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The prevalence of tramadol use and its dependence for the pain management in Al Ahsa district of Saudi Arabia: A chart review study

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Abstract

Background: Tramadol hydrochloride, synthetic centrally acting opioid analgesics is being widely used throughout the world. In many Middle East countries, tramadol abuse was raised as a major public health issue. This study was aimed to determine the prevalence of tramadol use and abuse among Saudi patients living in Al-Ahsa region, the risk factors associated with tramadol use/ abuse.

Material and methods: This was a cross-sectional chart review study which was conducted at a single center, King Fahad Hospital in Al Hofuf, Saudi Arabia from January 2020 to December 2021. The data were collected from three main sources: the Pharmacy medical records, from the electronic medical records, and from interviewing the patients. The incomplete information was obtained by calling the patients through the contact number they had provided to the hospital. The Epi info software was used for calculating the sample size, assuming a confidence level of 95% and margin of error at 5% and a power of 80% and with the assumption of the prevalence of tramadol use in the population to be 26% (as reported from one similar study) with 5% deviation. The total sample size calculated was 277.The data were collected on the data collection sheet especially prepared for this study based on the similar study.. The data were entered and analyzed by using the SPSS, version 21. Descriptive statistics (e.g. number, percentage) and analytic statistics using Chi Square tests ($\chi 2$) to test for the association and/or the difference between two categorical variables were applied. Logistic regression analysis was also done. A p-value equal to or less than 0.05 was considered statistically significant.

Result: The records of 277 patients who were taking pain killer for their treatment were retrieved for this study. The mean age of the participants was 43.10 years ± St. Dev. 11.30 years. Majority of the participants were in the age group of 38-47 years of age (35.4%). The majority of the participants (71.8%) were male. Likewise majority of the participants were married (90.3%) while 2.9% were never married and 6.5% were divorced. More than fifty parents of the participants were graduate (56.7%) while 30.3% were secondary educated. Almost sixty four percent of the participants were unemployed. More than thirty one percent (31.4%) of the participants were using tramadol tablet. Among them 84.5% were using it for acute pain while the rest 15.46% were using it for chronic pain. More than seventy two percent of the participants (72.71%) never used the tramadol without physician prescription while the rest took it from other source without physician prescription. Young (18-27 years) and older age group (58- 67) participants were 2 times more likely to use the tramadol as compared to other age group (AOR 2.27; 95% CI 1.36-3.41,P=0.046).Most of the elder group of the participants used tramadol for arthritis pain. Non Saudi was 7 times more likely to use and misuse tramadol (AOR 7.27; 95% CI 3.23-12.98, P=0.013). Similarly the use and dependency on Tramadol among the participants with high income group was 2.50 times more than those with middle and low income group participants (AOR 2.50,95% CI1.35-4.32,P=0.045) and the participants with arthritis were 7 times more prone to Tramadol use and dependency as compared to other participants with other diseases (AOR 7.23 ; 95% CI 3.35-14.43).

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Conclusion: The study has shown not only a high prevalence of tramadol use but also\ high dependency of the patients suffering from pain on tablet tramadol. This is a matter of concern especially among the young population. The strict regulation on the drug system in Saudi Arabia has not allowed it for easy access. However it is important that measures should be taken by the public health department to stop the unnecessary use of tramadol to prevent the abuse.

Keywords: Tramadol tablet; Use; Dependence; Al Ahsa

1. Introduction

Tramadol hydrochloride, a synthetic centrally acting opioid analgesics, is approved by the Food and Drug Administration (FDA) to treat the moderate to severe pain since 1995.[1]The dual action of this medicine, one by acting weakly through m-opioid and k-opioid receptors and the other by inhibiting pain signal transmission through norepinephrine and serotonin reuptake blockage makes it physicians choice for pain treatment .[2,3] Several randomized controlled trials and Cochrane reviews have revealed tramadol's efficacy in treating chronic pain, neuropathic pain and pain related to osteoarthritis.[4-6] Some animal studies have reported tramadol use to be an effective medication for pain among diabetic painful neuropathy.[7] The recommended daily dose of immediate-release tramadol is 50 to 100 mg every 4 to 6 hours. The maximum dose recommended by the manufacturer is 400 mg in 24 hours. As reported by many studies, tramadol had been commonly used among construction workers, bus drivers and textile industries workers to improve mood and to decrease work stress.[8,9] Wide use of tramadol among the young population as a remedy for premature ejaculation, increasing sexual desire and for extended orgasm has also been reported. This benefit of tramadol in premature ejaculation has been widely studied and reported in several review articles thereby raising the concern its potential long-term risks, safety and the effective.

However the widespread extent of abuse related to tramadol could not be noticed and scheduled to the Medicines Control Act until 2014 in the United States. In many countries, it is a prescription-only medicine, and further made widely available via the internet at a cheap price.[10] The incidence rate for tramadol abuse is around 70 in every 1,000 individuals per year in 2002..[11] The Intercontinental Marketing Services (IMS) reported consumption of more than 420 ton of tramadol worldwide in 2012, with more than 40% increment of use in comparison to 2006 consumption.[7] In many Middle East countries, tramadol abuse was raised as a major public health issue. It was registered under national control in Bahrain, Jordan, Saudi Arabia, and in Egypt before.[7] In a recent systematic review and meta-analysis, data estimates of 12-month use of tramadol in the Iranian general population were near 5% among Iranian males. The percentage of tramadol poisoning was 13% among all drug-poisoning patients, with seizure and death reports exceeding third of tramadol-poisoning patients.[12] In Egypt, tramadol was considered as the most abused drug among Egyptian drug users based on a report using.[13]

In Saudi Arabia, there is paucity of knowledge about the trends of all substance abuse with most reports conducted in the 1980s and 1990s. Alahmari et al. (2019) reported a change in the trend of substance use with the increased use of opioids from all types which was correlated to the lower educational level among abusers.[14] It is noteworthy that tramadol was also the most frequently dispensed opioid analgesic (82%) [15] in a single-center retrospective chart review of adult patients seen in the orthopedic outpatient clinics at King Khalid University hospital, Riyadh; acute nociceptive musculoskeletal pain was likewise treated by opioid as much as two-third of times. The prevalence of tramadol use and misuse is largely unknown in many parts of Saudi Arabia. To the best of our knowledge this study was the first of its kind in the eastern province of Saudi Arabia. This study was aimed to determine the prevalence of tramadol use and abuse among Saudi patients living in Al-Ahsa region, the risk factors associated with tramadol use/ abuse, the common medical diagnoses associated with oral tramadol use and its dependence.

2. Material and methods

This was a cross-sectional chart review study which was conducted at a single center, King Fahad Hospital in Al Hofuf (KFHH), Saudi Arabia. All the patients who had attended the hospital for the management of pain from January 2020 to December 2021 were the study population. Inclusion criteria included patients, who were 18 years old and above, those who attended the hospital for pain management from January 2020 to December 2021. Patients who were administered by tramadol through the other routes of drug administration for their pain management were excluded from the study. The data were collected from three main sources: the Pharmacy medical records, from the electronic medical records, and from interviewing the patients. The incomplete information was obtained by calling the patients through the contact number they had provided to the hospital. The Epi info software was used for calculating the sample size, assuming a confidence level of 95% and margin of error at 5% and a power of 80% and with the assumption of the prevalence of tramadol use in the population to be 26% (as reported from one similar study) with 5% deviation. The

total sample size calculated was 277. Every second patient from the patient record who had attended the hospital for pain management was selected till the sample size was achieved.

The data were collected on the data collection sheet especially prepared for this study based on the similar study .The data collection sheet contained the information on the sociodemographic characteristic (age, sex, educational qualification, and employment and income status). Apart from this, data on participants' medical diagnosis, oral tramadol use, and other comorbidities or psychiatric disorders and corresponding medications used were recorded. The data also included an 11-item self-administered screening instrument for drug-related problems, giving information on the selected criteria for dependence according to the ICD-10 diagnostic systems. The data were entered and analyzed by using the SPSS; version 21 (Chicago, IL, USA).Descriptive statistics were presented using counts, proportions (%), mean ± standard deviation whenever appropriate. A chi Square test ($\chi 2$) was used to test for the association and/or the difference between two categorical variables were applied. A multivariate logistic regression analysis was also done to find out the adjusted odds ratio. A p-value equal to or less than 0.05 was considered statistically significant. Ethical approval from the local authority and Institutional Review Board (IRB) were taken before the start of the study. Individual informed consent was also taken from the participants.

3. Results

The records of 277 patients who were attending the hospital during January 2020 to December 2021 for their pain management were retrieved. The mean age of the participants was 43.10 years ± St. Dev. 11.30 years (Range 18-67 years). More than 6% were in the age group 18-27 years while 26.7%, 35.4%, 24.2% and 7.6% were in the age group of 28-37 years, 38-47 years, 48-57 years and 58-67 tears respectively. The majority of the participants (71.8%) were male. Likewise majority of the participants were married (90.3%) while 2.9% were never married and 6.5% were divorced. One participant was widow. The vast majority (94.4%) were Saudi while the rest were non Saudi. More than fifty parents of the participants were graduate (56.7%) while 30.3% were secondary educated and the rest 13% were primary educated. Almost sixty four percent of the participants were unemployed while 31.4% were employed and 4.7% were retired. Majority of the participants (53.8%) were from the middle income group while 23.8% with low income group and 22.4% with the high income group. More than fifty four percent of the participants were not suffering from any chronic diseases while 1.1% were suffering from diabetes ,18.1% were having hypertension ,13.75% with both hypertension and diabetes and 13% with arthritis. The details of the sociodemographic characteristic are shown in table 1 (Figure 1-9).

Table 1 The sociodemographic characteristic of the participants

Variables	Number	Percentage
Age: 43.10 years ± St. Dev. 11.30 years (Range 17-67 years)		
Age groups		
18-27 years	17	6.1
28-37 years	74	26.7
38-47 years	98	35.4
48-57years	67	24.2
58-67 years	21	7.6
Sex		
Male	199	71.80
Female	78	28.20
Nationality		
Saudi	261	94.20
Non Saudi	16	5.80
Marital Status		
Never married	8	2.90

Married	250	90.30
Divorced	18	6.40
Widow	1	0.40
Educational status		
Uneducated	0	0.0
Primary educated	38	13.0
Secondary educated	84	30.3
Graduate	157	56.7
Employment status		
Unemployed	87	31.4
Employed	177	63.9
Retired	13	4.7
Income group		
Low income group	66	23.8
Middle income group	149	53.8
High income group	62	22.4
Associated chronic disease		
No chronic disease	150	54.2
Type 2 Diabetes	3	1.1
Hypertension	50	18.1
Both Type 2 Diabetes and Hypertension	38	13.7
chronic Arthritis	36	13.0

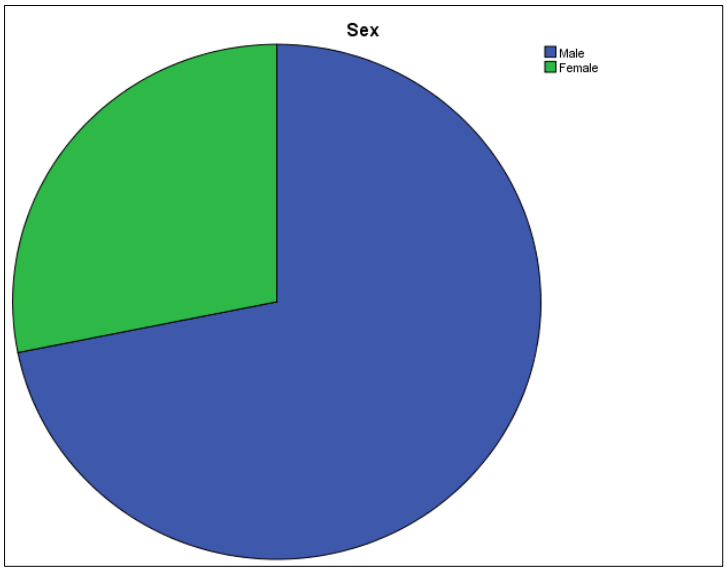

Figure 1 Sex distribution of the participants

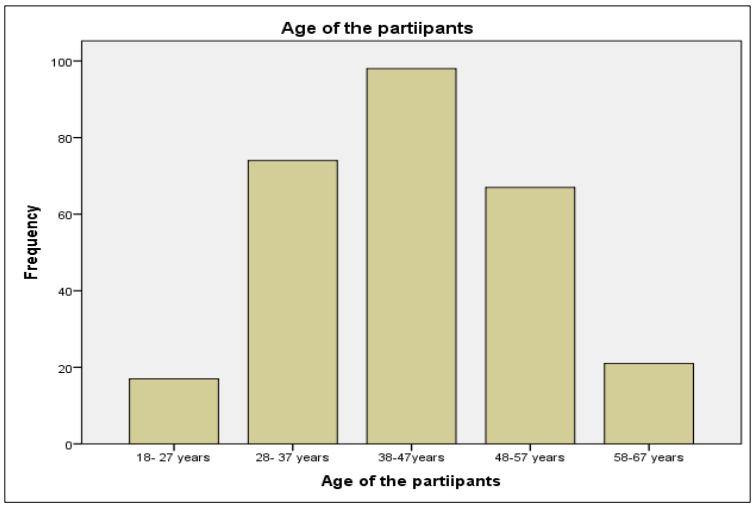

Figure 2 Age distribution of the participants

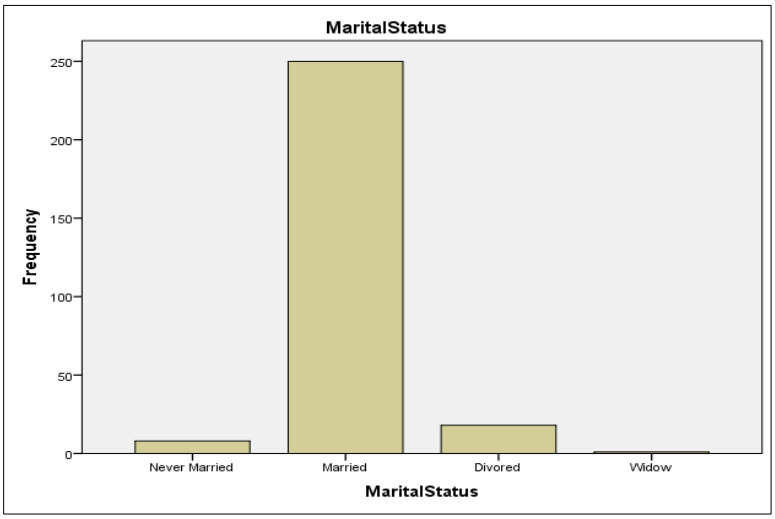

Figure 3 Marital status of the participants

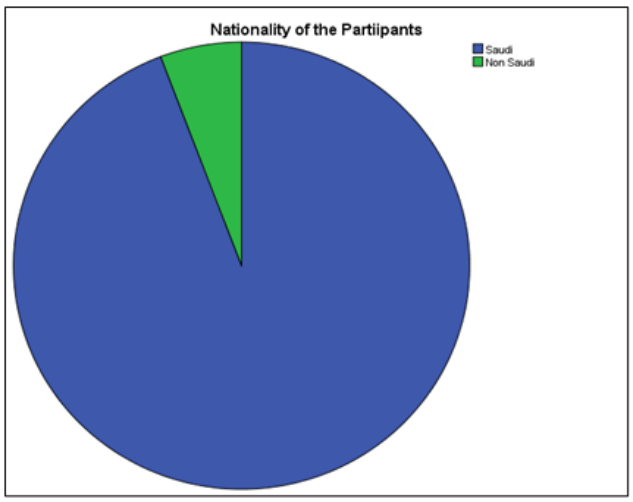

Figure 4 Nationality of the participants

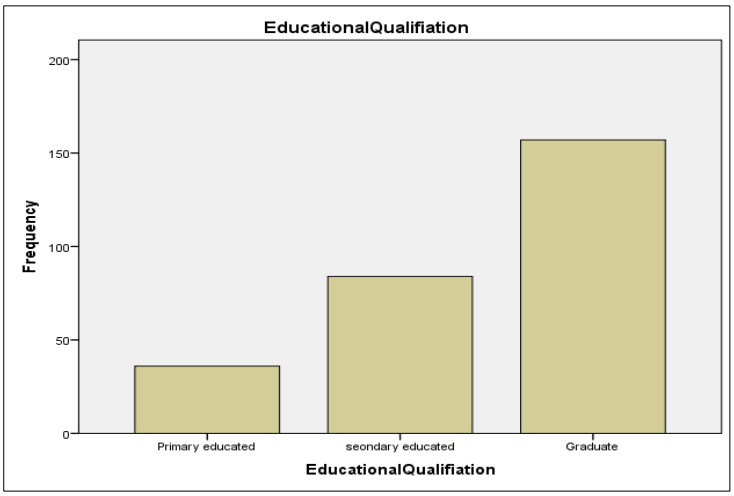

Figure 5 Educational qualification of the participants

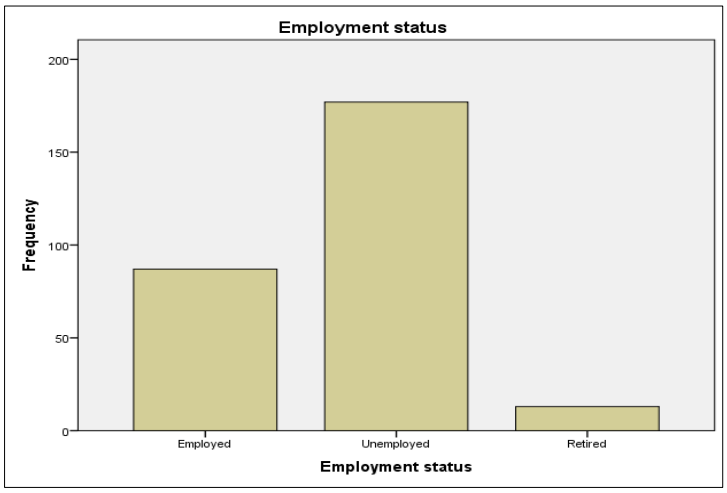

Figure 6 Employment statuses of the participants

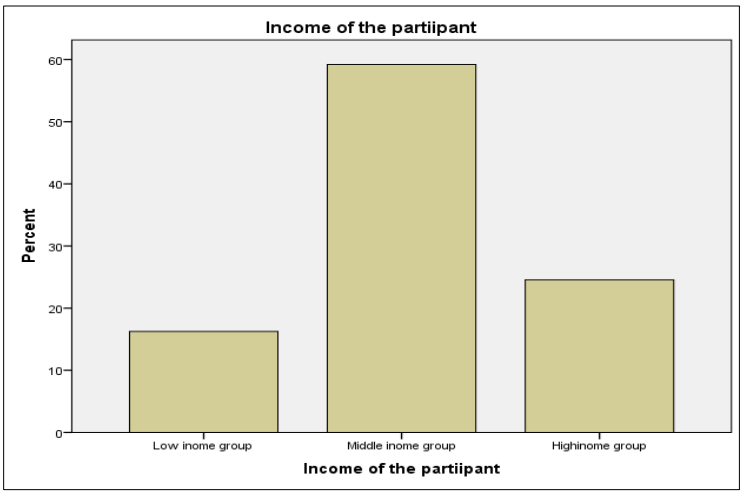

Figure 7 Income status of the participants

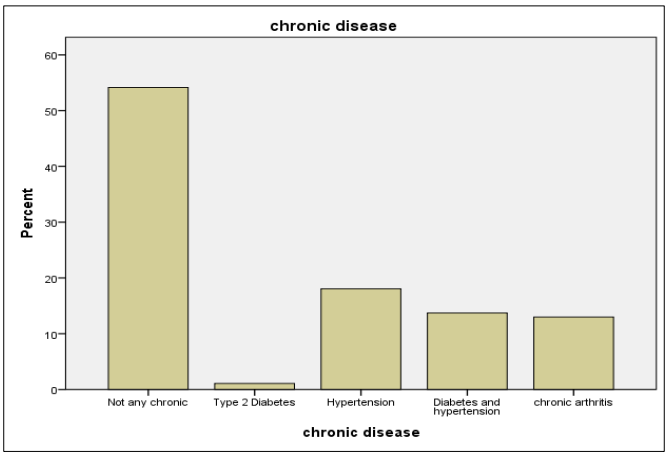

Figure 8 Chronic disease among the participants

3.1. Tramadol use

Table 2 The details of tramadol use by the participants

Variables	Number	Parentage
Are the patients attending the hospital for pain treatment using Tramadol tablet		
Yes	87	31.40
No	190	68.60
If they are using tramadol tablet then for what it has been prescribed (N=87)		
Acute Pain	71	81.61
chronic pain	16	18.39
Did the participants ever use tramadol without the physician prescription?		
Yes	24	27.59
No	63	72.41

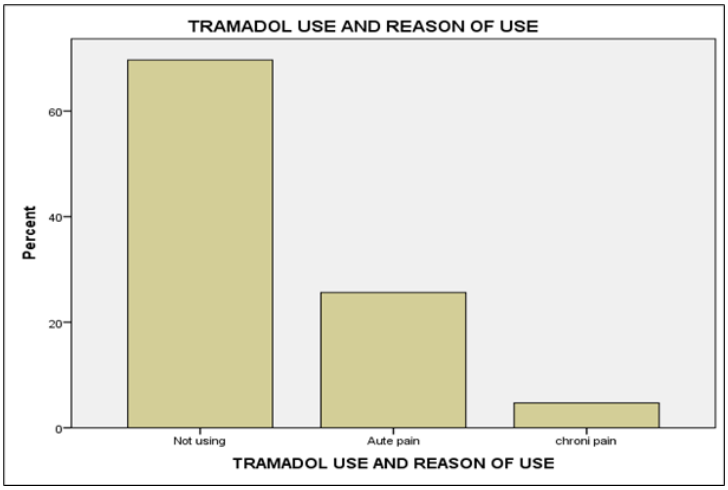

Figure 9 Tramadol use and the reasons of use

More than thirty one percent (31.4%) of the participants were using tramadol tablet. Among them 84.5% were using it for acute pain while the rest 15.46% were using it for chronic pain. More than seventy two parent of the participants

(72.71%) never used the tramadol without physician prescription while the rest 27.59% took it without the physician advice from other source. The details of the tramadol use are shown in table 2 (Figure 9).

3.2. Association of sociodemographic characteristics with the tramadol use

The prevalence of tablet tramadol use was highest(38.09%) among the age group of 58-67 years followed by the participants in the age group of 18-27 years (35.29%).30-47 years of age (34.70%) and 48-57 years of age (23.88%) (P=0.046). The prevalence of tramadol use was more among the male than the female but it was not statistically significant (30.65% vs. 29.495, P=0.543). The use of tramadol tablet was significantly more among the unmarried than those divorced and widow (75%66.66% vs. 27.60% vs. 0.0%, P=0.043). Use of tramadol tablet was significantly more among the Non Saudi than the Saudi participants (68.75% vs.29.12%, P=0.013). The prevalence of tramadol use was also significantly higher among the graduate than the secondary educated and primary educated (36.31% vs.29.76% vs.19.44%, P=0.032). The use of tramadol was more among the retired participants than those who were employed and not employed but it was not statistically significant (38.46% vs.26.44% vs. 31.63%, P=0.560 The participants of high income group were using the tramadol tablet significantly more than those with middle and low income group (51.61% vs.28.19% vs.19.70%, P=0.041). The participants who had chronic arthritis were also using tramadol significantly more than those with type 2 diabetes, hypertension and both type 2 diabetes and hypertension (77.77% vs.0.0% vs.40% vs.55.26%,P=0.000). The details of the association of tramadol use with the sociodemographic characteristics are shown in table 3.

Table 3 The details of the association of tramadol use with the sociodemographic characteristics

Variables	Using Tramadol N (%)	Not using tramadol (Other pain treatment) N (%)	P-value
Age groups			0.046
18-27 years	6(35.29)	11(64.71)	
28-37 years	20(27.02)	54(72.98)	
38-47 years	34(34.70)	64(65.30)	
48-57years	16(23.88)	51(76.12)	
58-67 years	8(38.01)	13(61.99)	
Sex			0.486
Male	61(30.65)	138(69.35)	
Female	23(29.48)	55(70.52)	
Nationality			0.013
Saudi	76(29.12)	185(70.88)	
Non Saudi	11(68.75)	5(31.25)	
Marital Status			0.043
Never married	6(75.0)	2(25.0)	
Married	69(27.60)	181(72.40)	
Divorced	12(66.66)	6(33.34)	
Widow	0(0.0)	1(100.0)	
Educational status			0.032
Uneducated	0	0	
Primary educated	7(19.44)	20(80.56)	
Secondary educated	25(29.76)	64(70.24)	
Graduate	57(36.31)	100(63.69)	

Employment status			0.560
Unemployed	56(31.63)	64(68.37)	
Employed	23(26.44)	121(73.56)	
Retired	5(38.46)	8(61.54)	
Income group			0.045
Low income group	13(19.70)	53(80.30)	
Middle income group	42(28.19)	107(71.81)	
High income group	32(51.61)	30(48.39)	
Associated chronic disease			0.000
No chronic disease	15(10.0)	135(90.0)	
Type 2 Diabetes	0(0.0)	3(100.0)	
Hypertension	20(40.0)	30(60.0)	
Both Type 2 Diabetes and Hypertension	21(55.26)	17(44.74)	
chronic Arthritis	28(77.77)	8(22.23)	

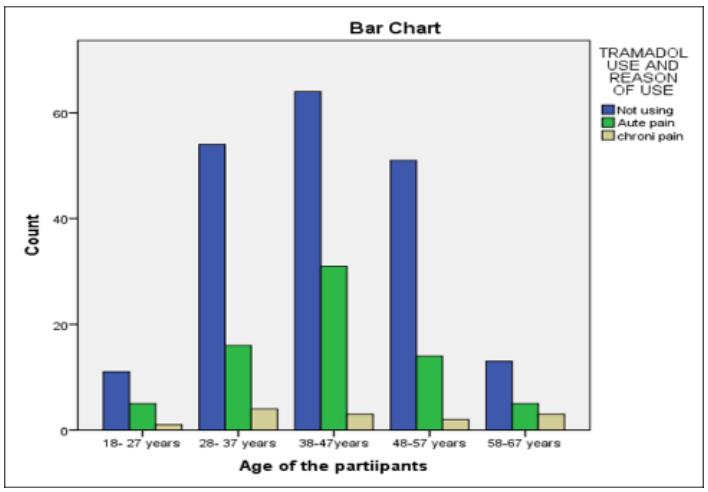

Figure 10 Use of tramadol among the different age groups

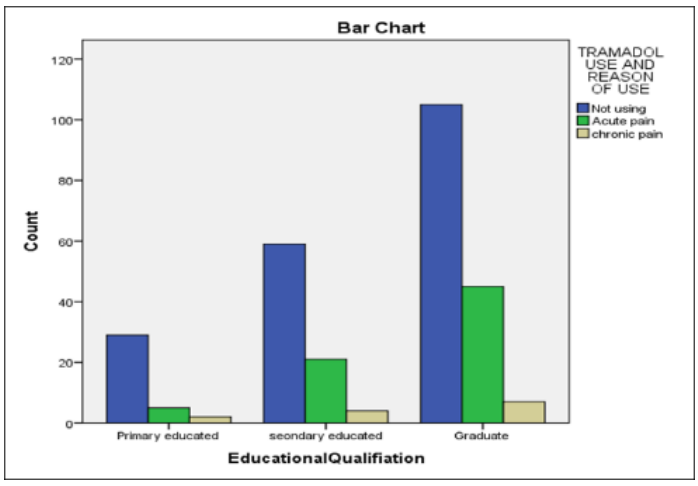

Figure 11 Use of tramadol among the participants of different educational qualification

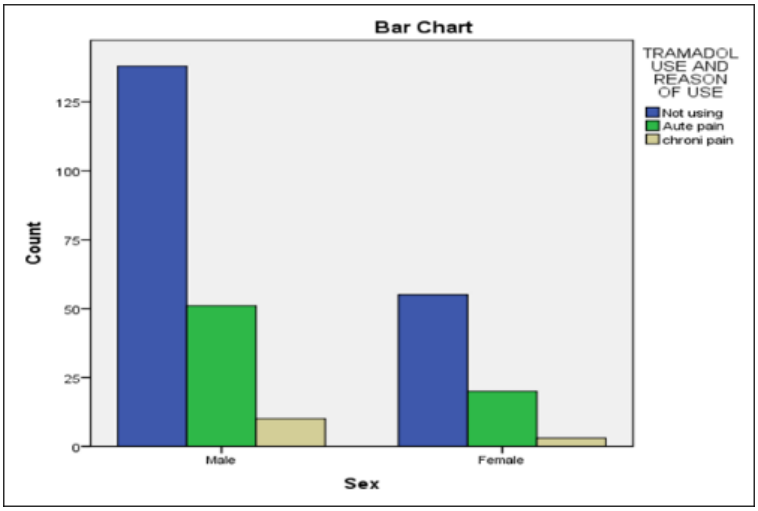

Figure 12 Use of tramadol among the different sex

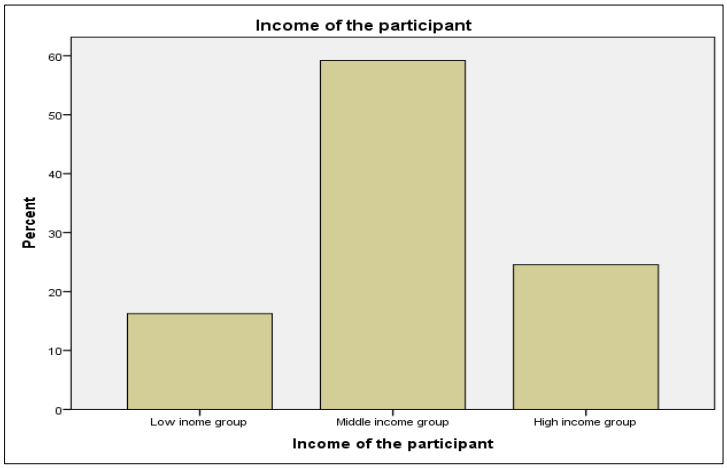

Figure 13 Use of tramadol among the different income group

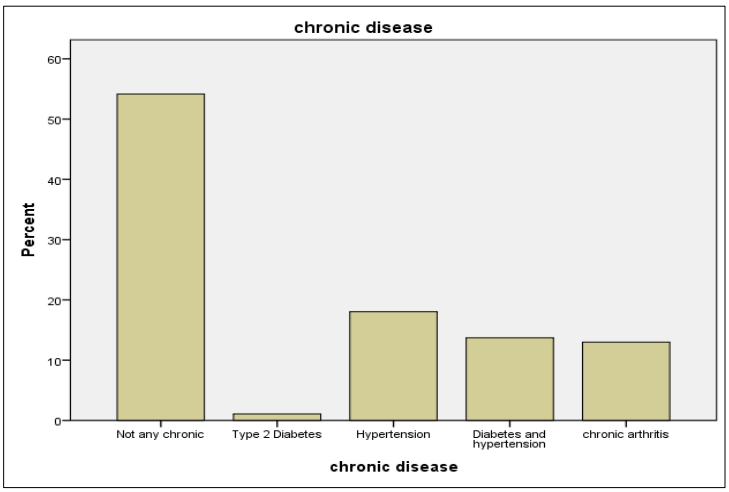

Figure14 Use of tramadol among the participants with different chronic diseases

3.3. Frequency of Occurrence of Diagnostic Criteria of Dependence for tramadol use

Of all the diagnostic criteria for dependence, difficulty in controlling substance intake behavior was the commonest reported among 52.62% (N=51) of the subjects. This is followed by symptoms of physiological withdrawal among 37.93% (N=33), persistent use despite evidence of harm among 20.69% (N=18) and neglect of other source of pleasure among 27.59% (N=24) while the least occurring criterion was progressive increment in the quantity of tramadol 18.40% (N=16). The details of the frequency of occurrence of ICD-10 criteria of dependence are shown in table 4.

Table 4 The frequency of occurrence of ICD-10 criteria of dependence

Variables	Number	Percentage
The frequency of occurrence of ICD-10 criteria of dependence (N=87)		
Difficulty in controlling substance intake behaviour		
Yes	51	58.62
No	36	41.38
compulsive desire for continuous use of tramadol		
Yes	23	26.44
No	64	73.56
Symptoms of physiological withdrawal		
Yes	33	37.93
No	54	62.07
persistent use despite evidence of harm		
Yes	18	20.69
No	69	79.31
progressive increment in the quantity of tramadol		
Yes	16	18.40
No	71	81.60
Neglect of other source of pleasure		
Yes	24	27.59
No	63	72.41

3.4. Logistic regression analysis

Young (18-27 years) and older age group (58- 67) participants were 2 times more likely to use the tramadol as compared to other age group (AOR 2.27; 95% CI 1.36-3.41, P=0.046).Most of the elder group of the participants used tramadol for arthritis pain. Non Saudi was 7 times more likely to use and misuse tramadol (AOR 7.27; 95% CI 3.23-12.98, P=0.013).This might be the reason that the Non Saudi may bring this drug from their own country where the drug regulation is not strict. Similarly the use and dependency on tramadol among the participants with high income group was 2.50 times more than those with middle and low income group participants (AOR 2.50,95% CI1.35-4.32,P=0.045) and the participants with arthritis were 7 times more prone to tramadol use and dependency as compared to other participants with other diseases (AOR 7.23 ; 95% CI 3.35-14.43}.

4. Discussion

The present study was conducted in a tertiary hospital in Al Ahsa district of Saudi Arabia where the patients are being referred for pain management. The purpose of this study was to assess the prevalence of tramadol tablet use for the management of pain. The study has found that more than thirty one parent of the patients who attended the hospital for pain management were using tramadol oral treatment. The maximum prevalent of tramadol use was among the patients in the age group of 58- 67 years (38.01%) followed by the patients within the 18-27 years age group

(35.29%).In a similar Nigerian study the researchers have reported the prevalence of the use of the tramadol to be.54.4% .However in this study the prevalence of tramadol was highest in the age group of below 38 years (65.0%).Similarly in one Iranian study the participants in the aged younger than 30 years were the maximum user(89%) of the tramadol.[16] Over 93% of tramadol users were males in the Nigerian study while the present study has found almost equal use among males and females .[17] In one Somalia study also majority (83.1%) of the respondents were males whereas the remaining (16.9%) were females. This could be attributed to the fact that more males are involved in activities that trigger them to use tramadol. Tramadol use was more prevalent among the subjects of age group of 21-25 in this study (62.3%).[18]

In a Dubai study, Ferguson Saapiire et al has found that 36.2 % of the participants were using tramadol for third pain management. Like the present study this study has also found a positive association between the educational status of the participants .The present study has detected that as the educational status increased the prevalence of tramadol use also increased .The Dubai study has also reported that 38% and 34% of tramadol users were at least secondary educated and basic educated respectively. In the present study the highest prevalence of tramadol use was among the retired participants followed by those who were unemployed .The Dubai study has found that the majority of the tramadol user were self-employed (57.6%) followed by those who were unemployed (39.9%).[19] Like the present study which has found that the tramadol use among the unmarried was the maximum (75%) , the Somalia study[18] has also reported use of tramadol among the unmarried to be 84.6% However in the present study 66.6% of the widow were also using tramadol tablet. The prevalence of tramadol use was also higher among the subjects with higher education in the Somalia study .It was maximum among the senior high school graduate. I[18]n the present study also as the level of education increased the use of tramadol also increased. Only 27.59% of the participants in the present study could manage tramadol tablet without the physician prescription. Fifty eight parents of the subjects in an Iranian study did not have prescription for tramadol. A very high percentage of the participants (91.8%) in the Nigerian study [17] were found to be using tramadol without any prescription. Low intake of Tramadol tablet without prescription in the present study might be due to strict drug regulation here.

However a self-reported study on oral tramadol misuse (relative to other commonly prescribed opioids) in USA has reported a low prevalence of oral tramadol (4-5 %) relative to other commonly used opioids (9-10%).The misuse of oral tramadol was also reported much less than alprazolam in this study.[20] Recent reports on misuse and dependency of tramadol by the expert advisory committee established by the German Federal Government found a low potential for misuse, abuse, and dependency for tramadol, and a low prevalence in clinical practice. This study has found incidence of abuse or dependency as 0.21 and 0.12 cases per million defined daily dosages (DDDs). High usage with more than 180 DDDs per year was found in 8.6% of patients treated with tramadol in this study.[21]

Tramadol dependence was identified among the maximum 52.62% of the participants in the present study. However in Nigerian study 60.46% of the tramadol user was found to be tramadol dependence. [17] Of all the diagnostic criteria for dependence, difficulty in controlling substance intake behavior was the commonest reported reason for dependence. However in the Nigerian study the progressive increment in the quantity of the substance used (tolerance) was the commonest reported reason (88.5%). In the Iranian study also 65% of the tramadol user was found dependent on tramadol.[16] However in a study conducted in Ghana , a low rate of dependence (249%) on tramadol has been reported .[22]

5. Conclusion

The study has shown not only a high prevalence of tramadol use but also\ high dependency of the patients suffering from pain on tablet tramadol. This is a matter of concern especially among the young population. The strict regulation on the drug system in Saudi Arabia has not allowed it for easy access. However it is important that measures should be taken by the public health department to stop the unnecessary use of tramadol to prevent the abuse.

Compliance with ethical standards

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Disclosure of conflict of interest

No conflict of interest

Statement of ethical approval

The present research was a hart review study and did not contain studies performed on human subjects by any of the authors.

Statement of informed consent

Informed consent was obtained from all individual participants included in this study.

References

[1] Holford S, Allegaert K, Anderson B, Kukanich B, Sousa AB, Steinmann A, et al. Parent-Metabolite pharmacokinetic models for tramadol-tests of assumptions and predictions. Journal of Pharmacology & Clinical Toxicology. 2014;2(1).

[2] Desmeules JA, Piguet V, Collart L, Dayer P. Contribution of monoaminergic modulation to the analgesic effect of tramadol. British journal of clinical pharmacology. 1996;41(1):7-12.

[3] Raffa RB, Friderichs E, Reimann W, Shank RP, Codd EE, Vaught JL, et al. Complementary and synergistic antinociceptive interaction between the enantiomers of tramadol. Journal of Pharmacology and Experimental Therapeutics. 1993; 267(1):331-40.

[4] Chaparro LE, Furlan AD, Deshpande A, Mailis-Gagnon A, Atlas S, Turk DC. Opioids compared to placebo or other treatments for chronic low-back pain. Cochrane Database of Systematic Reviews. 2013(8).

[5] Whittle SL, Richards BL, Buchbinder R. Opioid analgesics for rheumatoid arthritis pain. Jama. 2013; 309(5):485-6.

[6] Meske DS, Lawal OD, Elder H, Langberg V, Paillard F, Katz N. Efficacy of opioids versus placebo in chronic pain: a systematic review and meta-analysis of enriched enrollment randomized withdrawal trials. Journal of pain research. 2018;11:923.

[7] Lavasani H, Sheikholeslami B, Ardakani YH, Abdollahi M, Hakemi L, Rouini M-R. Study of the pharmacokinetic changes of Tramadol in diabetic rats. DARU Journal of Pharmaceutical Sciences. 2013; 21(1):17.

[8] Badzi CD, Ackumey MM. Factors influencing use of analgesics among construction workers in the Ga-East municipality of the Greater Accra region, Ghana. Ghana medical journal. 2017; 51(4):156-63.

[9] Abd-Elkader MR, Kabbash IA, El-Sallamy RM, El-Sawy H, Gad E-SA-H. Tramadol abuse among workers in an industrial city in mid-Nile Delta region, Egypt. Environmental Science and Pollution Research. 2020:1-8.

[10] Brandt S. 4-Fluoromethcathinone (flephedrone; 4-FMC). Critical Review Report. Agenda item 4.16. Expert Committee on Drug Dependence. Thirty-sixth Meeting. Geneva, 16-20 June 2014 (World Health Organization). 2014.

[11] Knisely JS, Campbell ED, Dawson KS, Schnoll SH. Tramadol post-marketing surveillance in health care professionals. Drug and Alcohol Dependence. 2002;68(1):15-22.

[12] Alblooshi H, Hulse GK, El Kashef A, Al Hashmi H, Shawky M, Al Ghaferi H, et al. The pattern of substance use disorder in the United Arab Emirates in 2015: results of a National Rehabilitation Centre cohort study. Substance abuse treatment, prevention, and policy. 2016;11(1):19.

[13] Bassiony MM, Salah El-Deen GM, Yousef U, Raya Y, Abdel-Ghani MM, El-Gohari H, et al. Adolescent tramadol use and abuse in Egypt. The American journal of drug and alcohol abuse. 2015;41(3):206-11.

[14] Alahmari T, Ashworth F, Alkhalaf A. Changing trends of substance addiction in Saudi Arabia between 1993 and 2013. MOJ Addiction Medicine & Therapy. 2019;6(1).

[15] AlRuthia Y, Alhazzani H, Alhindi G, Alarfaj M, Almutairi L, Alanazi M, et al. Predictors of Opioid Prescription Among a Sample of Patients with Acute Musculoskeletal Pain at a Tertiary Care Hospital in Saudi Arabia. Journal of Pain Research. 2020;13:2929.

[16] Ebrahim Zabihi, Aateffeh Hoseinzaadeh, Maryam Emami, Mahdieh Mardani, Baradaran Mahmoud, and Moghadamnia Ali Akbar,Potential for Tramadol Abuse by Patients Visiting Pharmacies in Northern Iran, Subst Abuse. 2011; 5: 11–15. doi: 10.4137/SART.S6174

[17] Ibrahim A. W., Yerima M. M., Pindar S. K, Onyencho V. C.3, Ahmed H. K., Machina B. K.4,Shehu S., Rabbebe I. B., Wakil M. A.,Tramadol Abuse Among Patients Attending An Addiction, Clinic in North-Eastern Nigeria: Outcome of a Four Year, Retrospective Study, Advances in Psychology and Neuroscience ;2017; 2(2-1): 31-37doi: 10.11648/j.apn.s.2017020201.16

[18] Omar AA,Ahmed HM, Abuse and misuse of tramadol among the youth in hodan district Mogadishu,Somalia,Matrix scei pharma 2021,5:36-41

[19] Ferguson Saapiire , Godfrey Namillah, Vincent Tanye , and Abdulai Abubakar ,The Insurgence of Tramadol Abuse among the Most Active Population in Jirapa Municipality: A Study to Assess the Magnitude of the Abuse and Its Contributory Factors,Hindawi Psychiatry Journal Volume 2021, Article ID 3026983, 10 pages https://doi.org/10.1155/2021/3026983

[20] Scott A Reines, Bonnie Goldmann, Mark Harnett, and Lucy Lu[1],Misuse of Tramadol in the United States: An Analysis of the National Survey of Drug Use and Health 2002-2017, . Subst Abuse. 2020; 14: 1178221820930006. . doi: 10.1177/1178221820930006

[21] Lukas Radbruch , Gerd Glaeske, Stefan Grond, Frank Münchberg, Norbert Scherbaum, Elisabeth Storz, Kathrin Tholen, Petra Zagermann-Muncke, Walter Zieglgänsberger, Helmut Hoffmann-Menzel, Hendrik Greve, Peter Cremer-Schaeffer, Topical review on the abuse and misuse potential of tramadol and tilidine in Germany, Subst Aabus, 2013;34(3):313-20. doi: 10.1080/08897077.2012.735216.

[22] Mavis Danso , Francis Anto , Factors Associated with Tramadol Abuse: A Cross-Sectional Study Among Commercial Drivers and Assistants in the Accra Metropolitan Area of Ghana,2021 Sep;8(3):337-347.doi: 10.1007/s40801-021-00247-6. Epub 2021 Apr 2.