WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 7.523
Volume 7, Issue 3, 78-93. Research Article ISSN 2277– 7105

KNOWLEDGE ATTITUDE AND PRACTICE REGARDING PARACETAMOL USE AMONG MEDICAL AND NON-MEDICAL STUDENTS OF THE UNIVERSITY OF KHARTOUM, SUDAN.

Sayed Halaly[1]*, Samar H. Mubarak[2], Abraa A. Sharif[3], Siham Balla[1], Amani Abdrhaman[1], Haitham Awadalla[1], Zainab S. Dahab[1], Kamil Mirgani[1] and Nuha M. E. Agabna[4]

[1]Department of Community Medicine, Faculty of Medicine, University of Khartoum, Sudan.
[2]Fifth Year Medical Student, Faculty of Medicine, University of Khartoum, Sudan.
[3]Neel College of Medicine, Sudan.
[4]Pharmacology Dept. (Dept of Medicine), Faculty of Medicine, University of Khartoum, Sudan.

Article Received on
11 December 2017,
Revised on 01 Jan. 2018,
Accepted on 22 Jan. 2018
DOI: 10.20959/wjpr20183-10889

***Corresponding Author**
Dr. Sayed Halaly
Department of Community Medicine, Faculty of Medicine, University of Khartoum, Sudan.

ABSTRACT

Background: Paractamol is the most commonly used analgesic worldwide. It is one of the over the counter (OTC) drugs and is an effective analgesic in treating mild to moderate pain and fever. **Aim:** The aim of the study is to assess Knowledge, attitude and practice towards paracetamol use among medical and non-medical students in the University of Khartoum (U of K). **Materials and Methods**: A descriptive cross sectional study was conducted among medical and non-medical students of the University of Khartoum during October-November 2016. Three hundred and forty four students were randomly selected and interviewed. Half of them (172) were from the Faculty of Medicine and the other half (172) were from the Faculty of Education. A structured questionnaire to assess the Knowledge, attitude and practice of the students regarding paracetamol use was used. **Statistical analysis**: Data was analyzed using the Statistical Package for Social Sciences (SPSS) version 21. Chi square test was used to assess the association between the type of education (medical or non-medical) and each of the level of knowledge, attitude and practice of the respondents. **Results**: The total sample was 344 students; it was predominantly females (73% females and 27% males). The mean age was 21 years (SD±1.9). Only a quarter (27%) of the respondents had good total knowledge regarding

Paractamol use (41% of medical and 13% of non-medical students), with p value< 0.05. More than three quarters (79%) of the students agree that paracetamol overdose can cause death, p<0.05. Half (50%) of the students agree that taking multidrug containing paracetamol is not safe (58% of medical and 42% of non-medical), p<0.05. There is a positive association between the type of education (medical or non-medical) and the students' level of knowledge towards paracetamol use and their attitude towards both the risks of paracetamol to cause death in overdose and the use of multiple drugs containing paracetamol). Medical students are more knowledgeable about the use of paracetamol and its risks. Nearly half (48%) of the students agree that self-prescription is harmful (44% of medical and 51% of non-medical). Eighty one per cent of the students who took paracetamol, headache was the most common cause for using paracetamol (88%), and both the pharmacy and the supermarket were the most common sources for paracetamol. Of all the students who took paracetamol in the last month 85% did that without prescription i.e. with self prescription, 39% mentioned that they have enough knowledge to self prescribe (commonly medical students) and 25% of them did that to avoid time loss (commonly non-medical ones). While there was no association between the type of education and attitude towards self prescription (p>0.05) there is an association between the type of education and the ways of getting paractamol (p<0.05). Self prescription is more common in medical students. Only 15% took paracetamol with prescription, 58% of them did that because of their fear of side effects (commonly medical students) and 20% to avoid wrong doses (commonly non-medical students). **Conclusion:** Most of the students had poor knowledge about paractamol but medical students had better knowledge than non-medical ones. Most students have good general attitude but most of them had poor attitude regarding self-prescription. Self-medication was the most common way of getting paracetamol, and it is high in both medical and non-medical students but is more common among medical students. There is an association between the type of education and students' knowledge and attitude regarding paracetamol use and the ways of obtaining it. Headache was the most common cause of taking paracetamol and both the pharmacy and supermarket were the most common sources to obtain paracetamol. Awareness campaigns and health education sessions are needed to increase the awareness of the university students and the community about OTC drugs including paracetamol. More studies are needed to explore the problem of paractamol use in the entire Sudanese population.

KEYWORDS: Paracetamol use, knowledge, attitude, practice, over the counter drugs (OTC), prescription, self-prescription, medical students, non-medical students, University of Khartoum.

INTRODUCTION

Paracetamol(N-acetyl-p-aminophenol; APAP; or acetaminophen) is a popular nonprescription non-narcotic analgesic, antipyretic drug used to treat mild to moderate pain and fever. It lacks anti-rheumatic, anti-inflammatory, or uric acid excretory effects.[1] Paracetamol was discovered in Germany at the end of the 19th century, but was not widely used until midway through the 20th century[2] It became a pharmacopoeial product that is mentioned in all pharmacopoeias; e.g.: British Pharmacopoeia (BP), and united States Pharmacopeia. There are several formulations of paractamol. It is considered a safe drug but can lead to various complications if taken in over dose. Paracetamol is the most common used analgesic worldwide[3] because of its effectiveness as analgesic in many conditions. It is one of the most frequently used drugs in self-prescribing situations which is a common practice among university students who allured to use a range of medicines from conventional anti-pains to antibiotics without a doctor' prescription.[4] Non-prescription medication taking behavior might lead to problems of misuse.[5] Paracetamol is the commonest agent employed in self-poisoning.[6] Illicit use of prescription pain medications may represent a problem among undergraduate students. Over the counter (OTC) drugs are those that can be bought by the public without a doctor's prescription. OTC drugs are used to relieve self limiting illnesses and are recommended for a certain period of time not exceeding five to seven days. The use of OTC drugs may lead to their misuse/abuse.[1]

Paracetamol as a famous OCT drug is frequently misused to achieve better analgesia. As such, paracetamol is one of the most common pharmaceuticals associated with both intentional and accidental poisoning. It is still legitimate to ask whether the amount of injury and death is acceptable for an OTC analgesic.[1]

The toxicity of OTC analgesic was noticed in 1960s and 1970s, but paracetamol was considered safe at normal doses. There were few, if any, reports of abuse involving paracetamol and the use of paracetamol steadily increased, replacing the most toxic analgesics available at that time(acetanilide and phenacetin).[7] In 1994/1995 the rates in some developed countries were 20g/person/year, although in countries such as the UK, the US, Australia and New Zealand, consumption was 8g/person/year.[8,9] In UK an estimate of

more recent consumption, including prescribed paracetamol and combination tablets and paracetamol purchased without a prescription, is 3500 million 500 mg tablets in 2000.[8] It was not until 1966 that hepatotoxicity was first reported in humans.[2] In the US, Pharmacoepide, estimated that Paracetamol overdose costs the nation $87 million and result in over 200 fatalities annually. Paracetamol associated over dose also account for about 56000 emergency room visits and 26000 hospitalizations yearly and mortality files show that 458 deaths occur each year from paractamol associated over doses.[10]

A study done by Asma's (2008) among students of Jordon University to assess knowledge, attitude and practice (KAP) regarding paracetamol appropriate use and misuse. The sample size was 1000, data collected using a questionnaire and the mean age was 22.4 years (S.E. =0.054). The KAP about paracetamol appropriate use and misuse was poor in general. However, a KAP of Medicine and Pharmacy students was better than other Health Sciences (HS) students, and as expected HS students in general knew about paracetamol better than non-health sciences (NHS) students. The main factors that affected the KAP ($p<0.05$) were sex, faculty, area of residence, presence of relatives working in health professions, pharmacist role as an advisor about interactions and contraindications, and reading the patient information leaflet (PIL).[1] In a community based cross-sectional study conducted by Abdelmomeim etal(2005) about self medication in Khartoum State with a sample of 1,200 adult persons, with a mean age of 46.1 year, the prevalence of self-medication including medicines and herbs was found to be 81.9%, with a prevalence of self-prescribed medicines of about 28.3%, including analgesics containing paracetamol in 9.7% of them. The study also showed that economic status appeared to be a major factor influencing self-medication, where participants with higher incomes were less inclined to self-medicate. University graduates respondents and those with at least a secondary education appeared more inclined to self-medicate, as were participants below the age of 40 years.[11]

The use of self-medication is higly prevalent in the community.[12] Around the world , studies show that 38.5% to 65% of students practiced self –medication with paracetamol.[12,13,14] Self-medication can be defined as obtaining and consuming one (or more) drug(s) without the advice of a physician either for diagnosis, prescription or surveillance of treatment. Normally paracetamol is considered a safe drug but it may produce acute centro-lobular hepatic necrosis when taken in overdose.[15] Paracetamol toxicity is one of the most common cause of

poisoning worldwide. it is the most common cause of acute liver failure and drugoverdose.[16, 17,18] Similar picture may also occur in Sudan.

In Jordon self-medication was a common practice among Jordanians (42.5%).[19] In 2002 a cross sectional study done by Shankar etal , in Western Nepal regarding self –prescription among students the prevalence of self-prescription was about (59%) with paracetamol use in about 43%.[20] Another study conducted by Maryam AL- hussaini etal in Kuwait (2014) among undergraduate students with a sample size of 819 showed that the overall prevalence of self-medication was 97.8%, the age was significantly inversely proportional to self – medication and there was a significant difference between male and female students in self – medication practice.[21] In Egypt a study done by Elezz among 300 medical students of Ain Shams University with a mean age of about 21 years; found that 165(55.2%) of them practiced self-medication, with analgesics use in 87% of them.[22]

Because of the dearth of literature on OTC use of paracetamol in Sudan, this study was conducted to explore the knowledge, attitude and practice regarding paracetamol use among undergraduate students.

MATERIALS AND METHODS

This is a descriptive cross sectional study on knowledge, attitude and practice regarding paracetamol use among medical and non-medical students of the University of Khartoum, Sudan. The study was conducted in the Faculty of Medicine and the Faculty of Education. The Faculty of Medicine, founded in 1902, is found in the medical campus which is located south of central Khartoum. The Faculty of Education is located north east of central Omdurman. The respondents include medical students represented by students from the Faculty of Medicine and non-medical students represented by students from the Faculty of Education. The sample size was estimated to be 344 students, using the equation: $n = N/ (1+ N*d^2)$. Where: n = sample size, N= the total population of the Faculty of Medicine and English Language department of the Faculty of Education (=2,323) and d = margin of error (= 0.05).

The sample size was divided equally (172 medical and 172 non-medical students) and the respondents were randomly selected. Consent was taken from the students before being interviewed using a structured questionnaire. The questionnaire was taken from previous literature and modified to fit the objectives of the study. It consisted of three sections: the first

section included demographic data about the participants (gender, age, education type and study year). The second section included assessment of knowledge about paracetamol (knowing the drug, cause for use, maximum allowed dose and minimum fatal dose). The third section included three questions for assessment of attitude regarding effects of overdose, self-prescription of paracetamol and taking multiple drugs containing paracetamol. The fourth section included 9 questions to assess the practice of the students including (dose, frequency, most common cause of use, most common source, ways of getting paracetamol, cause of getting paracetamol with prescription, cause of self-prescription and criteria of self-prescription).

The data were analyzed by using the Statistical Package for Social Sciences (SPSS) version 21. For knowledge questions a scoring system was made depending on the number of correct answers. Total score was 9, those scoring 5 points or more were considered to have good knowledge, anyone scoring less than 5 was considered to have poor knowledge. Chi-square test was used to assess the association between type of education and (level of knowledge, attitude of students and practice).

Ethical clearance was made by the Department of Community Medicine, Faculty of Medicine U of K and there was no conflict of interest to be disclosed.

RESULTS

Age and Gender of respondents (Table 1)

The total sample was 344, half (172) of the participants were medical students and the other half (172) were non-medical students. The mean age was 21 years (SD±1.89), age range between 17 and 28 years old and mode of 21. Female students were 73% and males 27%.

Students' Knowledge of paractamol use (Table 2)

The mean score of knowledge towards paracetamol was 4.5, the minimum score was 0 and the maximum score was 9. A quarter (27%) of the students had good total knowledge regarding paracetamol and nearly three quarters (73%) had poor total knowledge. In medical students the mean score of knowledge was found to be 5.2, with 2 and 9 as minimum and maximum scores respectively, 41% had good total knowledge and 59% had poor total knowledge. While in non-medical students the mean knowledge score was 3.7 with 0 and 7, only 13% had good knowledge and 87% had poor knowledge. The mean score of knowledge about indications of paracetamol for the total sample was 3.5, in medical students the mean

score was 3.8 and in non-medical students it was 3.1. Regarding knowledge about side effects the mean score was 0.6, with a mean of 0.7 for medical and 0.5 for non-medical students. In all students only 13% know the maximum allowed dose per day and 87% don't know it. In medical students about a quarter (24%) know the maximum allowed dose compared to only 3 of non-medical students. About a quarter (24%) of the students know the minimum fatal dose of paracetamol (42% of medical compared to 7% non-medical) and 24% admitted that they don't know (15% of medical and 33 of non-medical). About 31% of the students under estimated the minimum dose (18% of medical and 43% of non-medical). Results showed that there is a positive association between the type of education and level of knowledge (p value =0.000, $p<0.05$).

Students' attitude towards paracetamol use (Table 3): Of all the students more than three quarters (79%) agree that paracetamol overdose can cause death and 21% agree that it will not (88% of medical students agree that paracetamol overdose can cause death and 12% agree that it will not, in non-medical students 70% think that overdose can cause death and 30% think that it will not). There is significant association between type of education and attitude of students regarding the use of paracetamol in over dose to cause death ($p<0.05$).

Nearly half (48%) of all the students agree that self-prescription is harmful and more than half (52%) agree that it is not harmful (44% of medical students agree that it is harmful and 56% agree that it is not harmful, in non- medical students 51% agree that it is harmful and 49% agree that it is not harmful). There is no significant association between type of education and student' attitude towards self-prescription ($p=0.195$, $p>0.05$).

Of all the students half (50%) agree that taking multi drugs containing paracetamol is safe and the other half (50%) think that it is not safe(42% of medical students agree that it is safe and 58% think it is not safe, 58% of non-medical students think it is safe and 42% think it is not safe). There is an association between the type of education and students' attitude regarding the use of multiple drugs containing paracetamol($p<0.05$).

Students' practice towards paracetamol (Table 4): Among all the students 81% took paracetamol in the last month (82% of medical students and 81% of non medical). There is no significant difference between medical and non-medical students regarding paracetamol use ($p>0.05$).

Most of the students (94%) used to take paracetamol as one tab (500mg) or two tabs (1000mg) per dose and in more than half (59%) of them the frequency of taking paracetamol varies between daily to monthly and more.

Headache was the most common cause (88%) for taking paracetamol among the students (86% of medical students and 91% of non-medical students), Followed by flue/influenza and fever).

Regarding the source of acquiring paractamol among students who took it, 43% of medical students reported that they used to get paracetamol from a pharmacy, 29% from a supermarket and 14% from family members. In non-medical students 36% used to get paracetamol from a pharmacy, 52% from a supermarket and 10% from family members. Both the pharmacy (39%) and the supermarket (40%) constitute the most common sources for obtaining paracetamol.

While 85% of all the students took paracetamol without prescription, only 15% did that with prescription. 96% of medical students took paracetamol without prescription and only 4% took it with prescription. While three quarters (75%) of non-medical students took paracetamol without prescription, a quarter (25%) of them did that with prescription. There is a significant association between the type of education and the ways of obtaining paracetamol ($p< 0.05$). Medical students get paracetamol without prescriptions more than non-medical.

Only 41(15%) of the students took paracetamol with prescription. 24 (58%) of them did that because of their fear of side effects (68% of medical and 47% of non-medical), 9 (22%) to avoid drug dependence (28% of medical and 16% of non-medical) and 8(20%) did that to avoid taking wrong doses (4%of medical and 37% of non-medical).

Of all the students who took paracetamol without prescription (85% as mentioned above), 39% of them said they have enough knowledge to take paracetamol (57% of medical and 15% of non-medical), 28% said that they don't care (23% of medical and 35% of non-medical). A quarter (25%) did that to avoid time loss (17% of medical and 35% of non-medical) and only 8% of them (3% of medical and 15% of non-medical) did that to avoid cost.

Of all the students who took paracetamol without prescription (self-prescribing), 185 (78%) of them reported doing that based on their previous experiences (79% of medical and 75% of

non-medical), 51(21%) of them based on family advice (20% of medical and 23% of non-medical) and only 3(1%) based on advice from friends (only 1% of medical and only 2% of non-medical).

TABLES AND FIGURES

Table 1: Demographic data of the students.

		Medical	Non-medical	All students
Age (years)	Mean	20.5	20.3	20.4
	Maximum	27	28	28
	Minimum	17	17	17
	Mode	21	21	21
Gender	Male	53 (31 %)	40 (23 %)	93 (27%)
	Female	119 (69 %)	132 (77%)	251 (73%)
	Total	172 (100%)	172 (100%)	344 (100%)
Student year	1st	29	38	67
	2nd	24	28	52
	3rd	28	33	61
	4th	32	32	64
	5th	33	41	74
	6th	26	-	26
	Total	172 (50%)	172 (50%)	344 (100%)

Table 2: Students' Knowledge of Paracetamol use.

	Medical	Non-medical	All students	P value
Knowledge of Paracetamol use: Good knowledge Poor knowledge Total	71 (41%) 101 (59%) 172 (100%)	22 (13%) 150 (87%) 172 (100%)	93 (27%) 251 (73%) 344(100%)	0.000
Knowledge score: Mean Minimum Maximum Knowledge about indications: Mean Knowledge of side effects: Mean	5.2 2.0 9.0 3.8 0.7	3.7 0.0 7.0 3.1 0.5	4.5 0.0 9.0 3.5 0.6	
Knowledge of maximum allowed dose/day: Know the max allowed dose Do not know the max allowed dose Total	41 (24%) 131 (76%) 172 (100%)	5 (3%) 167 (97%) 172 (100%)	46 (13%) 298 (87%) 344 (100%)	< 0.001
Knowledge of the minimum fatal dose: Know the minimum fatal dose Underestimate the min fatal dose Overestimate the min fatal dose Don't know the min fatal dose Total	72 (42%) 31 (18%) 43 (25%) 26 (15%) 172 (100%)	12 (7%) 74 (43%) 29 (17%) 57 (33%) 172 (100%)	84 (24%) 105 (31%) 72 (21%) 83 (24%) 344 (100%)	< 0.001

Table 3: Students' attitude towards Paracetamol use.

	Medical	Non-medical	All students	P value
Attitude in use of Paracetamol in overdose & death: Paracetamol in overdose can cause death Paracetamol in overdose does not cause death Total	151 (88%) 21 (12%) 172(100%)	120 (70%) 52 (30%) 172 (100%)	271 (79%) 73 (21%) 344 (100%)	0.001
Students' attitude towards self prescription: Self- prescription is harmful Self-prescription is not harmful Total	76 (44%) 96 (56%) 172(100%)	88 (51%) 84 (49%) 172 (100%)	165 (48%) 179 (52%) 344 (100%	0.195
Students' attitude towards use of multiple drugs Containing paracetamol: Use of multiple drugs containing paracetamol is safe Use of = = = = = = = = = = = = = = = = = = is not safe Total	72 (42%) 100 (58%) 172(100%)	100 (58%) 72 (42%) 172 (100%)	169 (50%) 175 (50%) 344 (100%)	0.010

Table 4: Students' practice towards paracetamol.

	Medical	Non-medical	All students	P value
Students' use of Paracetamol in last month: Used Paracetamol Did not use Paracetamol Total	141 (82%) 31 (18%) 172 (100%)	139 (81%) 33 (19%) 172 (100%)	280 (81%) 64 (19%) 344 (100%)	0.10
Dose of paracetamol used: 1 tab (500mg) 2 tabs (1000mg) 3 and more tabs Total	66 (47%) 66 (47%) 9 (6%) 141 (100%)	79 (57%) 53 (38%) 7 (5%) 137 (100%)	145 (52%) 119 (42%) 16 (6%) 280 (100%)	
Frequency of paracetamol intake: Daily Weekly Monthly More than monthly Total	7 (5%) 37 (26%) 32 (23%) 65 (46%) 141 (100%)	11 (8%) 32 (23%) 45 (32%) 51 (37%) 139 (100%)	18 (6%) 69 (25%) 77 (28%) 116 (41%) 280 (100%)	
Reasons of taking paracetamol: Headache Flu and influenza Toothache Fever Backache & muscle pain Total	124 (86%) 4 (3%) 4 (3%) 7 (4%) 6 (4%) 145 (100%)	122 (91%) 6 (4%) 2 (1%) 3 (3%) 2 (1%) 135 (100%)	246 (88%) 10 (4%) 6 (2%) 10 (4%) 8 (2%) 280 (100%)	

Sources of obtaining paracetamol: Pharmacy Supermarket Friend Family Totl	61 (43%) 41 (29%) 4 (3%) 35 (14%) 141 (100%)	50 (36%) 72 (52%) 3 (2%) 14 (10%) 139 (100%)	111 (39%) 113 (40%) 7 (3%) 49 (18%) 289 (100%)	
Students ways of obtaining Paracetamol: Used to obtain paracetamol with prescription Used to obtain paracetamol without prescription Total	6 (4%) 135 (96%) 141 (100%)	35 (25%) 104 (75%) 139 (100%)	41 (15%) 239 (85%) 280 (100%)	0.001
Reasons for taking paracetamol with prescription: Fear of side effects Avoid wrong doses A void dependence Total	15 (68%) 1 (4%) 6 (28%) 22 (100%)	9 (47%) 7 (37%) 3 (16%) 19 (100%)	24 (58%) 8 (20%) 9 (22%) 41 (100%)	
Reasons for taking paracetamol without Prescription: Don’t care Avoid time loss Avoid cost Have enough knowledge Total	31 (23%) 23 (17%) 4 (3%) 77 (57%) 135 (100%)	36 (35%) 36 (35%) 16 (15%) 16 (15%) 104 (100%)	67 (28%) 60 (25%) 19 (8%) 93 (39%) 239 (100%)	
Factors affecting paractamol self-prescription: Previous experience Family advice Friends advice Total	107 (79%) 27 (20%) 1 (1%) 135 (100%)	78 (75%) 24 (23%) 2 (2%) 104 (100%)	185 (78%) 51 (21%) 3 (1%) 239 (100%)	

DISCUSSION

Paracetamol is an over the counter(OTC) drug which is recommended for indications such as mild to moderate pain and pyrexia according to the British National Formulary.[23] The use of self-medication is highly prevalent in the community.[12] In this descriptive study knowledge, attitude and practice of medical and non-medical students regarding paracetamol use were compared. The total number of the respondents was 344 divided in two halves (172 each) into medical and non-medical students. According to the outcomes of many researches, Paracetamol and non-steroidal ant-inflammatory agents (NSAIDs) were the most frequently consumed medicines.[4,5,24,25]

The students’ knowledge results above show that most of the students have poor knowledge about paracetamol (including knowledge about side effects, indications and maximum dose

allowed per day and minimal fatal dose), and that only a small percentage was found to have good knowledge about paracetamol, and these results were similar to other studies in Jordon and UK.[1,6] The majority of students weren't aware of the maximum daily dose and this result was also reported in UK.[26] Regarding minimum fatal dose, about one fifth (21%) of the students were found to be overestimating it compared to higher percentages, sixty two and seventy five percent of the US and UK students respectively.[6] this may be due to variability in knowledge, though poor, about paracetamol among the students in different countries. The association between type of education and level of knowledge was found to be significant, medical students have more knowledge regarding paracetamol use than non-medical ones, this may be because medical students have more health information than non-medical ones, but the overall knowledge assessment is poor, this may be to defects in the curriculum, poor health education, poor public awareness about paracetamol and may be that patients do not used to read carefully the internal recipe for paracetamol or the recipe itself is not available as when paracetamol is obtained for example from the supermarket or from a family member.

Regarding attitude, the majority of the students agree that paracetamol overdose can cause death and these results were similar to other studies conducted among UK and US students.[6] Half of the students thought that taking multi drugs containing paracetamol is not safe and the other half thought it is safe. A significant association was found between the type of education and both students' attitude regarding paracetamol overdose side effects and their attitude regarding taking multi drug containing paracetamol. This probably may be because that medical students had better knowledge regarding paracetamol compared to non-medical ones due to their medical field of education. About half of the students thought that self-prescription is harmful and the other half of the students thought it is not. These findings are similar to findings of a previous study in Sri Lanka.[14]

With regard to the practice of the students towards paracetamol, the majority of them reported using paracetamol, this may be due to its availability and its effectiveness which was reported by many previous studies.[4,5,24,25] It is found that Headache is the most common cause for using paracetamol among the students who took it which can be explained that the students were under stress most of the time. Of the students who use paracetamol, the majority reported using it without prescription (self-prescribing); this was also reported in previous studies conducted in Sudan, Sri Lanka, Kuwait India and Palestine.[11,14,21,27,28] More

than half of medical students had been practicing self-medication regarding paracetamol use because they think that they have enough knowledge to do so. However the majority of the non-medical students practice self-medication, either because they don't care or to avoid time loss. These results were similar to findings in previous studies done in Sri Lanka and Saudi Arabia.[14,29] Most students (medical and non-medical) took paracetamol without prescription on their previous experiences as reported by another previous study.[14] Although half of the students thought that self-prescription is harmful, they took paracetamol without prescription, this may be because self-prescription is a traditionally accepted practice. Self-medication might be used as away to cope with the obstacles to medical care.[14] Furthemore a small percentage of students reported using paracetamol with prescription for fear of side effects (both medical and non-medical students), to avoid dependence (mainly medical students), and to avoid taking wrong doses (mainly non-medical). Similar picture was also reported by another study done in India.[27] The most common source of paracetamol in medical students is found to be a pharmacy compared to non-medical students, where it is a supermarket. However it is a major issue that most of the pharmacies do not offer any counseling on the proper use of paracetamol, they supply OTC drugs including paracetamol without prescription and only consider profit maximization. It is a big responsibility of pharmacists to reduce the self-medication practice with paracetamol. It is the pharmacists' and drug regulatory authority's duty to enforce the regulations towards the importance of doctors' prescription of drug usage including paracetamol, to reduce misuses and toxicity.[14]

Limitation

The Faculties selected to represent the target population (the students of the U of K) were supposed to be selected randomly from the total number of the faculties of the University, unfortunately most of them were closed because of student' strike during October/November and only few of them were available to conduct the study. These were the faculties of the Medical Campus and the Faculty of Education.

CONCLUSION

In conclusion both medical and non-medical students have poor knowledge about paracetamol indications and doses. But medical students had a better knowledge than non-medical ones. With respect to their attitude most of the students had good attitude towards both use of multi-drugs containing paracetamol and paracetamol overdosing, but most of

them have poor attitude regarding self-prescription. An association is found between the type of education and both students' knowledge and attitude towards Paracetamol use.

Self-prescription of paracetamol is more common than doctor's prescription among the students of the faculties of Medicine and Education of the University of Khartoum and it is more common in medical students than non-medical ones. There is an association between the type of education and the ways of obtaining paracetamol. Pharmacies and retail shops are easy accessible sources of drugs such as paracetamol, and the most common cause for paracetamol use was found to be headache.

Awareness campaigns and health education sessions are needed to increase the awareness of the university students and the community about OTC drugs including paracetamol. In order to prevent misuse and toxicity of paracetamol and OTC drugs, changing the health policy regarding these drugs is recommended. More studies are needed to explore the problem in the entire Sudanese population.

REFERENCES

1. Asma'a, A.A. Knowledge attitude and practice of Jordan university students towards paracetamoul appropriate use and misuse., 2008.
2. Sheen, C. L., Dillon, J. F., Bateman, D. N., Simpson, K.J., And Macdonald T.M. ''Paracetamol toxicity: epidemiology, prevention and costs to the health-care system''Qjm, 2002; 95(9): 609-619.
3. Gunnell, D., Murray, V. and Hawten, K. Use of paracetamol (acetaminophen) for suicide and nonfatal poisoning: Worldwide patterns of use and misuse. Suicide and life threatening behavior., 2000.
4. Abey SM, Amello, W. "Assessment of self-medication practices among medical, pharmacy and health science students in Gondar University, Ethiopia", J Young Pharm., 2010; 2(3): 306 – 310.
5. Acocella, CM. "Using diaries to assess non-prescription drug use among university students", Journal of Drug Education, 2005; 35(4): 267 – 274.
6. Gilbertson, RJ. Harris, S.K. Pandey, P. Kelly, W. Myers, "Paracetamol use, availability, and knowledge of toxicity among British and American adolescents", Arch Dis Child., 1996; 75(3): 194 - 198.
7. Prescott LF. Paracetamol (Acetaminophen): A Critical Bibliographic Review, 1st edn. London, Taylor & Francis, 1996.

8. Spooner JB, Harvey JG. The history and usage of paracetamol. J Int Med Res., 1976; 4: 1–6.
9. Newson RB, Shaheen SO, Chinn S, Burney PG. Paracetamol sales and atopic disease in children and adults: an ecological analysis. Eur Respir J., 2000; 16: 81723.
10. Nourjah,P., Ahmed, S.R., Karwoski, C, Willy, M., estimates of acetaminophen (paracetamol) associated overdoses in the United States. Pharmacoepidem. Drug Safe., 2006; 15: 398-405. doi:10.1002/pds.1191.
11. Awad, Abdelmoneim Ismail, Idris Babikir Eltayeb and phillip A.Capps. "Self-medication practices in Khartoum State, Sudan." European journal of clinical pharmacology., 2006; 62(4): 317-324.
12. Kashari SS etal. Prevalence and pattern of Self-medication Practices in Rural Area of Barabanki. Indian Journal of Clinical Practice., 2014; 25(7): 636-639.
13. Yadav AK etal. Self-prescription of Paracetamol by Undergraduate Students in BP Koirala Institution of Health Sciences. Jnma J Nepal Med Assoc., 2016; 55(203): 11-15.
14. Samarawickrama, A.A.H.S. et al "A study on paracetamol consumption by undergraduate students in the Faculty of Allied Health Sciences, University of Peradeniya. International Journal of Scientific and Research Publications., 2014.
15. Perscott LF. Paracetamol over dosage: Pharmacological consideration and Clinical management., 1983.
16. Larson AM, Polson J, Fontana RJ, Davern TJ, Lalani E, Hynan LS, Reisch JS, Schiødt FV, Ostapowicz G, Shakil AO, Lee WM; Acute Liver Failure Study Group. "Acetaminophen-induced acute liver failure: results of a United States multicenter, prospective study". Hepatology (Baltimore, Md.)., December 2005; 42(6): 1364–72. doi:10.1002/hep.20948. PMID 16317692.
17. Buckley N, Eddleston M "Paracetamol (acetaminophen) poisoning". Clinical evidence., December 2005; 14: 1738–44. PMID 16620471.
18. Bower WA, Johns M, Margolis HS, Williams IT, Bell BP "Population-based surveillance for acute liver failure". The American Journal of Gastroenterology., November 2007; 102 (11): 2459–63. doi:10.1111/j.1572-0241.2007.01388.x. PMID 17608778
19. Yousef AM, Al-Bakri AG, Bustanji Y, et al. Self-Medication Patterns in Amman, Jordan. Pharm World Sci., 2008; 30: 24-30.
20. Shankar, P.R, P. Partha and N Shenoy. "Self-medication and non-doctor prescription practices in Pokhara Valley, Western Nepal: A questionnaire-based study" BMC Family Practice., 2002; 3(1): 1.

21. Al-Hussaini M, Mustafa S, Ali S. Self-medication among undergraduate medical students in Kuwait with reference to the role of the pharmacist. J Res Pharm Pract., 2014; 3: 23-7.
22. EL Ezz, N.F., and Ez-Elarab H.S. "Knowledge attitude and practice of medical students towards self-medication Ain shams university, Egypt. journal of preventive medicine and hygiene., 2011; 52: 4.
23. British National Formulary., 2007; 54: 224 – 225.
24. Tahir M.U, Shoaib N, Usman A, Sadiq S, Harris N.I.K, "Prevalence Of Analgesic Use Amongst University Students". Unpublished., 2011.
25. Gutema G.B, Gadisa A.D, Kidanemariam Z.A, Berhe D.F, Berhe A.H, Hadera M.G., et al, "Self-Medication Practices among Health Sciences Students: The Case of Mekelle University", Journal of Applied Pharmaceutical Science, 2011; 01(10): 183-189.
26. Fosnocht D, Taylor. Jr, Caravati Em "Emergency department patient knowledge concerning acetaminophen in over counter and prescription analgesics"., 2008.
27. Thadani S, Salman MT, Ahmad A. Knowledge, Attitude and Practice of Self Medication Among Second Year Undergraduate Medical Students. J Rational Pharmacother Res., 2013; 1(3): 131-134.
28. Ansam F. Sawalha, et al" Self-medication practices among Palestinian medical and non-medical university students., 2008.
29. Sayed I.A, et al "Perception towards Appropriate Use and Adverse Effects of Paracetamol among the Residents of Al Ahsa "International Journal of Health sciences'., 2015; 3(2): 307-310.