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Prevalence, Awareness and Reasons for Use of Non-Opioid Analgesics among Students of College of Health Sciences, Northern Ethiopia: A Cross-Sectional Study

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Abstract

Background: Drugs which are used for relieving of several kind of somatic pain are commonly known as painkillers or Analgesics. Non-opioid analgesics include acetaminophen and non-steroidal anti-inflammatory drugs (NSAIDs). The main aim of this study was assess the prevalence, awareness and reasons of non-opioid analgesic use among the college of health sciences students.

Methods: A cross-sectional study was conducted on students of the college of health sciences students at Mekelle University, Northern Ethiopia. A stratified sampling method was used and self-administered questionnaire was used for data collection. The data were entered and analyzed by the statistical package for social sciences version 16. Descriptive statistics, chi-square tests were computed and then logistic regressions were run with p-value <0.05 and 95 % confidence interval.

Results: A total of 339 participants were included in the study and the response rate was 280 (82.6% among which 195 (69.6%) were males and the mean age was 21.14+2.57 years. Prevalence of non-opioid analgesic use at least once during their life-time was 42.5%; and 39.6% during the past 3 months. Among those with non-opioid analgesics use experience, acetaminophen was found to be the most used non-opioid analgesic in both life-time and current use; 162(70.43%) and 74 (32.17%) respectively. Ibuprofen was the second prevalently used among non-opioid analgesics; 28 (12.17%) in life-time and 21(9.13%) current use. The common reasons for non-opioid analgesic use were the headache (80.87%), menstrual pain (16.52%), and dental pain (14.35%. Females were more likely to use non-opioid analgesic than males in their life time and currently.

Conclusion: The prevalence of non-opioid analgesic use at least once during their life-time was high. Acetaminophen was the most commonly used non-opioid analgesic and the usual reason was headache. It is better to use specific non-opioid analgesic for specific pain by consulting health professionals.

Keywords: Non-opioid analgesic; Prevalence; Awareness; Reason for use

Abbreviations: aOR; adjusted Odds Ratio; cGPA; cumulative Grade Point Average; CHS; College of Health Sciences; COX; Cyclooxygenase; MU; Mekelle University; NOA; Non Opioid Analgesic; NSAIDs; Non Steroid Anti-Inflammatory Drugs; OTC; Over the Counter; USA; United State of America

Introduction

Drugs which are used for relieving of several kinds of somatic pain are commonly known as painkillers or analgesics. Based on their mechanism of actions to relieve pain these drugs are mainly classified into two; those drugs which act on receptors in the brain to inhibit pain impulses being called opioids and those which inhibit the synthesis of prostaglandins including non-steroidal anti-inflammatory drugs (NSAIDs), acetaminophen and phenacetin collectively called non-opioids (non-narcotic analgesics) [1-4]. Mostly non-opioid analgesics (NOA) including Acetaminophen and non-steroidal anti-inflammatory drugs (NSAIDs) such as ibuprofen and salicylates like acetylsalicylic acid (aspirin) are used as over-the-counter (OTC) (non-prescribed) drugs by the public [2]. Both acute and chronic pains caused by several disease processes such as trauma, arthritis, surgery, and cancer are mainly treated by NOA [5]. Acetaminophen is one of the most important drugs among NOAs which was mainly underutilized in an outpatient setting [6]. However acetaminophen is a non-salicylate product that has proportional analgesic and antipyretic potency as aspirin and with the minimal gastric mucosal side effect. In contrary acetaminophen has no antiplatelet effect and lacks anti-

inflammatory effects as well [5]. Beside this mild to moderate pain like transient musculoskeletal pain or joint pain, fever, headache, acute migraine attacks, and dysmenorrhea are mostly treated by NSAIDs including acetylsalicylic acid [7,8]. Aspirin the best known NSAID have been used for long period of time as antiplatelet in order to reduce cardiovascular complications like stroke and myocardial infarction [9]. Generally NOAs are among the most commonly used drug group for self-medication [10]. Similarly Peoples in the western world mainly use acetaminophen and ibuprofen as over the counter drug to relieve pain without consulting medical professional [11]. However their ease of access and wide usage for long period of time expose peoples for tremendous risks like gastrointestinal inflammation and ulceration, exacerbation of asthma due to bronchospasm and increased bleeding time [11-13]. In other studies, analgesic consumption among university students was high due to different mental and physical stress caused by long study period, high pressure to achieve the best grade score and to

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meet their goals. In addition students' perception and life style viewing OTC medication as "weak" and hence, less risky than other forms of medication also contribute to their pain killer utilization [2,9]. Hence, the main aim of this study was to assess the prevalence, awareness, reasons for use and factors associated with the use of non-opioid analgesics among Mekelle University (MU), College of Health Science (CHS) students.

Methods

A cross sectional study was conducted from March 1 to April 12, 2013 in CHS, MU, Mekelle town, Tigray. Mekelle is the capital of Tigray Regional State, Northern Ethiopia, situated at 783 km to the North of Addis Ababa. MU is one of the public Universities in Ethiopia.

The study was conducted using questionnaire based survey among CHS students of MU. Those students who were enrolled as regular students in CHS, MU were enrolled. Socio-demographic characteristics (age, sex, level of education, department) and type of disease, its severity and duration were collected as independent variables and use of NOA was the dependent variable.

The sample size (n) was calculated using 95% (Z 1/2=1.96) confidence interval with 5 % (0.05) margin of error and prevalence (p) of 50% (0.5) using single population proportion formula for finite population (i.e., N=1998) as depicted hereunder.

$$n=(Z2\ \alpha/2\ p\ (1-p)\ N)/\ (d2N+Z2\ \alpha/2\ p\ (1-p))$$

$$n=1.96*1.96*0.5*(1-0.5)*\ 1998/(0.05*0.05*1998+1.96*1.96*0.5*(1-0.5))=322.$$

Considering a 5% non-response rate, the total sample size was corrected to be 322+ (322*0.05)=338.1~339.

Stratified sampling design was employed in that the first stage containing all departments and the second stage containing all regular class from 1st to 5th batch. All 6th year medical students (interns) and extension, summer and in-service students were excluded. And accordingly, all students from all departments and batches were eligible to participate in this survey. Finally the actual study samples were selected by employing a systematic random sampling technique from the list of all students which was obtained from the registrar administrative office of the college (Table 1).

The instrument used for data collection was a self-administered questionnaire. All the necessary and relevant data were collected from the questionnaire that was filled and returned by students. Information associated with socio-demographic characteristics of students (age, sex, department, class year), type of disease for which they take NOA, the type of drug they used with its dose, frequency and the duration of therapy in the past three months, awareness towards side effects caused by those drugs and their safety profile, how they get the information about the drugs, when to use the drugs and what the side effects were and how they get the drugs were included in the questionnaire.

Before the actual data collection, the questionnaire was pretested on 17 Sheba University College students of health science which were selected randomly. The data collected was checked for any kind of errors and was edited, coded, entered to SPSS windows version 16.0. Descriptive statistics was used to determine prevalence. The association between dependent and independent variables was computed by binary logistic regression and chi-square tests (p-value <0.05 and 95 % CI). The processed data was organized and presented using tables and figures.

Results

Three hundred and thirty nine participants were included in the study and the overall response rate was 280 (82.6%) with 195 (69.6%) being males and 85 (30.4%) females making up 2.3:1 male to female ratio; the reason being busy with other academic activities to fill the questionnaire by the non-respondents. The mean age of the respondents was 21.14 (SD=2.57, range 18-25) with the marital status of 247 (88.2%) being single, 27 (9.6%) in a relationship and 5 (1.8%) married (Table 2).

From the 280 study participants, 230(82.1%) have used NOA at least once and 111(39.3%) have taken during the last three months. Seventy one (63.9%) of those who have taken NOA used less than 3 times during the last 3 month while 24 and 13 of them used 3-5 times and >7 times respectively. Most of the participants took for one day (152), whereas 60 of them took for one week. But only 41 of them took on a regular basis. With regard to specific NOA use among those with NOA use experience, acetaminophen was found to be the most commonly used NOA (162 (70.43%)) followed by ibuprofen (28 (12.17%)), diclofenac (17(7.39%)) and aspirin (17(7.39%)) (Figure 1).

With regard to awareness, out of 280 participants, 272 (97.1%) have read or heard about NOA. Only 8 participants didn't know about NOA in which five were the first year and three were the second year students; four of them being medical students and the rest from other departments. Among the 272 participants that read or heard about NOA, 216 (79%) listed one pain killer, 52 (19%) of them listed more than one NOA whereas only 4 (1.4%) of them could list opioids. From those 272 participants, 251 (92%) suggested that NOA could be used for headache, 146 (53.6%) for dental pain, 131 (48.16%) for back pain and 118(43.4%) for fever. However, 230 (82.1%) of the participants used NOA at least once in their lifetime and reasons given by those NOA users were headache 186 (80.87%), menstrual pain 38 (16.52%), dental pain 33 (14.35%), back pain 25 (10.87%), fever 25 (10.87%), stress 19 (8.26%) and stomachache 18 (7.82%) (Figure 2).
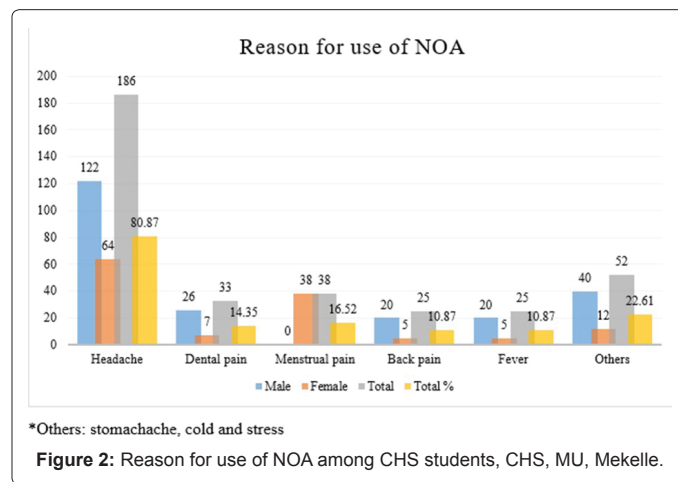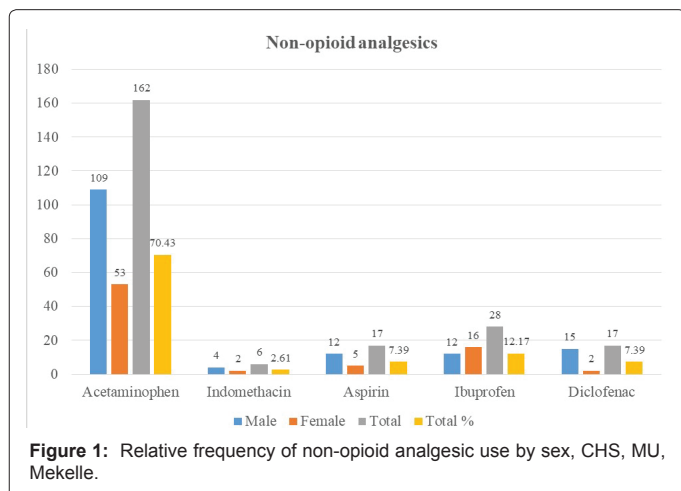
Two hundred fifty four (90.7%) of the study participants thought that NOA can have side effects which include liver damage (55.4%), gastritis (39%), nausea (37.8%) and bleeding (37.4%) (Table 3). Around 120 (47.2%) of the participant, suggested that acetaminophen is toxic to liver whereas 114 (44.8%) thought aspirin can cause bleeding. Only 14 (5.5%) knew that NOAs have no use in reducing swelling while 128 (50.3%) think that NOAs can reduce swelling and only 18 (7%) suggested that NOAs can't cause dependence, while 140 (55%)

Objective	Questions of the Research	Questions of the Interview
To analyse contraceptive methods, maternal and neonatal mortality in Afghanistan: Based on the results of interviews	Contraceptive Methods	How many children are usually in the Afghan family?
		Children's gender preference in the Afghan family.
		What are the methods of contraception in the family? Midwife´s recommendations or advice on family planning.
	Maternal and Neonatal Mortality	The place of childbirth (hospital, home). Maternal care during and after childbirth.
		Neonatal care (newborn care, breastfeeding etc.).

Table 1: The plan of interview.

Variables		Frequency	Percent
Sex	Male	195	66%
	Female	85	34%
Age group	18-21	148	52.86
	22-25	132	47.14
Department	Medicine	136	48.6%
	Pharmacy	49	17.5%
	Dental medicine	6	2.1%
	Public Health	30	10.7%
	Nursing	27	9.6%
	Midwifery	22	7.9%
	Psychiatry	10	3.6%
Academic Year	1	57	20.4%
	2	61	21.8%
	3	58	20.7%
	4	61	21.8%
	5	43	15.4%
Marital Status	Single	247	88.2%
	In relationship	27	9.6%
	Married	5	1.8%
	Divorced	1	0.4%
cGPA	1.75-2	7	2.5%
	2-3	70	25%
	3-4	203	72.5%

Table 2: Socio demographic characteristics of CHS, MU students, Mekelle.

Figure 1: Relative frequency of non-opioid analgesic use by sex, CHS, MU, Mekelle.

Figure 2: Reason for use of NOA among CHS students, CHS, MU, Mekelle.

think that NOAs cause dependence [56 (40%) for acetaminophen and 36(25.7%) for aspirin].

With regard to dispensing, 64 (22.9%) of participants think that NOA can be given without prescription whereas 216 (77.1%) think that NOAs are prescription drugs. Seventy one (32.8%) of these think that all NOA are prescription drugs while those that think Indomethacin and aspirin are prescription drugs were 59(27.3%) and 24 (11.1%) respectively. Among 230 students who were found to use NOA at least once in their life time, 29 conveyed that brand name affects their drug of choice. Together with this, 25 (10.87%) students reported that they used what other people have recommended and 77 were found to use the nearest NOA they could find. While 97 (42.17%) of the students reported to use specific non-opioid analgesic for specific pain, only 2 (0.8%) of the students choose non-opioid analgesic on the basis of their cost and side effect (Table 4).

Using chi-square test, life time NOA use was found to be associated with only sex that being female have an increased fold of life time use of NOA (p value- 0.009) (Table 5).

In the case of current use of NOA statistically significant associations were found with both sex and marital status using chi-square test (p-value 0.001 and 0.038 respectively). But using multivariate binary logistic regression analysis for both variables, the significant association was found to be with only sex and taking NOA during the last 3 months (aOR 2.25 (1.246-4.052)) implying that females were 2.25 times more likely to use non-opioid analgesics than males (Table 6).

Discussion

Non opioid analgesics are among the most common OTC drugs used worldwide. It has been estimated that in the United Kingdom only they constituted approximately 23% of OTC sales in 2004 [14].

Side effect	Male No (%)	Female No (%)	Total
Liver damage	104 (40.9%)	37 (14.5%)	141 (55.5%)
Gastritis	67 (26.3%)	32 (12.6%)	99 (39%)
Nausea	66 (26%)	30 (11.8%)	96 (37.8%)
Bleeding	72 (28.3%)	23 (9%)	95 (37.4%)
Kidney damage	53 (20.8%)	14 (5.5%)	67 (26.37%)
Rash	36 (14.17%)	13 (5.1%)	49 (19.3%)
Diarrhea	32 (12.6%)	4 (1.57%)	36 (14.17%)
Noisy ear	31 (12.2%)	5 (1.9%)	36 (14.17%)
Swelling	10 (3.9%)	2 (0.78%)	12 (4.7%)

Table 3: Relative frequency of NOA side effects reported by CHS, MU students, Mekelle

Influence on the students	Number of the students (%)
Brand drug	29 (12.6%)
Recommended	25 (10.9%)
Nearest drug at the time	77 (33.5%)
Specific analgesic for specific type of pain	97 (42.2%)
Others*	2 (0.8%)
Total	230 (100%)

* Include cost and side effects

Table 4: Claimed factors that influence students' choice of NOA, CHS, MU, Mekelle.

Variables	NOA taking in Life time (even once) (n=280)			P-Value
		Yes	No	
Sex	Male	152 (54.3%)	43 (15.3%)	0.009*
	Female	78 (27.85%)	7 (2.5%)	
Age group	18-21	120 (42.85%)	27 (9.64%)	0.876
	22-25	110 (39.3%)	23 (8.21%)	
Department	Medicine	113 (40%)	23 (8.21%)	0.132
	Pharmacy	45 (16%)	4 (1.43%)	
	Dental medicine	5 (1.78%)	1 (0.35%)	
	Public Health	23 (8.21%)	7 (2.5%)	
	Nursing	23 (8.21%)	4 (1.4%)	
	Midwifery	14 (5%)	8 (2.85%)	
	Psychiatry	7 (2.5%)	3 (1.07%)	
Academic Year	1	45 (16%)	12 (4.28%)	0.293
	2	49 (17.5%)	12 (4.28%)	
	3	45 (16%)	13 (4.64%)	
	4	51 (18.21%)	10 (3.57%)	
	5	40 (14.28%)	3 (1.07%)	
Marital Status	Single	201 (71.8%)	46 (16.4%)	0.643
	In-relationship	23 (8.21%)	4 (1.43%)	
	Married	5 (1.78%)	0	
	Divorced	1 (0.35%)	0	
CGPA**	1.75-2	4 (1.43%)	3 (1.07%)	0.086
	2-3	54 (19.2%)	16 (5.7%)	
	3-4	172 (61.4%)	31 (11%)	

Table 5: Association of NOA taking in life time, CHS, MU, Mekelle.

In this study, it was found that a lifetime NOA use prevalence rate to be 82.1% that was slightly higher than the 73% rate found among college students in the United Kingdom [11]. Another survey also determined that 68.1% have used nonprescription medicine within one month [15]. This may be in part due to the high education load in health science students that may result in tensions and associated problems. It may also be due to the fact that access to NOA is very easy and mostly they may not want to go to health institutions as most people thought symptoms like headache can be self-treated. But our result was comparable with one study found that 83.1%of students use nonprescription medicine [16]. But this study assessed that took nonprescription medicine within one week while our finding was a lifetime NOA use and it also included drugs other than NOA.

In our study, the relative frequency of NOA use during the past 3 months was 39.3%. It was much lower compared to the study done among students in Qom state, Iran which was 76.6%. This could be associated with the sample size [17]. On its top, NOA use during the last 3 month was higher in medical and pharmacy students; and on class year basis, second year students were happened to use NOA during the last 3 month more than any other class year students. This may be because of the higher samples taken from the two departments and higher academic load.

Variables		NOA taken during the last 3months (n=230)		P-Value
		Yes	No	
Sex	Male	61 (26.5%)	91 (39.5%)	0.007*
	Female	50 (21.7%)	60 (26%)	
Age group	18-21	60 (26%)	60 (26%)	0.6
	22-25	51 (22.2%)	59 (25.6%)	
Department	Medicine	48 (20.8%)	65 (28.2%)	0.143
	Pharmacy	27 (11.7%)	18 (7.8%)	
	Dental medicine	3 (1.3%)	2 (0.86%)	
	Public Health	7 (3.04%)	16 (6.9%)	
	Nursing	13 (5.65%)	10 (4.34%)	
	Midwifery	8 (3.47%)	6 (2.6%)	
	Psychiatry	5 (2.1%)	2 (0.86%)	
Academic Year	1	20 (8.7%)	25 (10.8%)	0.329
	2	29 (12.6%)	20 (8.7%)	
	3	23 (10%)	22 (9.56%)	
	4	20 (8.7%)	31 (13.5%)	
	5	19 (8.26%)	21 (9.13%)	
Marital Status	Single	90 (39.1%)	11 (4.8%)	0.038*
	In-relationship	18 (7.8%)	5 (2.17%)	
	Married	3 (1.3%)	2 (0.86%)	
	Divorced	0 ()	1 (0.43%)	
CGPA	1.75-2	4 (1.7%)	0 ()	0.118
	2-3	27 (11.7%)	27 (11.7%)	
	3-4	80 (34.8%)	92 (40%)	

*Variables significantly associated with NOA use within the last three month using chi square.

CGPA: Cumulative Grade Point Average

Table 6: Association of NOA taken during the last 3 months, Mekelle.

Relative frequencies of the NOA use at least once in the life year were 70.43%, 12.17%, 7.39%, and 7.39% for acetaminophen, ibuprofen, aspirin and diclofenac respectively. In comparison with findings of other studies, it was higher in the case of acetaminophen, but lower in the case of ibuprofen and aspirin as per the study done among students in the United Kingdom which were 50%, 20% and 9% respectively [11]. The study findings were also concordant with findings of the study conducted in Mozambique [18]. In general, acetaminophen was the most commonly used NOA among College of Health science students of the University which is in concordance with the other studies mentioned herewith.

According to the finding of our study, headache (80.87%), menstrual pain (16.95%), dental pain (14.35%), back pain (12.61%), fever (12.17%) were the main reasons given for NOA use. In similarity, headache (78%) was the most common reason for NOA use in a study conducted in the United Kingdom [11]. Another study conducted in Çanakkale Onsekiz Mart University, Turkey also identified that headache (53.6%), menstrual pain (14.7%), and stomachache (3.4%) to be the common reasons for NOA use [18]. A study done in Bangladesh also identified that headache (53.3%) as a reason to take painkillers [15].

Two hundred and fifty four (90.7%) of the study participants thought that NOA can have side effects which include liver damage (55.4%), gastritis (39%), nausea (37.8%) and bleeding (37.4%). Around 120(47.2%) of a participants suggested that Acetaminophen is toxic to liver whereas 114(44.8%) thought aspirin can cause bleeding.

As per the results of our study, a specific analgesic for specific type of pain (42.2%) nearest drug at the time of pain (33.5%), brand name (12.6%), NOA recommended by others (10.9%) were the factors reported to affect students' choice of NOA. This was found to be with significant discrepancy as compared to the study conducted in the United Kingdom in which students' choice of NOA were affected by nearest painkiller at the time (13 (48.1%)), specific painkiller for specific type of pain (11 (40.7%)), recommended by others (2 (7.4%)) and brand name (1 (3.7%)). This high discrepancy may be due to the smaller sample size used by the study which was only 50 (2).

Limitation of this Study

The limitation of the study could be the cross-sectional design used which might not define the cause-effect relationship of the factors with the use of NOAs and the use of only quantitative data without triangulating with qualitative due to resource shortage. In addition, there was decreased response rate.

Conclusion

This study has demonstrated a high prevalence of NOA use among the college of health sciences students with a life time 230(82.1%) and current use of NOA 111(39.3%) prevalence rate with the most commonly used NOA being acetaminophen 162 (57.9%) followed by ibuprofen. Among the reason given for NOA use, headache, menstrual pain, dental pain, back pain were the major ones. Females were found to be prone to use non-opioid analgesics than males.

Ethical Statement

Ethical clearance was taken from Mekelle University College of Health Sciences Ethical Review Committee (Ref. No.: CHS/296/pharm05) and verbal consent was obtained from all study subjects with Ethical Review Committee approval due to the fact that the data collected were not invasive with minimal health impact; hence,

ascertained that the participation was voluntarily. The study participants' code numbers were used rather than personal identifiers. Finally, all questionnaires were kept for an intended purpose only with due security.

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