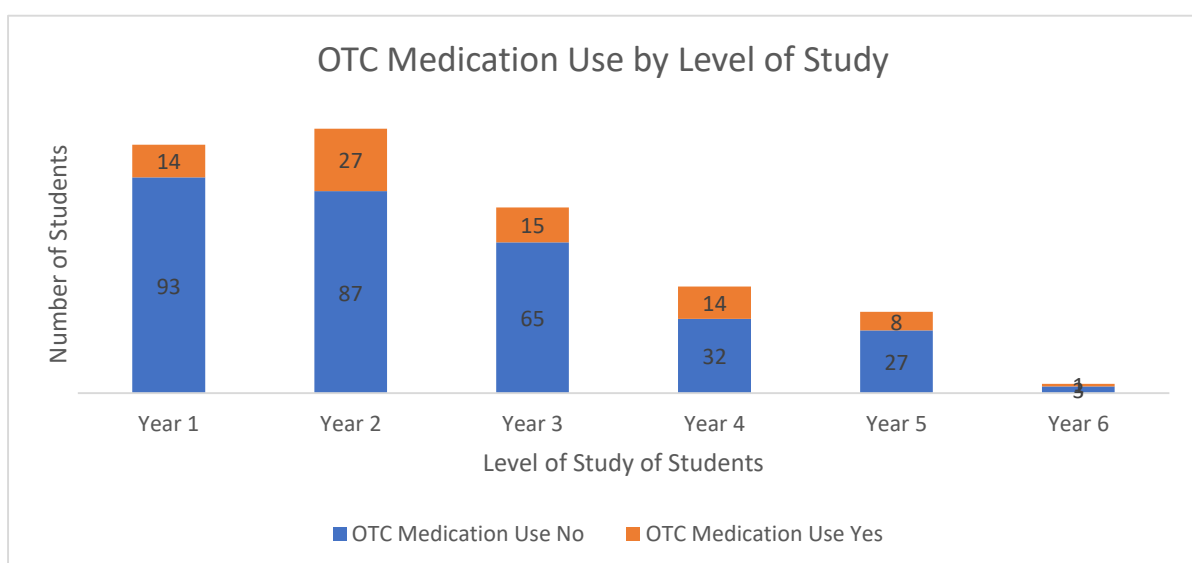


Figure 3: OTC Medication use by level of study

The bar chart distribution of the family income of the students is shown in Figure 4.

OTC medication use is influenced by family income, the lowest socioeconomic class had the least number of OTC medication users. Over 75% of the students who used OTC medication during the examination period belonged to the income category of N100,000 – N1,000,000; (n=29 for N100,000 – N200,000; n=15 for N200,000 – N400,000; n=17 for N400,000 – N1,000,000). The lowest percentage 10%, n=5 was recorded by indigent students with a family income of N50,000 – N100,000.

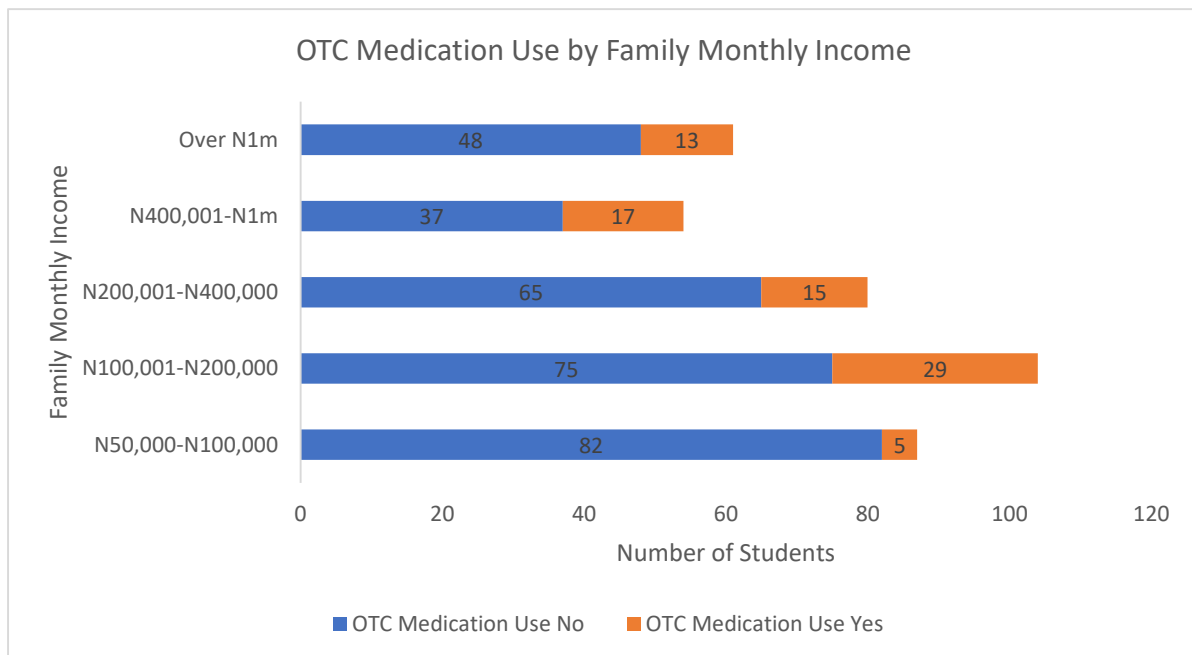


Figure 4: OTC Medication use by family income

Discussion

Gender - This study reported higher female participation than male participation. Similar reports of higher female participation among undergraduates in different geographical contexts have been reported (Al-Kubaisi et al., 2022; Orayj et al., 2021; Oyerinde et al., 2020). Correspondingly, a study conducted among Turkish undergraduates reported higher female preponderance in the survey (Akici & Basharan, 2013). By inference, the current study concludes that females show greater interest in participating in such surveys on campus than males.

Age – In this study, OTC medication use was more prevalent in age groups 16 – 21 with a steady rise followed by a decline in medication use observed after age 22. Although the p-value suggests a weak association with a p-value of 0.08, the bar charts reveal an initial increase in OTC medication use from age 16 to 21 after which a decline in the explored phenomenon was observed. The current author opines that the increase in OTC medication use exhibited by university students until age 22 could be a result of maturity from adolescence and the use of better, coping mechanisms as a student to combat academic stress and rigours (Ogobodu et al., 2023b).

Level of Study – Study findings revealed that lower OTC medication misuse was found with higher levels of study; the highest OTC medication use was in first-year and second-year students while the lowest OTC medication use was reported in fifth-year and final-year students. The study findings align with the assertion by Ogobodu et al which cited adolescence as a critical period of development characterised by high experimentation and risk-taking by adolescents making first and second-year students more prone to experimentation with OTC medication [Ogobodu et al 2023a]. Furthermore, final-year students in a Brazilian

study showed lesser OTC medication preference [da Silva et al., 2012]. In contrast with the above findings, studies conducted in Sri Lanka and Istanbul, OTC medication use was significantly higher in last-year students than in first-year students, and the tendency for the use of OTC medication showed an increase with an increase in academic year (Subashini and Udayanga, 2020; Akici & Basharan, 2013).

Course of Study – the current study revealed that the course of study of the undergraduates had no association with the probed factors. However, the field of study was reported as a significant factor influencing OTC medication use in a Sri Lankan study [Subashini & Udayanga 2020].

Religion – the participants in the current study were largely, Christians. This finding is in alignment with a study on medication use by university undergraduates in Nigeria where about 77% of the participants were Christians (Oyerinde et al., 2021). The similarity in the study settings of Southwest Nigeria might be an indicator of the prevailing religion in this region or could be a reflection of the degree of willingness of these individuals to participate in the study.

Family income - OTC medication in this study is influenced by family income, the lowest socioeconomic class had the least number of OTC medication users. A study conducted among undergraduate students in Eritrea aligns with the finding that high family monthly income has been demonstrated to encourage self-medication [Araia et al., 2019].

OTC medication used by undergraduates and the route of administration

In this study, the most commonly used OTC medications were painkillers, cough and cold medications, and vitamins (supplements and herbals). Our study findings align with other scholars who reported the use of painkillers to treat headaches and body aches during examinations and cough syrups, especially, for their sedative action that makes students sleep for prolonged periods of time after studying hard and for longer during the exam period (Orayj et al., 2023; Almasdy & Sharraf, 2011).

This study revealed that the prevalent route of administration was oral, swallowing tablets with water. At other times, students licked the medication or chewed it. No inhalation or intravenous administration was reported. In line with this, a similar study conducted in Turkey amongst university students asserted that students' oral medications were used with and without water, licking at the least (Akisi & Basaran 2013).

Conclusion

Examination stress and lack of time are reasons for self-medication. Students who reside in university hostels perceive minor ailments such as headaches as not requiring professional medical attention thus making students more prone to engaging in self-medication practices. The ease of access to OTC medications available for sale at campus stalls and tuck shops contributes to self-medication practices. Tuck shops and residing in university hostels involve interactions with peers and associates who may make self-medication practices appealing especially from lived experiences of prompt relief and lack of time wasted for consultation at the university clinic or pharmacy. Academic and social pressures of students can be managed with stress management programs that aim at reducing the tendency to self-medicate with counselling sessions and workshops to address specific gender tendencies. Future research recommendations include the investigation of the effectiveness of educational interventions targeted at the rational and responsible use of OTC medications among university students during the academic session.

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Conflict of interest

The author declares no conflict of interest.

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Institutional Review Board Statement

The study was conducted according to the guidelines of the Declaration of Helsinki and approved by the Research Ethics Committee in the Department of Health Studies, University of South Africa project number REC-012714-039.

Informed Consent Statement

All the study participants gave informed consent.

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