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RESEARCH ARTICLE

NON-MEDICAL USE OF ANALGESICS AMONG MEDICAL STUDENTS

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ABSTRACT

Background: Non-medical use of medications is defined as the use of treatment for disorders which self-diagnosed. There are multiple factors could shape such use like; age, education, family, and society.

Objectives: The current study was carried out to estimate prevalence of non-medical use of analgesics and to investigate potential risk factors of nonmedical use of analgesics among (Al-Azhar university) medical students.

Methodology: This is a cross-sectional study which was conducted during the period (March to May 2016) using self administered questionnaire. The questionnaire was circulated and accomplished by 1097 medical students attending two faculties of medicine "Girls and boys" in Cairo, Egypt. Data was analyzed using STATA version 13. A multiple logistic regression model was built to investigate potential covariates of nonmedical use of analgesics.

Results: non-medical use of analgesics in the previous 6 months was 68.92%, and it was more prevalent among female students (70.69%). Analgesic use in the previous six months was one time in 66.80%, double in 14.95%, triple times in 10.71% and more than three times in 7.54% of the medical students. Of all the medical students, 23.52% reported headache as the problem while around 12.00% claimed bone and tooth aches as the main causes of their non-medical use of analgesics. The more likely used basic knowledge for non-medical use of analgesics were friends and families recommendations (42.0%), formerly used analgesics (12.4%), their own basic knowledge (6.9%) and a pharmacist suggestion (4.0%). Regarding the independent predictors of non-medical usage of analgesics, older students were more 1.2 times likely to be experience non-medical use. Male medical students were 1.29 times more likely experienced non-medical use. In general, the results revealed that students with co-morbidities were 1.95 times more probably experienced nonmedical use of analgesics.

Conclusion: non-medical use of analgesics is expanded among medical students in (Al-Azhar University). This might be an alarming signal for all policy makers of the Egyptian community. Insufficient information about analgesics, draw the attention for the magnitude of training courses and education over the social media.

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INTRODUCTION

Self prescription of analgesics is defined as "taking medicines without physician direction, designed for longer duration than arranged, or for basis other than the medication's proposed function (Mc Cabe *et al*., 2005; McCabe *et al*., 2006)". Policy makers and Ministry of Health have to make certain that self-medication is obtained through in a authoritative aspect, and guarantee that only sound medications are made accessible and that patients are well informed about safe medicines usage, and when to be forbidden (Hughes *et al*., 2001). Proper self-medication can alleviate health disorders and liberate moment lost while before you seek physician advice and might keep money. Moreover, it is approved that personal adequate medication for own care might be profitable to healthcare workers, pharmaceutical companies, and communities (Major *et al*., 1998). This is along with what WHO brought up that accountable non-medical could be advantageous in the control of problems that do not need physician appointment and afford an inexpensive back-up treatment for common illnesses (WHO, 1995). There was a massive enlarge in self use of analgesics during the last twenty years (Hughes *et al*., 2001).

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Based on what was declared by "National Survey on Drug Use and Health" (NSDUH), 2013 self medications were the next common fashionable medication among adolescents in America, (Substance, 2013) and analgesics are presently the most maltreated types of medications among youth, then stimulants, next tranquillizers and finally sedatives (Substance Abuse and Mental Health Services Administration, 2006). Remarkably, adolescents were hooked in greatest health-risk attitude, together with misuse of medications (Crockett *et al*., 2012). Preceding researches have declared that adolescents have the uppermost hazard of misuse of medications comparative to other age groups (McCabe *et al*., 2007), and this result might mirror adolescent's insight that misused medications are available at any time, without risk, and not as much as stigmatizing than drug addiction (Fleary *et al*., 2013). Nonetheless, it is apparent that adolescents non-medical use of analgesics has a key public health interest with destructive cost, like depression, anxiety and other psychological problems (Young *et al*., 2012). Self medication prescription analgesics among adolescents accounts for a mounting public health crisis (Jones, 2012), and pretty a small number of researches have label the covariates linked with medical students non-medical use of medication (Zacny, 2003). The level of self-medication reported in Middle East is high (Awad *et al*., 2005). However, there is lack of recording analgesic self-medication in Egypt, especially in the young population. To our understanding, there was not a study that dug into non-medical use of analgesics among Egyptian medical university students, and the potential predictors linked with self medication in Egyptian medical students is obliged. The aim of the current study was to estimate the prevalence of non-medical use of analgesics, to investigate its related factors and to determine the potential predictors of non-medical use of analgesics among medical college students in (Al-Azhar University) as a sample community in Egypt.

SUBJECTS AND METHODS

A cross-sectional study was applied in two faculties of medicine (Al-Azhar University) (faculty of medicine for boys and faculty of medicine for girls) in Cairo, Egypt, from grade one through grade 6. Grades 1, 2 and 3 were considered as an academic section, however grades 4, 5 and 6 were considered as a clinical section. The study was carried out between March and May 2016. The estimated sample "1084" by using STATA one sample comparison of proportions to hypothesized values was based on the 6% hypothesized proportion of non-medical use of analgesics and 8.5% postualted,[15] an α of 0.05, a power of 90%. The researchers invited all existing medical students to join the research. Among 1200 invited medical students, 1097 completed the self administered questionnaire with the response rate of 91%. An English Language self administered questionnaire composed of closed-ended questions was adopted as the study instrument and it took 5 minutes on average to be filled. There were total of nine questions on socio-demographic characteristics "age, sex, grade, marital condition, smoking status, paternal educational level, employment status, residence, and medical insurance. Also, there were total of five questions on self medication characteristics; frequency of non-medical use of analgesics, type of the frequently administered analgesics, basis of baseline knowledge considering analgesics, and co-morbidities that pointed out to non-medical use of analgesics. It was a valid and reliable questionnaire (Sweileh *et al*., 2016). All medical students were exclusively showed the objectives of the research study and the voluntarily pattern of their participation. An informed consent was gotten for each medical students. Ethics Committee of (Al-Azhar University) faculty of medicine for Girls and Boys officially approved the research proposal. In order to ensure the absence of potential information bias; three trained demonstrators distribute the questionnaires in the classrooms in nonappearance of the instructors. They were nearby during filling the questionnaire in case the participant students need support.

Statistical analysis

Two data entry persons in parallel entered all of the data. The data was coded, cleaned, processed and analyzed using STATA version 13. Descriptive analyses were applied to illustrate the different associations among the demographic characteristics and the prevalence of non-medical use of analgesics. Consequently, a multiple logistic regression model was built to investigate potential covariates that were independently predictive of non-medical use of analgesics. The researcher fed the model with all covariates (p value of 0.1 was considered for entrance and 0.101 for exit the model) to pick up the comprehensive predictors. The researcher used a two-sided tests at 0.05 ά level of significance. Questionnaires were plausibly inclusive, as there was minimal missing data "less than 5%" among all related covariates. The outcome variable was the non-medical use in the previous six months, it is coded as 1 if the response was yes and 0 if the response was no. In the current study, we merely incorporated four analgesics: acetaminophen codeine, diclofenac, aspirin and combined. The researcher selected certain medications based on the medicines commonly used by youth (Zhang *et al*., 2008). The socio-demographic variables were age, gender, marital status, paternal education, smoking, grade, medical insurance, student monthly expenses (<200 LE', '200–400 LE' or '>400 LE). The student was considered to be a smoker if she or he smoked at least a pack of cigarette in the last month. Baseline knowledge regarding non-medical use of analgesics was either from previously prescribed analgesics, families and friends, own medical information, pharmacist, or more than one source.

RESULTS

A total of 1097 university students participated and completed this cross-sectional survey with the response rate of 91%. It was revealed that the students mean age "21.39 ± 1.84" years; 63.45% were females (n= 696) and 36.55% males (n = 401). 51.05% of the students were studying in clinical years (grades 4, 5 and 6) and 48.95% were in academic years (grades 1, 2 and 3). Most of the participants (81.95%) were from rural residency, while 33.2% of them were in cities. Around three quarters of students` parents were highly educated and gave their children a monthly expenses more than 200LE. Almost all parents were working in private sectors. Majority of the students were non-smokers. More than half of the students were of normal weight and had medical insurance. Tenth of the students were married. The most frequent co-morbidity which forces students to take analgesics was headache, bone ache and toothache. Nearly half of the medical students used to take self prescribed analgesics once in the previous six months. The most frequently used self-prescribed analgesic was acetaminophen (Table 1 & 2). Medical students who experienced self prescribed analgesics were older, compared to their counterparts. Large proportion of female students used to significantly practice self-prescribed analgesics.

Table 1. Socio-demographic characteristics of the University Medical Students (N=1097)

Variable	N	%	
Age	21.39±1.84	Min 18	Max 24
Gender			
Male	401	36.55	
Female	696	63.45	
Grade			
1	194	17.68	
2	187	17.05	
3	156	14.22	
4	186	16.96	
5	214	19.51	
6	160	14.59	
Paternal Education			
Less than Secondary	7	0.64	
Secondary	244	22.24	
University and higher	846	77.12	
Paternal Employment			
Public work	96	8.75	
Private work	1001	91.25	
Smoking			
Smokers	184	16.77	
Non-smokers	913	83.23	
BMI			
Normal	647	64.38	
Overweight	246	24.48	
Obese	112	11.14	
Medical Insurance			
Have	481	43.85	
Does not Have	616	56.15	
Student Monthly Expenses(LE)			
<200 LE	234	21.33	
200 – 400 LE	430	39.20	
+400 LE	433	39.47	
Marital Status			
Not Married	968	88.24	
Married	129	11.76	

Table 2. Co-morbidities, types and frequencies of analgesics among the University Medical Students

Variables	N	%
Co-morbidity		
No	341	31.08
Headache	258	23.52
Bone ache	140	12.76
Toothache	135	12.31
Dysmenorrhea	91	8.30
colon	85	7.75
More than one cause	47	4.28
Frequency		
No	341	31.08
Once	505	46.03
twice	113	10.30
Three times	81	7.38
Four times	57	5.20
Types of Analgesics		
Acetaminophen	519	47.31
Aspirin	83	7.57
Acetaminophen codeine	72	6.56
Combined	82	7.47

Older clinical grades tend to experience self-prescribed analgesics compared to academic students. Non-married medical students were insignificantly more likely to experience self prescription compared to married peers. Students belonged to highly educated fathers worked in private sectors and have medical insurance seem to more frequently experience self prescription. There is non significant relation between BMI, residency and students monthly expenses and self prescription among medical students. Students with less GPA and not regularly practicing exercise significantly experienced self prescription compared with their counterparts (Table 3).

By building a multiple logistic regression model to suggest potential predictors of the non-medical use of analgesics among medical students, the study revealed that; age, regular exercise, marital status , BMI, paternal education, students monthly expenses and smoking were found be the significant predictors. Older students were 1.17 more likely to experience analgesics compared to their younger peers. Students who regularly practiced exercise were 0.68 times less likely to adhere to analgesics, contradict to students who did not use to practice exercise. Marriage is a protective covariate against analgesic use, as compared to non-married students; married ones were less likely to experience analgesic use.

Table 3. Distribution of self-prescribed analgesics according to socio-demographic characteristics (N=1097)

Variable	No Self-Medication		Self-Medication		Test	P value
	Mean	SD	Mean	SD		
Age	21.07	1.98	21.54	1.76	-3.92*	0.0001
	N	%	N	%		
Gender						
Male	137	34.16	264	65.84	2.79ǂ	0.09
Female	204	29.31	492	70.69		
Grade						
1	88	45.36	106	54.64	27.66ǂ	0.000
2	55	29.41	132	70.59		
3	51	32.69	105	67.31		
4	41	22.04	145	77.96		
5	58	27.10	156	72.90		
6	48	30.00	112	70.00		
Marital Status						
Not Married	296	30.58	672	69.42	0.98ǂ	0.32
Married	45	34.88	84	65.12		
Paternal Education						
Below Secondary	4	57.14	3	42.86	17.10ǂ	0.000
Secondary	100	40.98	144	59.02		
University and higher	237	28.01	609	71.99		
Employment						
Public work	39	40.63	57	59.38	4.47ǂ	0.03
Private work	302	30.17	699	69.83		
Medical Insurance						
Have	172	35.76	309	64.24	8.74ǂ	0.003
Does not have	169	27.44	447	72.56		
Smoking						
Smokers	232	25.41	681	74.59	81.81ǂ	0.000
Non-smokers	109	59.24	75	40.76		
BMI						
Normal	194	29.98	453	70.02	4.99ǂ	0.08
Overweight	83	33.74	163	66.26		
Obese	45	40.18	67	59.82		
Regular Exercise						
Yes	221	35.02	410	64.98	10.76ǂ	0.001
No	120	25.75	346	74.25		
Residency						
Rural	277	30.81	622	69.19	0.17ǂ	0.68
Urban	64	32.32	134	67.68		
GPA						
Less than very good	166	28.42	418	71.58	4.12ǂ	0.04
Very good and above	175	34.11	338	65.89		
Student Monthly Expenses						
< 200 LE	79	33.76	155	66.24	2.19ǂ	0.33
200-400 LE	138	32.09	292	67.91		
>400 LE	124	28.64	309	71.36		

*Independent t testǂChi square test

Table 4. Stepwise Multiple Logistic Regression Model for Possible Predictors of Self-prescribed Analgesics among Medical Students

Covariate	OR	SE	P	CI
Age	1.17	0.05	0.000	1.08 – 1.27
Regular Exercise	0.68	0.22	0.011	1.09 – 1.95
Marital Status	0.68	0.15	0.08	0.43 – 1.05
BMI	0.83	0.09	0.07	0.68 – 1.02
Education	1.47	0.24	0.018	1.07 – 2.02
Students monthly expenses	1.20	0.11	0.051	0.99 – 1.44
Smoking	4.28	0.77	0.000	3.01 – 6.09

Students with larger BMI were 0.83 less likely to comply with analgesics. Students whose parents highly educated were 1.47 more likely to experience non-medical use of analgesics. Medical students who got higher monthly expenses were 1.2 more likely to adhere to analgesics. Compared to non-smokers, smoker students were 4.28 times at risk of analgesic use. Controlling of all variables in the model. (Table 4)

DISCUSSION

The current study included medical university students; they were Egyptian, they all young aged, with virtually similar socio-demographic characteristics.

It was shown that non-medical use of analgesics was great among medical university students. The study reported that 46.03% of the students used analgesics one time or more in the previous six months. Several superior proportions were recorded among university students in Bahrain (81.3%) (James *et al*., 2006) , this could be attributed to the recall bias as their study question was related to the last three months, but the current study asks about the frequency in the last six months. This is in contrast to another study conducted in UK which declared 20% non-medical use of analgesics (Dengler, 1996) and 40% in Germany (Du, 2009). The discrepancy might be fairly due to different target population; as the study

population was from high school students, however the present study and the Bahraini study population was among faculty students. Also, it might be attributed to different sample size and technique or the categories of analgesics. Our results reported that the most frequent used analgesic among medical students was acetaminophen. This is inconsistent with what reported by a study which suggested that scattered analgesics were the most frequent analgesics, then Anti-Tussive with codeine (Wang, 2014). The present study claimed age to be significantly associated with analgesic use; older medical students tended to non-medically use analgesics compared to younger peers. This is consistent with what was reported by earlier researches which have shown that there is a significant relation between age and analgesic use (Nakawaki, 2012 and McCabe *et al*., 2007), on the other hand, it is opposing to what was recorded by a researcher in Sweden, who did not get a link between age and analgesic use (Abrahamsson, 2015). In general, the current study revealed insignificant association between gender and analgesic use. This is inline with what was reported by *Shadi et al., 2012*. On the opposite side there were several studies which stated a significant connection of female gender and analgesics (Sá, 2007 and Abahussain *et al*., 2005). In contrast to an earlier research, which recognized that males were significantly more probably experienced analgesic use than females (17.4% vs 15.7%) (McCabe *et al*., 2005).

Though, there were various disorders which impose usage of analgesics, the current research claimed headache as the main frequent cause of non-medical use of analgesics. This result is consistent with previous research conducted among Bahrain university students (James *et al*., 2006). The present results showed that, students in upper grades were less likely to be engaged with use of analgesics. Opposing to our results a study carried out in Detroit-area public school district found that older university students at higher were more likely to be involved in analgesic usage (Boyd *et al*., 2006). This could be credited to different study population as they involved medical and non-medical students. Faculty of medicine is usually categorized into academic and clinical years, with variable educational levels, though there is some students with minimal educational accomplishment (Lin, 2014; Haug 2013). Our results reported that students in clinical years were significantly more likely to experience analgesics use. It is supported with what two researches conducted in America and Korea (Pankrat'Ev *et al*., 2001; Heo *et al*., 2014). This could be justified by the fact that older students in clinical years are more likely to experience smoking behavior compared to those in academic years. It was quite remarkable that there was also no significant association between marriage status and analgesic consumption.

The current study is in concurrence with various studies carried out in Pakistan (Zafar *et al*., 2008), and Slovenia (Klemenc-Ketis *et al*., 2010), but in contrary to a study in conducted in Palestine (Sawalha, 2008). This might be credited to friends and families of non-married medical students have more baseline knowledge regarding analgesics then married medical students. According to residency, the current research showed no significant relationship with analgesics use among medical students. Nevertheless, there were variable study results; in a study, analgesic use was more common among students who experienced lonely living conditions (Figueiras *et al*., 2000), in contrast to the results of another study which showed non-significant relation of analgesic use with residence (Loyola Filho *et al*., 2002).

Medical students whose their average GPA less than very good experienced analgesic use more frequently than medical students whose their GPA more than very good. This is supported with earlier research which declared that students who are incapable to achieve academically were further expected to be engaged in analgesic use (Sun *et al*., 2012). The higher the medical students gained their monthly expenses the more insignificantly likely their adherence to analgesics, this is similar to certain research (Wang *et al*., 2014). This could be attributed to that more expenses students have the easier accessibility to analgesics. As well, we observed that students whose parents worked in private sectors were more likely to experience analgesic use. Similarly, a researcher confirmed that students whose families with higher social class were more frequently use analgesics compared to their low social class peers (Hanson, 2007). The current study showed a negative consequences that paternal education influence the students compliance to analgesics but surprisingly, students of highly educated parents were found to practice analgesics use compared to those whose parents less educated.

It might be associated with their kind of work and accessibility of drugs at home at any time. This necessitates the significance of advancement of parental continuous auditing of their children and their own medications. Indeed, smoking is positively correlated with non medical use of analgesics. The present research came up with the fact that smoker students were more likely to experience analgesic use. This is inline with earlier researches showing that smoking improved the frequency of analgesic use (Collins *et al*., 2011). Referring to the multiple logistic regression model, the current study suggested that; age, regular exercise, marital status , BMI, paternal education, students monthly expenses and smoking were found to be the significant predictors of analgesic use among medical students. Older students were more likely to take analgesics after adjusting for all other variables. Regular exercise seems to be associated with less consumption of analgesics. This could be attributed to the fact that, engagement in recreational activity makes better health. Married students tended to consume little analgesics, this could be explained by responsibilities they carried and being a role model to their children. Overweight or obese students were less likely to take analgesics, this might be due to following diet regimen and their physicians informed them about the risk of non-medical use of analgesics.

Highly educated parents might be linked with better job and social class and more busy life, so their children will have an opportunity t take such medications. Smoker students with highly monthly expenses definitely experience more analgesic use. In conclusion, non-medical use of analgesics among Egyptian medical students is a noteworthy public health crisis that draws the mind of ministry decision makers and scientists. These results could be generalized to medical students, so the recommended future research to compare medical with non-medical students. Students' engagement and good relationship with students are robustly inversely connected with non-medical use of analgesics. Orientation campaigns that are heading for adolescents and students are required to develop alertness of the grave cost of non medical analgesic use. Furthermore, decisions should be directed to monitor the sale of analgesics without prescription. Finally, strategic planning and implementation of suitable preventive programs are highly recommended in order to control analgesic use among young medical students.

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