Original Research Article

Prevalence and pattern of misuse of over-the-counter drugs among teachers in public and private secondary schools in Benin City, Nigeria

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Abstract

Purpose: Misuse of over-the-counter (OTC) medicines can result in several harms ranging from mild to very severe conditions. The study assessed the prevalence and pattern of misuse of OTC medicines among secondary school teachers, for improved safety measures.

Methods: A descriptive cross-sectional study was conducted, using a multistage sampling technique. A self-administered, structured, researcher-developed questionnaire on OTC medicine use was used for data collection after face validity and pre-test. OTC medicines misuse was assessed with reference to the recommended dose, among 300 respondents. Analysis of data was done using IBM SPSS version 21.0. $P \leq 0.05$

Results: A total of 300 respondents participated in the study and the majority were 25-40 years of age, 120 (40.0%). Females constituted 186 (62.0%) of the population. Vitamin supplements were predominantly misused 110 (36.7%) at varying degrees, followed by Analgesics 104 (34.7%), Cough mixtures 41 (13.7%) and Ointments 7 (2.3%) respectively. More than half of the respondents (62.3%) misused their OTC medicines at varying degrees; Always 6 (2.0%), Sometimes 145 (48.3%) and rarely 36 (12.0%). The majority of the respondents misused OTC drugs because they did not think it mattered 91 (48.7%). Other reasons were; recommended dose not effective 84 (44.9%) and the need for faster onset of action 9 (4.8%). The prevalence of misuse was 187 (62.3%).

Conclusion: There was high prevalence and widespread misuse of various OTC medicines by the teachers at varying degrees, with vitamin supplements being most misused. Teachers should have routine OTC drug information through workshops organized by health-related agencies, since they possess the ability to influence the larger society.

Keywords: Over-the-counter (OTC) medicines, misuse, school teachers, prevalence.

Introduction

Self-care appears to be gaining increasing recognition with the emergence of several point-of-care products and a wide range of over-the-counter (OTC) medicines. One of the components of self-care is self-medication which involves the use of selected OTC medicine by the patient in the treatment of a self-diagnosed illness [1]. OTC medicines, also known as non-prescription medicines are sold over the counter without a prescription [2], and are used to treat minor ailments that are commonly recognized by non-health professionals. They are regarded as safe and effective for use without a prescription or supervision by a health professional [3].

OTC use usually stems from the users' ability to rely on their skills for self-care. Other reasons identified for their use are busy schedule and ease of access [4]. Among its benefits is the reduction in the cost of care to the users as well as increased participation of individuals in their health care [5, 6]. OTC drugs are usually selected by regulatory agencies to ensure their safety when used without medical supervision [7].

The use of OTC medicines in self-medication may however delay the diagnosis of serious health conditions, and the potential for misuse of these drugs cannot be completely ruled out [8]. The consequences of improper diagnosis, and addiction in prolonged use of some OTC drugs are major challenges in unguided use of the drugs [9]. Misuse of OTC drugs can result in several harms ranging from renal impairment to hepatic toxicity [10]. These have led to the suggestion of strict regulation for the classification of drugs into OTC drugs and the recommendation for effective education led by the pharmacist [11]. Misuse of medicines refers to the incorrect use of the medicine for genuine medical purposes which include incorrect dosage, dosage form, frequency and duration.

The role of pharmacists as medication experts in OTC drug counseling enhances rational use by patients and other users. Pharmacists are usually the first line of contact for patients as a result of easy accessibility; this creates the opportunity for counsel on the most suitable OTC drugs for a patient [12]. The use of these drugs also increases the need for enhanced drug information services and general pharmaceutical care services by pharmacists, especially community pharmacists.

High percentage of OTC medicine users engage in risky self-medication practices and this may be significantly associated with educational qualification, occupation and knowledge on OTC medicines [13], Prevalence of overdose of OTC drugs have been reported at several percentages, ranges from 14.0% in Eritrea [13], to 22.6% in Nigeria [14].

This study assessed the prevalence and pattern of misuse of OTC medicines among secondary school teachers, for effective targeted education, to promote optimized and rational use of these drugs. It is necessary to carry out this study in secondary school teachers as they are in the strategic position to impact knowledge, and also a good source to disseminate knowledge.

Methods

A descriptive cross-sectional survey was done, involving 300 from a population of 452 public and private secondary school teachers in Egor Local Government Area (LGA), Benin City, Nigeria. Both temporary and permanent teachers were recruited for the study. Sample size determination was done using Cochran's formula [15]. Multistage sampling technique was utilized and comprised 3 stages, and a mixed method.

Stage 1: Five wards were selected from the list of wards in Egor LGA, by simple random sampling method through balloting.

Stage 2: One private and one public secondary school were selected from each of the selected wards also with the aid of simple random sampling method through balloting.

Stage 3: The third stage of the survey involved the use of a systematic sampling method, and respondents were recruited by probability proportional to size (PPS) based on the population of the teachers in the public and private schools. The number of teachers recruited in each stratum was obtained by multiplying the total number of teachers in the stratum by the sampling fraction. The proportionate allocation was used to determine the actual number of teachers to be recruited from each school using the sampling fraction (sample size (n) divided by the study population). The number of respondents in each school was calculated to be the number of teachers in a school multiplied by the sampling fraction. Systematic sampling was then used to select the teachers who would participate in the study, with the aid of the sampling interval which was calculated by dividing the study population by the sample size. Then, from the sampling frame; the first teacher was picked using simple random method after which every second (2nd) teacher was recruited for the study.

The tool for data collection was validated and tested for completeness through pretesting among teachers in a school outside the study area, but within the sane city. The validation was done through Cronbach's alpha test for internal consistency and reliability of questions. The tool

was structured and self-administered, comprising four sections. Section one was used to collect respondents' socio-demographic information. Section two was used to get information on prevalence of OTC drugs misuse and reported effects of OTC drugs, and was composed of six (6) questions. Section three comprised seven (7) s multiple-choice questions that assessed the pattern of misuse of OTC drugs and factors associated with the misuse.

Statistical analysis was done using IBM SPSS version 21.0 statistical software. Descriptive statistics was done, means for age and duration of practice were calculated and chi-square was used to test for associations ($p \leq 0.05$). Misuse of OTC drugs in respect to overdose was determined in comparison with the recommended dose. Also the number of people found to be involved in the misuse was used to determine the prevalence of misuse. Attitude towards OTC drugs was assessed with regards to use; respondents who misused their OTC drugs were termed to have a negative attitude towards the drugs and vice versa. Data were presented in frequency and bivariate tables.

Ethics Approval

Ethics approval with the protocol number: ADM/E22/A/VOL.VII/1284, was obtained from the Ethics and Research Committee of the University of Benin Teaching Hospital. Institutional approval was also obtained from the respective authorities, including the school authorities before the study. Individual informed consent was also sought and obtained before the study. Health education on rational drug use and consequences/management of OTC misuse was also carried out in the schools after the data collection activities.

Results

The response rate was 100% and a reliability of 0.77 was calculated. The majority of the respondents 120 (40.0%) were 25 – 40 years old. The mean age of male respondents was 36.0 (±11.4) years and that of the females was 34.9 (±11.9) years. The mean duration of practice for males was 9.9 (±9.9) years while that of females was 8.4 (± 7.9) years. Overall, more than half of the respondents were females186 (62.0%) and 191 (63.7%) had Bachelors' degree. While, 167 (55.7 %) had practiced within five years and 185

(61.7 %), practiced in public secondary schools. Others are as shown in Table 1.

Table 1: Respondents' socio-demographics
N = 300

Variables	Frequency (n)	(%)
Age (years)		
≤25	94	31.3
25 – 40	120	40.0
>40	86	28.7
Sex		
Male	114	38.0
Female	186	62.0
Marital status		
Never married	151	50.3
Ever married	149	49.7
Educational qualification		
Less than diploma	41	13.7
Diploma	25	8.3
Bachelors' degree	191	63.7
Postgraduate	43	14.3
Type of school		
Public	185	61.7
Private	115	38.3
Duration of practice (years)		
≤ 5	167	55.7
6 – 15	76	25.3
16 – 25	28	9.3
>25	29	9.7

About two-third, 201 (67.0%) knew OTC drugs could interact with other drugs, while more than half, 191 (63.7%) were not aware of any side effect of any OTC medicine. However, 230 (76.7%) were aware that OTC medicines are not without side effects. Awareness of the respondents on the possibility of life-threatening effects in the inappropriate use of OTC medicines was reported by more than two-third, 217 (72.3%) of the respondents. More than half of the respondents, 158 (52.7%) read the leaflets that accompanied their OTC drugs "sometimes", while 110 (36.7%) read the leaflets always. However, 32 (10.7%) never read the leaflets. The results also showed that nearly half of the respondents, 145 (48.3%) exceeded the recommended doses of their OTC drugs sometimes, a few 36 (12.0%) exceeded on rare occasions and very few 6 (2.0%) exceeded the doses always. Hence, the prevalence of OTC misuse was found in almost two-thirds, 187 (62.3%) of the respondents, while about one-third 113 (37.7%) never exceeded the recommended doses of their OTC drugs. See Table 2.

Table 3 shows the pattern of OTC drug misuse and its associated factors among respondents. It shows that the most commonly misused OTC drugs were 110(36.7%) vitamin supplements, 104 (34.7%) analgesics, 41(13.7%) cough mixtures and 7 (3.8) ointments respectively. More than half, 57 (54.8%) misused their analgesics sometimes, while less than half 44 (42.3%) misused it on rare occasions. The majority 65 (59.1%), also misused their vitamin supplements sometimes and less than a quarter misused it rarely 23 (20.9%) and every time 21(19.1%) respectively. The majority also exceeded their cough mixtures sometimes 29 (70.7%), while less than a quarter exceeded on rare occasions 12 (29.3%). Most of the respondents 91 (48.7%), did not perceive any problem with exceeding the recommended doses as they reported that it did not matter. Also, less than half 84 (44.9%), did not perceive effectiveness from the recommended dose of their OTC drugs and a few 9 (4.8), exceeded the doses because they required faster onset of action from the drug.

Table 2: Reading of drug information leaflets, prevalence attitude towards OTC drugs and reported effects of OTC drugs. N = 300

Variables	Frequency (n)	Percentage (%)
Read enclosed drug information leaflets		
Always	110	36.7
Sometimes	158	48.3
Never	32	10.6
Exceed recommended dose		
Always	6	2.0
Sometimes	145	48.3
Rarely	36	12.0
Never	113	37.7
Reported effects of OTC drugs		
Presence of drug-drug interaction with OTC drugs		
Yes	201	67.0
No	99	33.0
Awareness on any side effects of any OTC drug		
Yes	109	36.3
No	191	63.7
Presence of side effects with OTC drugs		
Yes	230	76.7
No	70	23.3
Presence of life-threatening effects with		
misuse of OTC drugs		
Yes	217	72.3
No	83	27.7
Attitude towards OTC drugs		
Positive	113	37.7
Negative	187	62.3

Table 3: Respondents' pattern and reasons for misuse of OTC drugs

Variables	Frequency (n = 300)	Percentage (%)
Type of OTC drug and frequency of overdose		
Analgesics (n = 104)		
Every time	1	1.0
Sometimes	57	54.8
Rarely	44	42.3
Others	2	1.9
Vitamin supplements (n=110)		
Every time	21	19.1
Sometimes	65	59.1
Rarely	23	20.9
Others	1	0.9
Cough mixtures (n = 41)		
Sometimes	29	70.7
Rarely	12	29.3
Ointments	7	2.3
Reasons for overdose (n = 187)		
Does not matter	91	48.7
Recommended dose is less effective	84	44.9
For faster effect	9	4.8
No reason	3	1.0

In table 4, the association between socio-demographics and OTC overdose is shown; where almost half 42 (48.8%), of the respondents above 40 years of age never misused their OTC drugs and majority 53 (56.4%) of those below 25 years misused their OTC drugs sometimes. The differences in misuse were however not significant with age and the other assessed socio-demographic variables. Others are as shown in table 4.

Table 5 shows that association between socio-demographics and perception of life-threatening effects in OTC drugs overdose, is significantly associated with educational qualification (*p = 0.016*), duration of practice (*p = 0.001*), type of school (*p = 0.001*) and marital status (*p = 0.001*). Respondents who had degrees less than a

diploma had a higher proportion 18 (43.9%), of respondents who were not aware of the potential presence of life-threatening effects in OTC drugs misuse, than the other educational groups. Others are shown in the Table.

Table 4: Association of respondents' characteristics and pattern of an overdose of OTC medicines. N = 300

Variables	Took overdose			
	Always n=6 (%)	Sometimes n=145 (%)	Rarely n=36 (%)	Never n=113(%)
Age (years)				
<25	0 (0)	53 (56.4)	12 (12.8)	29 (30.9)
25 – 40	4 (3.3)	57 (47.5)	17 (14.2)	42 (35.0)
>40	2 (2.3)	35 (40.7)	7 (8.1)	42 (48.8)
		$\chi^2 = 11.12$; df = 6; p = 0.085		
Sex				
Male	2 (1.8)	49 (43.0)	19 (16.7)	44 (38.6)
Female	4 (2.2)	96 (51.6)	17 (11.4)	69 (37.1)
		χ^2= 4.524; df=3; p = 0.210		
Marital status				
Never married	3 (2.0)	76 (50.3)	19 (12.1)	53 (35.1)
Ever married	3 (2.0)	69 (46.3)	17 (11.4)	60 (40.3)
		χ^2=0.869; df=3; p = 0.833		
Type of school				
Public	4 (2.2)	84 (45.4)	18 (9.7)	79 (42.7)
Private	2 (1.7)	61 (53.0)	18 (15.7)	34 (29.6)
		χ^2= 6.242; df=3; p = 0.100		
Duration of practice (years)				
≤ 5	4 (2.4)	79 (47.3)	24 (14.4)	60 (35.9)
6 – 15	1 (1.3)	45 (59.2)	8 (10.5)	22 (28.9)
16 – 25	1 (3.6)	12 (42.9)	1 (3.6)	14 (50.0)
>25	0 (0.0)	9 (31.0)	3 (10.3)	17 (58.6)
		F=13.137; df=3; p = 0.116		

Table 5: Association of respondents' demographic characteristics and perception of potential life-threatening effects of OTC drug overdose. N = 300

Variables	Presence of life-threatening effects in misuse		p – value
	Yes n = 217 (%)	No n = 83 (%)	
Age (years)			χ^2=5.781; df= 2; p = 0.056
<25	76 (80.9)	18 (19.1)	
25 -40	85 (70.8)	35 (29.2)	
>40	56 (65.1)	30 (34.9)	
Sex			χ^2 = 2.910; df = 2; p= 0.233
Male	80 (70.8)	33 (29.2)	
Female	131 (73.7)	49 (26.3)	
Educational qualification			χ^2 =10.322; df=3; ***p*=0.016***
Less than diploma	23 (56.1)	18 (43.9)	
Diploma	23 (92.0)	2 (8.0)	
Bachelors' degree	140 (73.3)	51 (26.7)	
Postgraduate	31 (72.1)	12 (27.9)	
Type of school			χ^2 =15.469; df =1; ***p*=0.001***
Public	119 (64.3)	66 (35.7)	
Private	98 (85.2)	17 (14.8)	
Duration of practice			χ^2 =17.725; df=3; ***p*=0.001***
<5	135 (80.8)	32 (19.2)	
6 -15	50 (65.8)	26 (34.2)	
16 – 25	13 (46.4)	13 (53.6)	
>25	19 (65.5)		
Marital status			χ^2 = 9.241; df = 1; ***p*=0.002***
Never married	121 (80.1)	30 (19.9)	
Ever married	96 (64.4)	49 (26.3)	
	*Significant		

Discussion

A high prevalence of OTC drugs misuse was observed in the study. The majority of respondents exceeded the recommended doses of their OTC drugs at varying degrees and this was because they mostly thought it did not matter. Other reasons were faster onset of action and increased efficiency/effectiveness, particularly for analgesics and cough syrups. A previous study also reported the intake of an overdose of OTC drugs by the respondents [13]. Similarly, a widespread prevalence of misuse of drugs especially antibiotics; was also reported in India [16]. These could be a result of low perception of the presence of serious consequences, or perceived low susceptibility to consequences of overdose. This study shows respondents' low awareness of the potentially harmful effects of this group of drugs. Meanwhile, a previous community-based study in Nigeria, reported a lower prevalence of misuse of drugs [14]. Differences in the specific OTC drugs in focus may be responsible for this difference in prevalence. Regular emphasis should be made by healthcare providers, through various media on the need to seek counsel on a more effective alternative, rather than an overdose of a chosen OTC medicine. Health care providers; particularly pharmacists, should also encourage and promote rational drug use through seminars, counseling, workshops and other means of education.

Vitamin supplements were observed to be the predominantly misused OTC drugs. Widespread availability and uncontrolled advertisements may have contributed to its widespread misuse. Also, being food supplements, there may be a misconception of unlimited safety margins of these OTC drugs, and absence of harm associated with misuse, resulting in a widespread overdose. However, a high dose of vitamin supplements may not always prevent diseases, but predisposes the user to increased risk of diseases [17]. Excessive or overdose of vitamin supplements is associated with several adverse effects. The pattern of misuse also showed that vitamins were more misused on a regular basis than other OTC drugs, cough mixtures and analgesics respectively, were next to them.

There appears to be a decline in misuse of OTC medicines with the increase in age as shown in the study. The majority of the respondents who were above forty years old, especially those who had more than sixteen years of practice experience did not take an overdose of their OTC medicines. OTC medicine misuse was however predominant in younger respondents, but this association with age was not statistically significant. Meanwhile, a previous study in Nepal reported a lower practice score for OTC medicine use among teachers who were below 30 and above 40 years old, with no difference between public and private secondary school teachers in the use of the medicines [18].

This study showed there was no significant association between the respondents' characteristics and overdose of OTC drugs. This implies that overdose was neither specific to age, sex, duration of practice, type of school nor educational qualifications. However, a previous study reported a low literacy level to be associated with misconceptions on the non-harmful effects of OTC drugs, resulting in the potential of adverse drug reaction associated with misuse [19]. Respondents in our study had high literacy levels, with a large majority having a university education, which may be a reason for the difference in findings. Also, Risks associated with analgesic misuse has been described as being dependent on the users' vulnerability [20], which may be related to the socio-demographic variables of the user. Socio-demographics like age, ethnicity and weight, among others, are important determinants of susceptibility to adverse effects of drugs hence, should be a focus in preventive educations.

Respondents' perception of potentially life-threatening effects in OTC medicines overdose was significantly associated with several attributable characteristics, among which were level of education, type of school, duration of practice and marital status. Respondents who had bachelors' degrees and postgraduates degrees appeared to have higher perception of the possibility of life-threatening effects with OTC medicines misuse. A higher literacy level in this group may be responsible for this finding. Meanwhile, a previous study suggests low perception of teachers on adverse effects of OTC medicine [21]. Perception of potentially life-threatening effects with OTC medicines overdose was also significantly higher among respondents in private school, married respondents and those who had longer practice years. Longer practice years exposes the practitioner to several forms of knowledge, which are necessary for informed choices.

Findings from a previous study also suggest misuse of OTC drugs to be associated with several respondents' characteristics, including; income [22], which may be related to practice duration.

The study showed that the majority of the respondents were not consistent in the use of their OTC drug leaflets. Similarly, a previous study shows that only a proportion of its respondents read OTC drug information leaflet [13]. Education on the benefits of reading these leaflets should be targeted at the younger group. A study on the effect of information leaflets on users' behavior reported a relationship between reading of leaflets and education level [23]. This is not consistent with findings from our study where educational qualification appeared not to play a significant role in the reading of drug information leaflets. This observed difference in findings could be due to socio-cultural differences in the two populations. In another study conducted in Sweden, a quarter of the respondents read drug information leaflets [7].

In spite of the several strengths of the study, including the probability method of recruitment which allows for generalization of findings, it is faced with the risk of self-reporting bias from the respondents. Also, the assessment of misuse of OTC drugs was based only on overdose and this may limit the scale of misuse of the drugs. Misuse of OTC drugs based on frequency and duration of use are areas to be explored to further quantify the scale of misuse of these drugs.

Conclusion

There were high prevalence and widespread misuse of various OTC medicines by the teachers, at varying degrees and this was mostly due to low perception of being susceptible to adverse effects following overdose. Vitamins were the most misused OTC drug and the majority of the respondents did not always read their OTC drug leaflets.. Teachers should have routine OTC drug information through workshops organized by health-related agencies; since they possess the ability to influence the larger society.

Author contribution

We declare that this work was done by the authors named in this article and all liabilities

pertaining to claims relating to the content of this article will be borne by the authors. We declare that COI and VYA conceived and designed the study, data collection was done by COI, while data analysis, drafting and review of the manuscript were also done by COI and VYA.

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Conflicts of interest

There were no known conflicts of interest.

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