

## Pattern, Knowledge And Other Contextual Correlates Of Use Of Pain-Killers Among Students Of Niger Delta University

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**Abstract:** Pain, a ubiquitous symptom in the clinics, requires the use of analgesics to manage. Analgesics have been reported to be very widely used and abused set of drugs globally. This study was aimed at evaluating the patterns and other contextual correlates of use of pain killers among Niger Delta University Students. This was a descriptive cross-sectional study. Questionnaires were administered randomly to 270 consenting students, after carefully explaining the objectives of the study. 56.3% of respondents were females; majority (68.9%) was aged 21-30 years; the prevalence of use of pain killers was 78.2% and self-medication rate was high at 67.63% among 21-30 year-olds; paracetamol, ibuprofen, aspirin diclofenac and indomethacin were most frequently used for general body pains, headaches, chest and menstrual pains; choice of drug was based on effectiveness (37.8%) and most drugs used were prescribed by health professionals (34.4%); 45.9% always consulted health professionals for pain management; 19.6% always visited chemists; 64.8% knew the correct dose to use but 66.7% took the right dose as prescribed. Adverse Drug Reaction (ADR) awareness was rated at least as good by over 70%; sweating, heart burn, chest pain, and stomach pains were reported as either always or sometimes experienced after taking pain killers; about 65% always reported these ADRs to a health professional; over 80% always or sometimes procured pain killers from community pharmacies, hospitals and chemist shops; an average of N500 was expended per month on pain killers. Educational status was correlated with ADR awareness. There is a need for educational interventions to ensure the rational use of pain killers among the students of Niger Delta University.

**Key words:** Pain; Analgesics; NSAIDs, Undergraduate students; Patterns of use.

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### I. Introduction

The most common ailment that takes people to the health professional and hospital is pain. This is because pain is a frequent manifestation (symptom) of very many disease states. Pain killers are the mainstay of management of pain, they are the most used and abused set of drugs globally. Non-steroidal anti-inflammatory drugs (NSAIDs) are one of the most frequently prescribed drugs for pain management worldwide[1].

NSAIDs elicit their pharmacological actions by inhibiting the enzymatic activity of the COX enzymes. These enzymes synthesize prostaglandins from arachidonic acid. Arachidonic acid is omega-6 poly-unsaturated fatty acid commonly found at the *sn*-2 position of the cell membrane[2].

The abuse of NSAIDs is informed by their widespread availability with no standard prescribing guideline for specific ailment and symptoms [3]. The abuse of NSAIDs has resulted to cardiovascular disorders such as heart attack and stroke due to inhibition of cyclooxygenase COX-2 which eventually secretes vasoconstrictors. This is more common in patients that had prior cardiovascular disorders[2]. Also NSAID- induced gastrointestinal disorder resulting in the perforation of mucosa has been reported[4]. The adverse drug reactions induced by NSAIDs vary based on the particular NSAIDs used and the degree of use/abuse.

In this study we evaluated the pattern of use of NSAIDs among undergraduate students of Niger Delta University in Nigeria, their knowledge, expenditure outlay and other contextual correlates of use of pain killers.

### II. Methodology

#### a. Study population

This survey was done among students in the Niger Delta University, Wilberforce island Bayelsa State, South –South of Nigeria. The University Community is made up of about 10,000 students.

#### b. Study Design and Sample

This was a descriptive cross-sectional study. Questionnaires were administered randomly to 270 consenting students after carefully explaining the objectives of the study.

The questionnaires were designed to retrieve demographic information, evaluation of NSAIDs use patterns, knowledge of NSAIDs, health seeking behaviours and the possible adverse reactions that come with the use of pain killers. The sample size was calculated using the formula for determining sample size for population studies[5].

**c. Data Analysis**

Data were coded and fed into SPSS version 20 spread sheet for descriptive and inferential (students'-test and one-way ANOVA) statistics.

**III. Results**

**a. Demographic Information**

The demographic characteristics of the respondents showed higher proportion of female to male (56.3% and 43.7%) in which majority of them were within the age of 21-25(51.1%) and most of the respondents that participated were the I jaws and Igbo's. All the students' level was represented in the study but more of 200 level and 400 level participated in the survey with 26.7% and 22.2% respectively. See table 1 for details.

**Table 1: Bio-socio-demographic data**

Variables	Frequency (%)	
Gender	Female	152(56.3)
	Male	118(43.7)
Age	16-20	152(56.3)
	21-25	132(51.1)
	26-30	48(17.8)
	>30	34(12.6)
Ethnicity	Ijaw	163(60.4)
	Urhobo	24(8.9)
	Igbo	51(18.9)
	Hausa	2(0.7)
	Yoruba	13(4.8)
Student Level	Others	17(6.5)
	100	45(16.7)
	200	72(26.7)
	300	44(16.3)
	400	60(22.2)
	500	49(18.1)

**b. Prevalence and Pattern of Self-medication with NSAIDS**

The result showed that 78.2% had ever used pain-killers; 35.6% preferred to use paracetamol always; 13% and 8.9% of respondents respectively preferred to use ibuprofen and Aspirin; 45.5% and 40.4% preferred to use ibuprofen and paracetamol sometimes. Other respondents also reported to use aspirin, diclofenac sodium and potassium, meloxicam and piroxicam sometimes. Most of the respondents did not use celecoxib, indomethacin, mefenamic acid, naproxen and other NSAIDs. Data showed that the incidence of self-medication was highest (47%) among 21-25 year-olds followed by >30 year-olds (22.05%). See table 2 for details.

**Table 2: Prevalence and Pattern of Self-medication with NSAIDS**

Prevalence	Frequency (%)		
Variables	Always	Sometimes	Never
Acetaminophen	96(35.6)	109(40.4)	15(5.9)
Aspirin	24(8.9)	47(17.4)	97(35.9)
Celecoxib	5(1.9)	10(3.7)	131(48.5)
Diclofenac sodium	17(6.3)	42(15.6)	99(36.7)
Diclofenac potassium	10(3.7)	44(16.3)	107(39.7)
Diclofenac with Misoprostol	4(1.5)	10(3.7)	135(50)
Ibuprofen	35(13.0)	123(45.6)	37(13.7)
Indomethacin	2(0.7)	10(3.7)	137(50.8)
Meloxicam	5(1.9)	12(4.4)	130(48.1)
Mefenamic Acid	2(0.7)	5(1.9)	134(49.6)
Piroxicam	11(4.1)	30(11.1)	118(43.7)
Others(Naproxen, tramadol, methylsalicylate)	11(4.1)	5(1.9)	75(27.8)
Incidence of self-medication among the age groups (yrs)	Frequency (%)		
16-20	7(10.29%)		
21-25	32(47.05%)		
25-30	14(20.58%)		
>30	15(22.05%)		

Regarding combination of pain relievers, 5.2% reported that they used Acetaminophen and Ibuprofen while 3.7% of respondents reported that they used Acetaminophen and Aspirin combination. See table 3 for details

**Table 3: Combinations of Pain Relievers**

Drugs	Frequency (%)
Acetaminophen and Aspirin	10(3.7)
Acetaminophen and Celecoxib	1(0.4)
Acetaminophen and Diclofenac	9(3.3)
Acetaminophen and Ibuprofen	14(5.2)
Acetaminophen and Meloxicam	1(0.4)
Acetaminophen and Naproxen	2(0.7)
Acetaminophen and Piroxicam	1(0.4)
Acetaminophen and Tramadol	3(1.1)
Acetaminophen, Ibuprofen and Tramadol	1(0.4)
Aspirin and Diclofenac	1(0.4)
Diclofenac and Ibuprofen	1(0.4)
Diclofenac and Piroxicam	2(0.7)
Ibuprofen and Tramadol	1(0.4)
Pentazocine and Prednisolone	1(0.4)

**c. Reasons for choice and indications forusing pain Relievers**

Data showed that 37.8% of respondents reported that they used their NSAIDs because it was very effective; 23.3% because it was affordable; 34.4% because it was prescribed for them. Regarding indications for use, 33.7% and 34.8% of respondents *always* used NSAIDs for general body pains and headache respectively, while 20.7% *always* used NSAIDs for menstrual pain. Some of the respondents *sometimes* used NSAIDs for general body pain, menstrual pains, headache, joint pain, chest pain, leg/hand pain, stomach pain, arthritis, back pain, malaria and others pains. See table 4 for details.

Table 4: Reasons for choice of pain Relievers

Reason	Frequency/(%)		
Affordable	63(23.3)		
Prescribed by health professional	93(34.4)		
Very effective	102(37.8)		
Advert on media	6(2.2)		
Recommended by friends/family	15(5.6)		
Others	11(4.1)		
Indications for use of NSAIDs			
Indications	Frequency (%)		
	Always	Sometimes	Never
General Body pains	99(33.7)	110(40.7)	17(6.3)
Menstrual pains	56(20.7)	54(20)	101(37.4)
Headache	94(34.8)	107(39.6)	21(7.8)
Joint pain	33(12.2)	102(37.8)	64(23.7)
Back pain	41(15.2)	107(39.6)	50(18.5)
Chest pain	17(6.3)	83(30.7)	89(33.0)
Leg pain	32(11.9)	94(34.8)	69(25.6)
Hand pain	29(10.7)	80(29.6)	82(30.4)
Arthritis	7(2.6)	43(15.9)	132(48.9)
Stomach	13(4.8)	75(27.8)	109(40.4)
Malaria	24(8.9)	75(27.8)	100(37.0)
Others	3(1.1)	12(4.4)	89(33.0)

**d. Knowledge NSAIDs**

Data showed that 64.8% and 43% of respondents reported that they had good knowledge about the correct dose of their pain relievers and frequency of administration respectively.. Over 30% of respondents reported that they had a good knowledge of how long to use the NSAIDs, the need to use with food, not to be used on empty stomach and with alcohol. See table 5 for details.

Table 5: Knowledge about pain relief drugs

Information	Frequency (%)		
	Very well	Average	No idea
Correct dose	175(64.8)	60(22.2)	8(3.0)
How often to be used	116(43.0)	92(34.1)	17(6.3)
How long to be used	105(38.9)	100(37.0)	21(7.8)
Use with food	130(48.1)	87(32.2)	11(4.1)
Use on empty stomach	105(38.9)	82(30.4)	35(13.0)
Use with alcohol	89(33)	58(21.5)	68(25.2)
Use with other drugs	96(35.6)	102(37.8)	25(9.3)

**e. Health seeking behavior and drug utilization patterns**

Data showed that 35.9% and 19.6% of respondents respectively reported that they *always* visited the pharmacy and chemist for their pains; 54.1% of respondents *sometimes* visited the hospital for their pains; 48.1% *sometimes* visited the pharmacy and 43.3% *sometimes* visited the chemist shop for their pains. 26.7%, 19.6% and 12.6% respectively *sometimes* visited church/mosque, massaging homes and street medicine vendors for their pains. Regarding how they took pain relievers, 6% of respondents reported that they *always* took their NSAIDs as prescribed by the health care providers, while, 66.7% took the right dose as prescribed. 20.4% and 20.7% of respondents respectively took their pain relievers as recommended by chemist and product leaflet instructions. 23.7%, 35.9% 19.6% and 39.6% of respondents respectively *sometimes* used their pain relievers as prescribed, as recommended by chemist/friends and according to product leaflet instructions. 13.7% reported that they *sometimes* took the right dose of their pain relievers. 4.8% of respondents reported that they *always* took antimalarial with pain relievers. 6.3% and 5.2% of respondents reported that they *always* took antibiotic and hot balm with their pain medications respectively. 50%, 48.5%, 35.2%, 35.2% and 27% respectively reported that they *sometimes* took antimalarial, antibiotic, ointments, cough syrups and muscle relaxant with their pain reliever medications. See table 6 for details.

Table 6: Health Seeking Behavior

Response	Frequency (%)		
	Always	Sometimes	Never
Hospital	27(10)	146(54.1)	44(16.3)
Herbal clinic	3(1.1)	18(6.7)	165(65.1)
Massaging homes	4(1.5)	53(19.6)	137(50.7)
Church/Mosque	12(4.4)	72(26.7)	108(40)
Pharmacy	97(35.9)	130(48.1)	17(6.3)
Chemists	53(19.6)	117(43.3)	38(14.1)
Street medicine vendors	6(2.2)	34(12.6)	148(64.8)
Drug use			
As prescribed by healthcare providers	161(59.6)	64(23.7)	7(2.6)
As recommended by chemists	55(20.4)	97(35.9)	45(16.7)
As recommended by friends	7(2.6)	53(19.6)	122(45.2)
As recommended on label	56(20.7)	107(39.6)	43(15.9)
Any how		16(5.9)	158(58.5)
At right dose	180(66.7)	37(13.7)	6(2.2)
Drugs/substances used concomitantly with pain relief			
Herbs	5(1.9)	39(14.4)	144(53.3)
Antimalarial	13(4.8)	135(50.0)	62(23.0)
Antibiotics	17(6.3)	131(48.5)	59(21.9)
Muscle relaxant	6(2.2)	73(27.0)	108(40.0)
Ointments	14(5.2)	95(35.2)	87(32.2)
Cough syrups	4(1.5)	95(35.2)	92(34.1)
Hot balms	15(5.6)	119(44.1)	68(25.2)
Spray	1(0.4)	55(20.4)	125(46.3)
Lotions	2(0.7)	69(25.6)	113(41.9)
Antacids	5(1.9)	64(23.7)	119(44.1)
Other substances	2(0.7)	16(5.9)	86(31.9)

**Awareness and Response to ADRs**

Regarding ADRs, 6.7% of respondents reported that, sequel to use of NSAIDs, they *always* experienced sweating; 27% and 28.1% of respondents respectively *sometimes* experienced heart burn and stomach pains; 18.9% and 43% *sometimes* experienced chest pain and sweating respectively. Out of the 270 respondents, the awareness of adverse reactions of NSAIDs was rated excellent (19.3%), very good (28.1%) and good (25.9%); 5.9% of respondents had no awareness on ADRs of NSAIDs at all. About a quarter (25.9%) of respondents reported that they *always* visited the doctor whenever they had ADRs; 29.3% visited the pharmacist and 10.4% visited Nurses. Only a minute percentage (below 5%) *always* visited family, herbal clinics, friends and Chemist. See table 7 for details.

Table 7: Awareness and Response to ADRs

ADRs	Frequency (%)		
	Always	Sometimes	Never
Heartburn	5(1.9)	73(27.0)	124(45.9)
Stomach pain	4(1.5)	76(28.1)	119(44.1)
Chest pain	3(1.1)	51(18.9)	114(53.3)
Blood in urine	1(0.4)	15(5.6)	179(66.3)
Blood in stool	1(0.4)	18(6.7)	176(65.2)
Body swelling	1(0.4)	25(9.3)	168(62.2)
Sweating	18(6.7)	116(43.0)	76(28.1)

Other	7(2.6)	24(8.9)	104(38.5)
Intervention to ADR			
Doctor	70(25.9)	81(30)	33(12.2)
Pharmacist	79(29.3)	76(28.1)	46(17.0)
Nurse	28(10.4)	72(26.7)	75(27.8)
Family	5(1.9)	49(18.1)	113(41.9)
Friends	3(1.1)	31(11.5)	127(47.0)
Chemists	14(5.2)	73(27.0)	84(34.1)
Herbal clinic	3(1.1)	13(4.8)	143(53.0)
Overall Awareness Level			
Variable	Frequency (%)		
Excellent	52(19.3)		
Very good	76(28.1)		
Good	70(25.9)		
Fair	40(14.8)		
Poor	14(5.5)		
Not at all	16(5.9)		

**i. Source of Procurement and cost of NSAIDs**

Data showed that 40.7%, 23.7% and 10.4% of respondents respectively reported that they *always* bought their drugs from the community pharmacy, chemist and hospital pharmacy; 30.4%, 39.6% and 27.8% reported that they *sometimes* bought their NSAIDs from the community pharmacy, chemist and hospital pharmacy. Majority of the respondents (40.4%) spent N100 to N500 per month in purchasing NSAIDs; 34.1% spent below N100 per month. See table 8 for details.

Table 8: Source of Procurement and cost of NSAIDs

Place	Frequency (%)		
	Always	Sometimes	Never
Community pharmacy	110(40.7)	82(30.4)	23(8.5)
Chemist	64(23.7)	107(39.6)	28(10.4)
Street hawker	1(0.4)	23(8.5)	151(55.9)
Inside bus	1(0.4)	21(7.8)	153(56.7)
Hospital pharmacy	28(10.4)	129(27.8)	39(14.4)
Supermarket	3(1.1)	35(13.0)	137(50.7)
Local market	2(0.8)	8(3.1)	149(58.4)
Herbal shop	1(0.4)	12(4.7)	144(56.5)
Others	1(0.4)	8(3.1)	75(29.4)
Cost of purchasing a pain reliever per month			
Budget/Month	Frequency (%)		
<N100	92(34.1)		
N100 - N500	109(40.4)		
N500- N1000	16(5.9)		
N1000 - N2000	3(1.1)		
N5000- N10000	1(0.4)		

**j. Correlations**

A one-way ANOVA was conducted to examine whether there was statistically significant difference among the students in different levels in relation to their knowledge of ADRs of pain drugs. Results revealed statistically significant difference among the levels,  $F= 13.210$ ,  $P= <0.05$ . Levene’s test of homogeneity was significant ( $p=<0.05$ ). Games-Howell post-hoc test revealed statistically significant difference between 400 level students ( $M=2.51$ ,  $SD=1.45$ ) and 500 level students ( $M=1.73$ ,  $SD=0.94$ ). See table 9 for details.

Table 9: One-way ANOVA for level

Variable	N	Mean±sd	Df	F	p-value	CI (95%)	
						Lower limit	Upper limit
100 level	42	3.38±1.33	4	13.210	<0.05	2.98	3.79
200 level	17	2.98±1.23				2.69	3.27
300 level	42	3.23±1.29				2.83	3.61
400 level	44	2.51±1.45				2.14	2.89
500 level	34	1.72±0.93				1.45	2.00

CI: confidence interval, F is significant at  $p<0.05$

**IV. Discussion**

**a. Demography**

This study was aimed at evaluating the pattern and other correlates of the use of pain killers among Niger Delta University students. The demographic characteristics of the respondents showed a higher proportion

of female to male within the age of 21-25. Most of the respondents that participated were, expectedly, from the Ijaw tribe since the institution is situated in Bayelsa which is dominated by the Izon people[6]

#### **b. Students' Level in the University**

All the students' levels were represented in the study; there were slightly more of 200 and 400 levels that participated in the survey. This implies that, at the time of the study, those available and ready for the survey were more of these two levels; it does not necessarily depict that there were more 200 or 400 level students in the University.

#### **c. Prevalence and Pattern of Self-medication with pain killers**

The most commonly used analgesic among the students was paracetamol. This is similar to other studies [7,8]. Ibuprofen, aspirin and diclofenac were also used but not as frequently as paracetamol.

The frequent use of paracetamol may be associated with the fact that it is cheap, can be procured without prescription and its ease of accessibility to everybody[8]. However, celecoxib, indomethacin, naproxen and mefenamic acid were not frequently used. This may be associated with their cost and the prescribers' reluctance in prescribing them due to their peculiar side effects. Other studies have shown NSAIDs as the most widely prescribed drugs in the world[9]. Although other NSAIDs are reported to be more potent and more effective than paracetamol, the latter has a better safety profile. This fact may favour the more frequent use of paracetamol in addition to its considerably lower unit cost. Differences in the levels of potency and effectiveness among the NSAIDs have been reported [10]. The rate of self-medication with NSAIDs was highest among students between the age group of 21-30 years. This reflects the age-related procurement and self-medication patterns among a critical population group. NSAIDs are seen as part of house hold drugs and they can be procured from common outlets such as supermarkets, open markets, street hawkers and many other unauthorized places that will not provide the needed counseling and education for medicating safely. Consequently, irresponsible self-medication practices should be expected. The attendant untoward and obnoxious effects like gastrointestinal ulceration, cardiovascular disorders and kidney impairment are a great concern[11]. The need for more education and enlightenment on responsible medication use and the adverse consequences of irrational use of pain killers among the Students in this university should be given priority attention.

#### **4.1. Use of NSAIDs in Combinations and other drugs**

In this study, very few of the respondents engaged in taking combination pills; those that did, reported that it was prescribed for them by a health professional. This is in line with other study reporting low incidence of use of combination NSAIDs and the few cases of combination of two NSAIDs were prescribed by health professionals [12]. Regarding combination of pain relievers, most of them took Acetaminophen/Ibuprofen and Acetaminophen/Aspirin combinations. The use of more than one NSAID has the advantage of synergic effect for acute and chronic pains[13]. However, some combinations come up with other complications such as aspirin and ibuprofen; ibuprofen has been reported to prevent platelet inhibition with aspirin [10]. Beside the synergic effects, combination of two or more NSAIDs results in broader adverse reaction spectrum. Moreover, the combination of two or more NSAIDs often time do not have therapeutic benefits; thus, prescribers should be encouraged to comply with standard treatment guidelines[14]. A strategic campaign on the rational use of NSAIDs should eliminate unnecessary and dangerous use of multi-drug therapies. This is against the backdrop of the notorious practice among non-professional drug vendors whereby "drug cocktails" are recommended to their clients. The additional risks of clinically significant adverse drug interactions (drug-drug, drug-food, and drug-disease) further emphasize the need for educating the students of rational drug therapy with NSAIDs.

#### **4.2. Reasons for choice of pain Relievers**

Most (37.8%) of respondents reported that they used their NSAIDs because it was very effective. The NSAIDs have been proven to be very effective at relieving pains of various origins. This is as a result of their mechanism of action – inhibition of cyclooxygenase (COX)[9,10,15,16]

Other major reasons adduced for choice of pain-relievers were their being prescribed by health professionals and affordability, quite similar to other reports [17]. Media adverts, friends and families did not appear to have significant impact on choice of NSAIDs. The obvious significance of these findings is that health professionals can be strategically used to curtail the inappropriate use of NSAIDs through provision of pharmaceutical care. Every encounter between a health professional and a patient / client should be seen as opportunity to provide valuable education and counseling on the merits and demerits of self-medication with NSAIDs. In Nigeria, chemist shops are very popular and wide-spread sources of drug distribution. It is, therefore, expedient to train such vendors on the rational use of NSAIDs so that they can educate and counsel their numerous clients.

#### **4.3. Knowledge about NSAIDs**

A significant proportion of respondents reported that they had good knowledge about the correct dose of their pain relievers and frequency of administration. Also, about a third of respondents claimed to have good knowledge regarding duration of use of NSAIDs, their use with food and the need to avoid taking them on empty stomach and with alcohol. This is similar to other studies[18]. Given the high prevalence of use of NSAIDs and the attendant grave consequences of their abuse and misuse, there is still a prime need to increase the level of knowledge of this population on the proper use of NSAIDs through public enlightenment campaigns, seminars and workshops.

#### **4.4. Health seeking behavior and other correlates of drug use**

The health-seeking behaviour of a people determines the quality of patient care that they receive. In this population, majority of the respondents *always or sometimes* visited the community pharmacy (84%) or hospital (60.1%) to secure treatment whenever they had pains. This level of practice is encouraging; the high level of contact with a health professional in such situation is expected to provide ample opportunities for appropriate education and counseling. In this population as well, over 60% also always or sometimes visited the chemist out of which about one-fifth always visited the chemist. It therefore means that chemists are significant outlets for distribution of NSAIDs which further buttresses the suggestion for their educational empowerment as a veritable means of curtailing abuse and misuse of NSAIDs. It is highly note-worthy that over 60% of the students never visited herbal clinics and street medicine vendors; the latter are known to be peddlers of fake and adulterated or expired products. Also, this study revealed that half of the population never visited massaging homes/clinics. The latter are very popular in this community. Regarding other correlates of drug use, about 60% of respondents *always* used NSAIDs as prescribed or advised by health professionals. Over 35% *sometimes* followed the advice of the chemist or follow product leaflet instructions; majority (58.5%) never used NSAIDs anyhow. Indeed, over 60% claimed they *always* took NSAIDs in the right doses. It would appear that majority in this population medicated rationally with NSAIDs. In-depth studies are needed to verify the data on professional advices provided and what the right doses are. Further analysis of other correlates revealed that half the respondents *sometimes* used anti-malarial agents with NSAIDs; over 35% *sometimes* used antibiotics, hot balms, ointments and cough syrups. A smaller proportion *sometimes* used muscle relaxants (27%), lotions (25.6%), antacids (23.7%) and sprays (20.4%). Malaria is always associated with body pains, a justification for use of NSAIDs. Cough may also present with chest pains, a justification for NSAID use. Appropriate hot balms, ointments, lotions and sprays may be used to alleviate muscle pains externally. Peptic ulcer may present with pains but NSAIDs are contra-indicated in this condition. The inflammatory response to infections [fever and pains] may justify the use of antibiotics. Whilst these correlates of use of NSAIDs may be justifiable on face value, in-depth studies are needed to provide concrete evidences for their rationality or otherwise. Before the advent of such hard facts, we may have to resort to providing appropriate education and counseling to this population at every opportune moment. Whilst not discrediting the effectiveness of herbs, it is worthy of note that over half of respondents in this population never used herbs in addition to NSAIDs to relieve their pains. For one, most herbs are misused, do not have precise dosage and their possible adverse interactions with NSAIDs are often not known to the users. All of these may result into obnoxious consequences and complications.

#### **4.5. Awareness and Response to ADRs**

Regarding ADRs, sweating, heart burn, chest pain, and stomach pains were reported as either *always or sometimes* experienced after taking NSAIDs. These are non-specific symptoms of NSAIDs and may actually be a part of the morbidity. The good thing is that among this population, the awareness of ADRs is rated at least as good by over 70%. A study had reported that patient unawareness to ADRs for NSAIDs and other medications is dangerous to any nation as it caused more harm than good to the health of the people [19]. Further, about 65% always reported these ADRs to a health professional. This is a plus for pharmacovigilance if such reports are appropriately documented. The current direction in pharmacovigilance is to involve consumers. This finding also emphasizes the need for health professionals to be familiar with ADRs associated with NSAIDs and how to manage them if they become very severe[20].

#### **4.6. Source of Procurement and cost of NSAIDs**

The source of procurement of pain drugs is also a factor for consideration since this determines the integrity of the drugs. Drugs that are not properly stored can “expire” before their expiry dates. Majority of this population *always or sometimes* procured their NSAIDs from community pharmacies, chemists and hospital pharmacies and not from street hawkers and open markets that are confirmed sources of fake, adulterated and expired products. It is therefore possible that appropriate information always or sometimes followed every purchasing or dispensing encounter. Every health professional has a legal responsibility to provide adequate drug information during encounters with patients or clients. Whilst storage conditions in

chemist shops may be sub-optimal always, not all community pharmacies also have optimal storage conditions. Therefore, there are still some risks associated with sources of procurement of drugs in this community. As a matter of fact there was no standard community pharmacy in this community at study time; those who always/sometimes visit community pharmacies did so in neighboring communities (especially Yenagoa) where they existed. The drug outlets in this community are comprised mainly of chemist shops and open markets. An earlier study done in the Niger Delta region of Nigeria had reported that patients preferred buying their drugs from unauthorized outfits and were prone to ADRs because they never received adequate pharmaceutical care [11, 21]. On cost implications, most of the students spent about N 500 per month on pain drugs. This might appear insignificant, but, considering the unit cost of the most widely used pain reliever (paracetamol), this amount of money spent per month is quite significant. Also, for a student, this amount may be significant. Therefore, misuse or abuse of NSAIDs is suspected among this population. Studies have also established that ibuprofen, aspirin and diclofenac are very cheap and are affordable [17]. These students should therefore be targeted for appropriate educational intervention against abuse/misuse of pain killers.

#### **4.7. Correlations**

A one-way ANOVA conducted to examine whether there was statistically significant difference among the students in different levels in relation to their knowledge of ADRs of pain reliefs returned statistical significance ( $F= 13.210$ ,  $P= <0.05$ ). Further, Levene's test of homogeneity was significant ( $p < 0.05$ ) and Games-Howell post-hoc test revealed statistically significant difference between 400 level students ( $M=2.51$ ,  $SD=1.45$ ) and 500 level students ( $M=1.73$ ,  $SD=0.94$ ). This implied a higher awareness level of ADRs of NSAIDs among 400 and 500 level students, with the latter showing a higher perception. The higher the level at school, the higher the level of knowledge and awareness about drug use in general.

### **V. Conclusion**

In this study more female students participated. A higher proportion of 200 level and 400 level students also participated; majority of respondents were aged 21 – 25 years and of Ijaw stock. In this community, there was a high prevalence of use of pain killers particular the cheaper brands like paracetamol, ibuprofen, aspirin and diclofenac. Self-medication with these drugs was also prevalent. Drug effectiveness was the major incentive for choice of pain killers used; most users relied on prescriptions or advice from health professionals; the health seeking behaviour for pain management was found to be appropriate as most of them visited the community pharmacy or hospital. A significant proportion also visited the chemist. The indications for use of pain killers were appropriate and most users used the drugs as prescribed by health professionals or according to instructions in the product leaflets. Most users were familiar with the ADRs associated with pain killers and responded appropriately to them by reporting to health professionals. The higher the level of education, the higher the level of awareness of ADRs associated with pain killers. Thus, pain killers could be said to be rationally used among students of Niger Delta University to a reasonable extent. Notwithstanding, there are still germane areas of concern. As a result of a high interaction of the respondents with health professionals prior to use of pain killers, it is highly recommended that health professionals in this community should update their knowledge of rational use of pain killers and how to deal with consequent ADRs. Further, they should be encouraged to educate and counsel students in this community at every opportune time of interaction on the rational use of pain killers, either in mono- or multi-therapy. The frequent involvement of chemists in this community also calls for their adequate educational empowerment so they can be agents of change as well. This will entail optimal storage conditions and the quality and quantity of information they need to give their clients. The establishment of community pharmacies in this community is highly recommended. The University should consider setting up a standard community pharmacy. The student bodies should also consider occasional educational programmes on the use of pain killers and other commonly self-prescribed drugs. The need for more education and enlightenment on responsible medication and the adverse consequences of irrational use of drugs among the students in this university should be given priority attention. All these precautionary measures are quite expedient against the backdrop that drugs are beneficial when properly used but can cause severe problems and even death otherwise.

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