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Research Article

### AWARENESS OF USES AND RISKS OF PARACETAMOL IN STUDENTS OF NORTHERN BORDER UNIVERSITY, SAUDI ARABIA

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**Abstract:**

**Introduction:** Paracetamol is commonly self-used drug for fever, headache and arthralgia; because it is easily available over the counter and gives prompt relief; although it has potential of causing hepatic and renal toxicity. Present study aimed to determine attitude and awareness of benefits and risks of paracetamol self-use among students of Northern Border University (NBU), Saudi Arabia.

**Materials and Methods:** A questionnaire was randomly distributed to students of colleges of Engineering, Education and Arts, Business Administration, Science and Community. Besides demographic data and attitude, study questions addressed the knowledge of indications, dosage and risks of paracetamol.

**Results:** Amongst 255 participants of both gender, 211 (82.7%) showed sufficient knowledge about paracetamol with average score 3.7/5. The majority (237, 92.9%) knew correct dose of paracetamol (500–1000mg) and 206 (80.8%) were aware of correct interval between doses (6–8 hour). All of them knew correct indications (Headache, toothache, arthralgia and fever), while 164 (64.3%) knew it can cause hepatotoxicity and nephrotoxicity. Most of them (195, 76.5%) were taking paracetamol without doctor's advice. Reasons for self-use were 'good knowledge about paracetamol' (117, 45.9%), 'to avoid wasting of time' (71, 27.8%), and 'prescription not necessary' (67, 26.3%).

**Discussion:** Present study revealed that paracetamol is frequently self-used for fever and pains. Literate population of Northern Border Region of Saudi Arabia had good knowledge of its indications, dosage and adverse effects. Results were comparable to similar studies conducted in England and France.

**Keywords:** Paracetamol; self-use; knowledge; indications; dosage; adverse effects; Northern Border University; Saudi Arabia.

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**INTRODUCTION:**

Paracetamol is one of the most popular and most commonly used analgesics and antipyretic drugs worldwide. The mechanism of action of paracetamol is complex and includes effects on both the peripheral (Cyclooxygenase, COX) and central (COX, serotonergic descending neuronal pathway, L-arginine/NO pathway, cannabinoid system) antinociception processes (Jóźwiak-Bebenista and Nowak, 2014).

Currently, paracetamol is the first-line choice for pain management and antipyresis in a variety of patients, including children, pregnant women, the elderly, and those with osteoarthritis, simple headaches, and other musculoskeletal conditions (Prescott, 2000). When used in the recommended doses, it has few side effects and is remarkably well-tolerated (Cranswick and Coghlan, 2000). The average adult dose of paracetamol to be taken at one time is 500 mg, which can be taken 3–4 times per day, with an interval of 6–8 hours, and up to a maximum of 3–4 grams. However, in adults weighing less than 50 kg or in patients undergoing certain risk factors, the recommended daily dose of paracetamol is limited to 60 mg/kg/day with a maximum of 3 g daily (Viguier et al., 2016).

The problem of unintentional poisoning caused by acetaminophen resulting in hepatotoxicity has been increasingly recognized in recent years (Civan et al., 2014). A single acute ingestion of acetaminophen greater than 10 g or 200 mg/kg (whichever is less) in adults or 200 mg/kg in children is considered hepatotoxic (Dart. Et al., 2006). Additionally, acetaminophen toxicity could occur after repeated ingestion of supra-therapeutic doses throughout more than 8 hours. These events might lead to symptoms such as confusion, loss of appetite, upper abdominal pain, nausea, and vomiting. These symptoms are mostly related to liver damage due to the formation of a toxic metabolite (N-acetyl-parabenzquinone-imine, NAPQI) in the liver and due to stomach upset because of cyclooxygenase (COX-1) inhibition leading to hyperacidity (Tan et al., 2015).

Screening for observational studies in English, which reported cardiovascular, gastrointestinal (GI) or renal adverse effects (AEs) in the general adult population at standard analgesic doses of paracetamol, revealed an increased risk ratio of cardiovascular AEs from 1.19 (range, 0.81 to 1.75) to 1.68 (range, 1.10 to 2.57), increased relative rate of GI AEs (Bleeds) from 1.11 (range, 1.04 to 1.18) to 1.49 (range 1.34 to 1.66), and  $\geq 30\%$  decrease in estimated glomerular filtration

rate from 2.19 (range, 1.4 to 3.43) to 1.40 (range, 0.79 to 2.48) (Roberts et al., 2016).

Very few studies have been conducted to assess the awareness of the beneficial and adverse effects of paracetamol. A study designed to evaluate the self-use of paracetamol and its outcomes was performed amongst students of the Faculty of Allied Health Sciences, University of Peradeniya, Sri Lanka. A majority of students were using paracetamol by self-prescription, and the disadvantages of this practice were emphasized by 65 % of students. Most of the students agreed that “paracetamol should be taken with a doctor’s prescription” (Samarawickrama et al., 2014). Because the respondents were associated with the Health Sciences, they were more aware of the draw-backs of self-use of paracetamol.

Recently, a study was conducted to assess the perception of the appropriate use of paracetamol among the residents of the Al-Ahsa City of Saudi Arabia. The overall awareness about the appropriate use and adverse effects of paracetamol among the community was very low. However, there was a significant association ( $< 0.05$ ) of the awareness with educational level (Ali. Et al., 2015)

The present study aimed to assess the attitude and awareness of benefits and risks of paracetamol self-use among students of various faculties of the Northern Border University, Arar, Saudi Arabia, excluding the colleges of Medicine, Pharmacy, Nursing, and Applied Medicine, thereby representing the literate population of the Northern Border Region.

**MATERIALS AND METHODS:**

A descriptive cross-sectional study was conducted among the male and female students of Northern Border University (NBU), Arar, Saudi Arabia, to evaluate the attitude and the knowledge of the dosage, benefits, and risks of paracetamol self-use, data were collected during April and May 2018. The population of the current study included the students of the colleges of Engineering, Education and Arts, Business Administration, and Science and Community of NBU, excluding students of Medicine, Pharmacy, Nursing, and Applied Medical Science. According to the university records from the deanship of student affairs, the total number of student registered for the study year was 14100. To calculate the sample size from this finite population, we adjusted the margin of error to 6 and confidence interval to 95%. Thus, the estimated necessary sample size for this study was 255. The questionnaire was distributed using proportional sampling

technique amongst students of the various colleges of NBU, mentioned above, in their male and female campuses.

The questionnaire was prepared both in Arabic and English and pretested and validated. Collected data were analyzed using SPSS statistical package 22, and the results were presented as absolute figures and percentages. Inferential statistics were applied, where needed, and p-values < 0.05 (two-tailed) was considered statistically significant.

Before data collection, the consent of the respondents had been obtained by a written and verbal explanation of the aims and objectives of the study, and the confidentiality of the participant's data was ensured. Only completed questionnaires were considered for data analysis. For knowledge questions; correct answers were scored as 1 which the wrong answers were scored as zero. Participants with a total score  $\geq 3$  are considered to have sufficient knowledge, while the lower scored persons were considered to have inadequate knowledge about paracetamol.

Statistical analysis: Chi square test was used to study the categorical data. Statistical analysis was conducted by Graph-pad prism software. Significance was considered with p-value < 0.05.

### RESULTS:

A total of 255 students from five colleges of the NBU participated in the study. The majority of the participants were from the College of Engineering (94, 36.9%); followed by Education and Arts (76, 29.8%), Business Administration (56, 22%), Science (27, 10.6%), and Community (2, 0.8%). Most of the participants were aged between 20 and 25 years (77.3%), with almost equal gender distribution [127

males (49.8%) and 128 (50.2%) females]. The participants were equally distributed across academic levels (Table 1).

Regarding the knowledge score, the participants showed overall score of  $3.7 \pm 1.2$ . 211 (82.7%) participants had showed sufficient knowledge. There was no significant effect for ages, genders and faculties of the participants and their overall knowledge scores (Figure 1). Regarding the individual questions, When participants asked about paracetamol dosage, a majority (202, 79.2%) knew the correct average adult dose (500 mg) usually taken at one time, and 206 (80.8%) were aware of the correct interval between the doses (6–8 h). However, relatively few participants (36, 14.2%) knew that the maximum permissible daily dose in healthy adults was up to 3–4 g, whereas, most of them said (219, 85.8%) 0.5 to 2 g (i.e., they were mostly on the safer side) (Table 2).

When asked about which organs are affected by the use of paracetamol, many of the respondents answered correctly [i.e., liver (73, 28.6%) and kidney (82, 32.2%)]. Some of the participants also mentioned the heart (37, 14.5%), stomach (4, 16.9%), and brain (20, 7.8%), which might also be occasionally affected. Another question that was asked to re-check their knowledge about adverse effects of paracetamol was also answered correctly by most of the participants (164, 46.3%), including hepatotoxicity (80, 31.4 %) and nephrotoxicity (84, 32.9%). Other participants mentioned peptic ulcer (53, 20.8%), sedation (31, 12.2%), and cardiotoxicity (7, 2.7%), which are also reported in the literature, particularly, with higher doses or chronic use (Table 2).

**Table 1: Demographic Data of the participants of the study.**

Variable	N (%)
<b>Age</b>	
17-19	55 (21.6)
20-22	121 (47.5)
23-25	76 (29.8)
26-28	3 (1.20)
<b>Gender</b>	
Male	127 (49.8)
Female	128 (50.2)
<b>College</b>	
Education and Arts	76 (29.8)
Business Administration	56 (22.0)
Engineering	94 (36.9)
Science	27 (10.6)
Community College	2 (0.80)

Table 2: Responses to questions for the assessment of knowledge.

Question	N	%
<b>Do you know the correct dose of Paracetamol?</b>		
500 mg	202	79.2
1 gm	35	13.7
2 gm	18	7.1
<b>Do you know the maximum dose of Paracetamol per day?</b>		
500 mg	68	26.7
1 gm	78	30.6
2 gm	73	28.6
3 gms	19	7.5
4 gms	17	6.7
<b>Do you know the correct interval between doses?</b>		
Every 2 hours	6	2.4
Every 4 hours	43	16.9
Every 6 hours	108	42.4
Every 8 hours	98	38.4
<b>Which one of the following organs is commonly affected by Paracetamol overdose?</b>		
Liver and kidney	155	60.8
Heart, brain and stomach	100	39.2
<b>Which of the following adverse effect is most common with Paracetamol overdose?</b>		
Hepatotoxicity	80	31.4
Cardiotoxicity	7	2.7
Nephrotoxicity	84	32.9
Peptic Ulcer	53	20.8
Sedation	31	12.2

Table 3: Responses to questions about attitude and perception.

Question	N	%
<b>How do you take Paracetamol?</b>		
On doctor prescription	60	23.5
Self-prescription	195	76.5
<b>Self-prescription is based on</b>		
Advice of friends	36	14.1
Own experiences	207	81.2
Internet search	12	4.7
<b>From where you get Paracetamol?</b>		
Left over tablet	86	33.7
Community Pharmacy	93	36.5
primary health care center or hospital	49	19.2
Retail shop	26	10.2
<b>For what reason do you take Paracetamol?</b>		
Headache	168	65.9
Flu/common cold/fever	10	3.9
Toothache	16	6.3
Joint pain	4	1.6
Generalized pain	57	22.4
<b>Reasons for using Paracetamol without prescription</b>		
Prescription not necessary	67	26.3
Avoid time wasting	71	27.8
Have good knowledge	117	45.9
<b>In practice, it is better not to use Paracetamol without prescription</b>		
Disagree	66	25.9

No idea	84	32.9
Agree	87	34.1
Strongly agree	18	7.1
<b>How frequently you take Paracetamol?</b>		
Rarely	95	37.3
Occasionally	135	52.9
Frequently	21	8.2
Daily	4	1.6
<b>For how-long you take Paracetamol?</b>		
1 Day	116	45.5
2 Days	58	22.7
3 Days	40	15.7
4 Days	18	7.1
More than That	23	9.0

In the assessment of attitude and perception, it was observed that most participants were taking paracetamol without the advice of a doctor or pharmacist [i.e., by self-prescription (195, 76.5%) and others (60, 23.5%) were taking on doctor's advice]. When enquired about the source, paracetamol was mostly obtained from a 'community pharmacy' (93, 36.5%) or 'leftover' (86, 33.7%), as it is commonly consumed and easily available as leftovers at home. The remaining few were getting paracetamol from a primary health care center or hospital (49, 19.2%) and retail shop (26, 10.2%), (Table 3). When asked 'it is better not to use paracetamol without prescription', about half of them (105, 41.2%) agreed or strongly agreed, a quarter of them (66, 25.9%) disagreed, while the remaining participants (84, 32.9%) said no idea. Regarding the frequency of self-use of paracetamol, the majority were rarely taking (95, 37.3%), or occasionally (135, 52.9%), while only a few were frequently taking (21, 8.2%) or daily (4, 1.6%). Regarding the duration of self-use, most respondents were taking paracetamol for 1 or 2 days only (174, 68.2%), whereas the remaining were taken for three to four days (58, 22.8%) and only a few (23, 9%) were taking for more than 4 days (Table 3).

When asked on what basis they were using by self-prescription, the majority (207, 81.2%) replied 'on personal experience', while the remaining were taking on the 'advice of friends' (36, 14.1%) or by 'internet search' (12, 4.7%). When asked about the reason for self-use of paracetamol, most of them said that 'have good knowledge about paracetamol' (117, 45.9%), some said 'to avoid wasting of time' (71, 27.8%), while the remaining replied that the 'prescription is not necessary' (67, 26.3%) (Table 3).

### DISCUSSION:

The present study aimed to assess the awareness of benefits and risks of Paracetamol self-use among

students of Northern Border University, Arar, Saudi Arabia, excluding medical, pharmacy, nursing and applied medicine students; with the aim of including a sample representative of the literate population (Non-medical) of the Northern Border Province. The majority of students (~80%) answered correctly for the indications, recommended daily doses, and dosage interval of paracetamol. About 60% were aware of its main adverse effects (hepatotoxicity and nephrotoxicity) and the major organs affected (liver and kidney). These results were comparable to similar studies conducted in Saudi Arabia. For example, a study conducted in Alhasa, in the Eastern Province of Saudi Arabia, which including the majority of well-educated persons (67%) and another 28% who had completed secondary school, showed that majority of the participants (85%) were aware of the indications and serious side effects of long-term paracetamol use (Ali et al., 2015). Similarly, a study conducted in Riyadh among university and high school students reported that 80.0% of the respondents were using non-steroidal anti-inflammatory drugs for a headache and pain relief and that the female students were found to be more knowledgeable about safety issues than male students (Almalak et al., 204). In another study done in Jeddah among patients attending Primary Health Care Centers, paracetamol was the most frequently used over the counter analgesic drug (86.1%) for the relief of a headache, toothache, and arthralgia, whereas 58.1% did not know their side effects (Babakor and Al Ghamdi, 2018). Some other studies conducted in Saudi Arabia have mainly aimed to determine the prevalence and predictors of self-medication (particularly analgesics, which were most frequently consumed) among medical students or other populations, without assessment of their knowledge about indications or adverse effects (Ibrahim et al., 2015; Aashi et al., 2016; Albatti. Et al., 2017; Albusalih et al., 2017).

The results of the present study regarding the knowledge of indications, dosage, and adverse effects of paracetamol were also similar to studies done in the UK and France. For instance, in a study conducted among patients attending emergency department of a teaching hospital in London (UK) to assess their knowledge of recommended daily doses of paracetamol, 53.8% answered correctly, 4.7% quoted a supra-therapeutic dose, and 41.5% a sub-therapeutic dose (Wood et al., 2010). Similarly, a study conducted in France among patients coming to buy over the counter paracetamol for themselves or their family revealed that most (84.4%) had good knowledge about indications and dosage; however, only 30.8% of patients were aware of its liver toxicity (Petitpain et al., 2016). In the present study, around 80% had good knowledge about the indications and dosage, and 64.3% knew about hepatotoxicity and nephrotoxicity.

Regarding the assessment of attitude and perception for the use of paracetamol in the present study, it was observed that most students were taking paracetamol by self-prescription (195, 76.5%) without consulting a doctor or pharmacist, and only a few were taking on doctor's advice (60, 23.5%). The main reasons for self-use were that they had good knowledge, easy availability without a prescription, and to avoid wasting time. A similar situation has been reported in some studies conducted in Saudi Arabia and other countries. For example, a study conducted in Taif reported that the most common drug taken by self-medication was paracetamol and the main reason for self-medication was expensive consultation and long waiting time in clinics and hospitals (Eldalo, 2013). Similarly, a study from Pakistan conducted among students showed a high prevalence of self-use of paracetamol and main reason behind self-medication included, time-saving, cost of physicians, easy availability over the counter, and advertisement by the media (e.g., television adverts) (Syed et al., 204).

Another important issue about self-use of paracetamol and easy availability is its consumption in toxic doses for suicidal purposes. A study conducted in Alkhobar (Saudi Arabia) in 2012 revealed that 10.3% patients reporting to an emergency in a university hospital for drug-related problems (DRPs) were of Accidental or suicidal drug ingestion and out of these 26.9% had taken an overdose of paracetamol (Alghamdy et al., 2015). In the United Kingdom, paracetamol has also been commonly consumed for self-poisoning, causing around 100–200 deaths every year (Wallace et al., 2002). Morbidity and mortality have been reported to be significantly reduced when a limit is imposed on

the sale of paracetamol in a single purchase (Hawton et al., 2001).

### CONCLUSIONS:

The present study revealed that the students of Northern Border University, representing the literate population of Northern Border Region of Saudi Arabia, had good knowledge of the indications, dosage and adverse effects of paracetamol. Most of the participants were taking paracetamol without the advice of a doctor or pharmacist and reasons for self-use were that the participants 'had good knowledge about paracetamol', 'wanted to avoid wasting of time' and that 'the prescription not necessary'. Based on our findings, we propose that morbidity and mortality can be reduced by imposing a limit on the sale of a single purchase of paracetamol.

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