DEVELOPMENT, VALIDITY AND RELIABILITY OF TRAMADOL USE AND MISUSE KNOWLEDGE ASSESSMENT QUESTIONNAIRE

Orfega Zwawua,[1] Rohani Ismail,[1] Mohd Yasin Mohd Azhar,[2] & Norhayati Mohd Noor[3]
Targema Iorvaa[4]

[1]Interdisciplinary Health Sciences Unit, School of Health Sciences, Universiti Sains Malaysia
[2]Department of Psychiatry, School of Medical Sciences, Universiti Sains Malaysia
[3]Department of Family Medicine, School of Medical Sciences, Universiti Sains Malaysia
[4]Department of Human Kinetics and Health Education, Benue State University Makurdi, Nigeria

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ABSTRACT

The prevalence of tramadol misuse in Nigeria and lack of a quantitative and valid instrument to assess knowledge on the use and misuse of tramadol necessitated this study. The objective of this study was to develop and validate a questionnaire to assess knowledge about tramadol use and misuse among tramadol users in Benue State of Nigeria. A mixed-method design was used. Literature review and focus group discussions were conducted to generate items for the questionnaire. Six experts were involved in content validation. The item-level content validity index (I-CVI) cut-off point was set at 0.83. Chain-referral sampling method was applied. Data were collected from tramadol users (n = 200) for the validation study. Item response theory model was applied in the assessment of the psychometric properties of the questionnaire. Cronbach alpha was computed to determine the internal consistency. Ten items were initially deleted for failing to meet the I-CVI cut-off point (I-CVIs < 0.83). The over-all CVI of the questionnaire was 0.86. Five more items were deleted for poor performance in both the difficulty and discrimination parameters, leaving 35 items for the final questionnaire. The reliability coefficient was 0.78 indicating good internal consistency. A valid and reliable self-report questionnaire therefore, emerged for the assessment of knowledge about tramadol in five domains including medical use, prescription, misuse, effects of misuse and withdrawal/detoxification. The questionnaire can serve as a valid and reliable tool for assessment of knowledge about tramadol and for evaluation of intervention efforts at curtailing tramadol abuse.

Keywords: development; validity; questionnaire; knowledge; tramadol; misuse

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Corresponding Author: Orfega Zwawua, Interdisciplinary Health Sciences Unit, School of Health Sciences, Universiti Sains Malaysia

INTRODUCTION

Tramadol is a prescription analgesic mainly indicated for providing relief for moderate to moderately severe pains. However, there are indications that tramadol as a pharmaceutical opioid is addictive and liable to misuse (Babalonis, Lofwall, Nuzzo, Siegel, & Walsh, 2013; Pollice et al., 2008; Sansone & Sansone, 2009; Zhang & Liu, 2013). Misuse of tramadol reflects in the use of the drug for a purpose that is not consistent with the medical or legal guidelines or using it in a manner or dose other than prescribed. For example, using tramadol for sexual stamina, work performance, euphoria and for several purposes other than pain treatment indicates misuse.

A report by the National Bureau of Statistics (2018), shows that 4.6 million people have misused tramadol in Nigeria. The high prevalence of tramadol misuse in Nigeria could be attributed partly to non-regulation of tramadol at the international level and its' availability at cheap prices (less than $1 for a 10-tablet strip of 100 mg) at Nigerian pharmacies which do not require prescription notes before selling out (Kayode, 2019). There is also illicit production of tramadol in Nigeria in addition to the huge, smuggled tablets. Report has it that in 2018, the Nigerian authorities seized illegal shipments of about 2 billion tablets of tramadol at the ports (Kayode, 2019). This indicates a booming market for tramadol in Nigeria whose youths are increasingly using the drug for non-medical purposes. The belief that tramadol serves as a remedy for premature ejaculation, extends orgasm and increases work performance has contributed to its popularity and massive use among Nigerian youths (Chikezie & Ebuenyi, 2019; Ibrahim et al., 2017; Orhero, 2018).

The alarming rate of tramadol misuse by young people has posed a serious health challenge globally as it is known to have dire health consequences ranging from mild effects like headache, stomachache, itchy skin and painful urination to severe long-term effects like psychiatric disorder, seizure, serotonin syndrome, cardiovascular collapse and respiratory depression (El-Hadidy & Helaly, 2015; Sansone & Sansone, 2009). A report on drug use shows that 450,000 people died in 2015 worldwide as a result of drug use. Out of that figure, 167,750 deaths were linked to drug use disorders in most cases involving misuse of pharmaceutical opioids like tramadol, morphine and codeine (United Nations Office on Drugs and Crime, 2018). The United States Substance Abuse and Mental Health Services Administration also reported that from 2005 to 2011, Emergency Departments visits for tramadol-related misuse or abuse increased 250% from 6,255 in 2005 to 21,649 in 2011 (Bush, 2013). In Northern Ireland, it was reported that tramadol abuse-related deaths represented 48% of all drug misuse in 2011 (Randall & Crane, 2014). Tramadol misuse has also been linked to acts of violence and criminality. For example, cases of robbery, rape, stabbing and Boko Haram activities were reported to have been fuelled by tramadol misuse in Gabon, Ghana and Nigeria (BBC, 2018; Ebo, 2018). These threats to health and wellbeing as well as to security posed by tramadol misuse are worrisome.

The importance of assessing knowledge on drugs cannot be over-emphasized. This is because, knowledge about drugs has been shown to wield influence on attitude and behaviour relating to drug use (Barati,

2014; Embleton, Ayuku, Atwoli, Vreeman, & Braitstein, 2012; Geramian, Akhavan, Gharaat, Tehrani, & Farajzadegan, 2012). The knowledge of prescription status of drugs and their indications and contraindications would play a significant role in the correct use of drugs and in avoiding self-medication and its attendant consequences. It is, however, unfortunate that a thorough literature search has shown that there is no valid and reliable questionnaire that could be used to assess knowledge about tramadol among individuals who use the drug. Several studies that reported on knowledge about tramadol did not use any questionnaire with psychometric properties (Elliason, 2018; Fuseini, Afizu, Yakubu, & Nachinab, 2019; Tafesh, 2013). The objective of this study was, therefore, to develop and validate a questionnaire to assess knowledge about tramadol use and misuse among tramadol users in Benue State of Nigeria.

METHOD

A mixed-method design combining a qualitative approach with quantitative procedure was applied in developing the instrument named 'tramadol use and misuse knowledge assessment questionnaire (TUMKAQ)'. Two stages were involved in developing this questionnaire. The first stage involves item and domain generation while the second stage was concerned with the validation of the questionnaire by content, face, and construct validation methods as well as test of reliability.

First Stage: Items and Domains Generation

The process of generating items for the development of this questionnaire began with a thorough literature review by accessing several databases (psycINFO, PubMed, googlescholar, Drug Database, Scopus, MEDLINE, Web of science, sociological Abstracts and others) to ascertain whether there was any valid and reliable knowledge assessment instrument on tramadol use and misuse, but none was found. We, therefore, deemed it necessary and timely to develop a questionnaire that will fill this important gap in drug research. Literature review was also conducted on indications and contraindications of tramadol, prescription status, and dosage requirement. Other areas that the review covered include tramadol abuse and misuse, tolerance, dependence and addiction, effects of tramadol abuse and misuse, withdrawal symptoms, safe-withdrawal from tramadol and detoxification.

To support the information from literature, three sessions of focus group discussions (FGDs) were conducted with two groups of tramadol users (eight participants each) and one group of psychiatrists (eight participants) working in tertiary health institutions in Benue State. Participants in the FGDs were 16 regular tramadol users who were recruited in Buruku and Gboko Local Government Areas of Benue State using snowball method. Participants (tramadol users) included 12 (75.0%) males and 4 (25.0%) females between the ages of 18 and 35. Most of the participants were married and were into hard jobs like farming, building/construction, and transportation. Participants were from a varied educational background, but all had completed at least primary education and had used tramadol without prescription. Another set of participants (psychiatrists) in the FGD included 5 (62.5%)

males and 3 (37.5%) females who were purposively selected from Federal Medical Centre, Makurdi and the Benue State University Teaching Hospital, Makurdi. All the participants had work experience of at least 3 years and had at one time or another treated Patients of tramadol addiction.

The FGDs with tramadol users were conducted to explore their knowledge of tramadol, its medical use, prescription status, dosage requirement and contra-indications. Other knowledge areas explored include tramadol misuse, tolerance, dependence and addiction as well as effects of tramadol misuse, withdrawal symptoms and safe-withdrawal from tramadol use. The FGD session with the psychiatrists explored facts related to tramadol use and misuse which the psychiatrists considered users of tramadol should know.

Information gathered from literature and the themes from the analysis of the FGDs were used to generate an item pool of 50 questions with five suitable domains namely: medical use (4 items), prescription (6 items), misuse (14 items), effect of misuse (19 items) and withdrawal/detoxification (7 items). A section on the demographic characteristics of the participants was also created with 7 items bringing the total number of items to 57. The response options for the questionnaire were 'True' 'False' and 'Not Sure'. The option of 'Not sure' was included to avoid guessing by the respondents.

Second Stage: Validation

Validation of the questionnaire (TUM-KAQ) was done in three phases namely, content validation, face validation and construct validation as described below:

Content validation

Copies of the draft questionnaire with a pool of 50 items were emailed to six experts including two psychiatrists, two addiction counsellors, one pharmacist and one expert in test and measurement to rate the relevance of the test items to the measured domains using a 4-point Likert format: "the item is not relevant", "the item is somewhat relevant", "the item is quite relevant", and "the item is highly relevant" with the numerical values of 1, 2, 3 and 4 respectively. They were also requested to carry-out qualitative assessment of the items that would make them suitable for the target group. Rating scores of 4 and 3 were converted to valid (1) and rating scores of 2 and 1 were converted to invalid (0) and the scores were entered into Microsoft excel to compute the item-level content validity index (I-CVI) and the scale-level content validity index (S-CVI) of the questionnaire. The cut-off point for retaining items was set at 0.83 (Polit, Beck, & Owen, 2007).

Face validation

To ensure the clarity and comprehensiveness of the items, copies of the questionnaire were given to 30 tramadol users to rate the degree of clarity and comprehensiveness of each item using a 4-point Likert format: "the item is not clear and understandable", "the item is somewhat clear and understandable", "the item is clear and understandable" and "the item is very clear and understandable". Rating scores of 4 and 3 were converted to valid (1) and rating scores of 2 and 1 were converted to invalid (0), and the scores were entered into Microsoft excel in computing item-level face validity index (I-FVI) and the scale-level face validity index (S-FVI) to identify those items that would be

retained or removed. The cut-off point was set at 0.83 (Yusoff, 2019).

Construct validation

Under this phase of validation, the subheadings of sample and sampling, research tool, data collection method, data analysis and ethical considerations are described.

Sample and sampling

Two hundred participants who were aged 18 to 35 years (age bracket for youth in Nigeria according to the National Policy on Youth Development, 2009), and who were screened positive for tramadol use using tobacco, alcohol, prescription medications and other substance use (TAPS) tool (McNeely et al., 2016), specifically indicating tramadol use were recruited from communities in Logo and Tarka Local Government Areas of Benue State to participate in the study. There is no precise sample for item response theory (IRT) analysis of a knowledge questionnaire, however some studies recommended a range from 100 to 500 participants (Edelen & Reeve, 2007; Goni et al., 2020; Zahiruddin et al., 2018). The sample size of 200 tramadol users was, therefore, considered sufficient for TUMKAQ validation. The chain-referral method of sampling was used. It is a technique for gathering research subjects through identification of an initial subject who is used to recruit others. The method was considered best for this study because of its suitability and effectiveness in studying sensitive and private matters (Waters, 2015). The first few subjects that were identified through an informant were used in recruiting their fellow tramadol users after convincing them by explaining the purpose of the study and assuring them of confidentiality.

Research tool

A self-report 40-item TUMKAQ (after deleting 10 items for low I-CVI) was used for data collection. The questionnaire was structured along five domains namely, medical use; prescription, misuse; effects of misuse, and withdrawal/ detoxification. Items were dichotomously scored with 'correct' answer getting a score of '1' and 'incorrect' answer getting a score of '0'. The option of 'Not sure' was also considered as 'incorrect' and was therefore given a score of '0'.

Data collection method

Data for this validation study were collected from April 2020 to May, 2020. The method of administration was face-to-face and no questionnaire was lost in the process. Data were collected for IRT analysis, which was used to evaluate the difficulty and the discriminative abilities of the questionnaire items.

Data analysis

The item response theory (IRT) model was applied for data analysis using R-software to assess the psychometric properties of the TUMKAQ. Two-parameter logistic IRT (2 PL IRT) model was specifically used because the aim was to estimate only the difficulty and discrimination parameters of the questionnaire items without the inclusion of guessing as a pseudo-parameter (Arifin & Yusoff, 2017). For the difficulty parameter, the acceptable range of -3 to +3 was used as a cut-off point while for discrimination, 0.25 to infinity was set as a cut-off point (Wyse, 2010). Item fit was measured using chi-square goodness-of-fit, and items with p-values greater than 0.05 (P > 0.05) were considered fit in the model. Modified parallel analysis was applied to check the assumption of unidimensionality of the items in the domains

with p-values greater than 0.05 confirming the assumption. Cronbach alpha was computed to assess the internal consistency of the TUMKAQ. The cut-off was set at 0.70 as acceptable reliability (Taber, 2018).

Ethical considerations

The study protocol was reviewed and approved by the Human Research Ethics Committee of Universiti Sains Malaysia (USM/JEPeM/19050316) and approval letters were obtained from the Local Councils of Logo and Tarka before data collection. After adequate briefing of the participants about the study and assurance of confidentiality, informed consent was obtained from each participant who agreed to participate in the study.

RESULTS

Description of the Participants

Descriptive statistics were used to analyse the demographic data of the participants as shown in Table 1 below:

Table 1. Descriptive analysis of demographic data (n = 200)

Variables	Mean (SD)	n	(%)
Age	26. 5 (4.8)		
Sex			
Male		188	(94.0)
Female		12	(6.0)
Marital Status			
Single		74	(37.0)
Married		115	(57.5)
Separated		9	(4.5)
Widowed		2	(1.0)
Level of Education			
Nil/primary		8	(4.0)
Secondary		172	(86.0)
Tertiary		20	(10.0)
Occupation			
Farming		105	(52.5)
Construction		37	(18.5)
Fishing/Hunting		8	(4.0)
Transportation		32	(16.0)
Trading		12	(6.0)
White-collar job		4	(2.0)
Others		2	(1.0)
Tramadol Prescription Status			
Prescribed for me		4	(2.0)
Not prescribed for me		196	(98.0)
Duration of Tramadol Use			
Less than one year		27	(13.5)
One year		5	(2.5)
More than one year		168	(84.0)

SD = standard deviation, n = frequency

Content Validity

The result of the content analysis showed that 10 out of 50 items had item-level content validity index of less than 0.83. Based on the cut-off point of 0.83 (Polit et al., 2007), Q1 (0.67), Q4 (0.5), Q5 (0.67), Q7 (0.67), Q12 (0.5), Q18 (0.67), Q21 (0.67), Q22 (0.5), Q31 (0.67) and Q48 (0.5) were deleted (I-CVIs < 0.83). The overall content validity index was 0.86, indicating good content validity for the TUMKAQ. Some of the items were re-phrased in line with expert suggestions as shown in Table 2.

Face Validity

The result of the face validity analysis showed that all items had I-FVIs of greater than 0.83 except Q24 that had I-FVI of 0.33 (< 0.83). This means items were clear and understandable by the target group. However, Q24 was not removed based on expert advice that the item was important in the measurement of tramadol knowledge. It was rather, rephrased from "Tramadol misuse does not cause difficulty in emptying of the bowels (constipation)" to "Prolonged use of tramadol does not cause difficulty in passing stools" for better clarity and comprehension. Over-all, the TUMKAQ had good face validity index of 0.97 (FVI > 0.83).

Construct Validity

The IRT analysis showed the psychometric properties of the TUMKAQ as shown in Table 3.

Based on the IRT results as presented in Table 3, Q12 in the misuse domain; Q32, Q34 and Q35 in the effects of misuse domain; and Q14 in withdrawal/detoxification domain were deleted for poor performances in both the difficulty and discrimination parameters (outside -3 to +3 range and < 0.25). In the medical use domain, Q7 and Q16 had poor discriminative indices (a < 0.25), and the p-values for all the items in the domain indicated they were not fit in the model ($p < .05$). They were, however, retained for good performances in the difficulty parameter. In the prescription domain, all the items except Q4 had p-values less than .05 indicating they were not fit in the model. These items were also retained for having good difficulty and discrimination indices (within the -3 to +3 range and > 0.25). In the misuse domain, apart from Q12 that was deleted, only Q17 had a poor discriminative index (a < 0.25) with Q5, Q8, Q10 and Q13 having p-values less than .05 indicating misfit in the model. The items were, however, accepted because they had good difficulty indices. In the effects of misuse domain, apart from Q32, Q34

Table 2. Result of the qualitative assessment of items

Item	Suggestion	Action taken
Q16	The item should be correctly written. Increasing the consumption of tramadol to get the desired effect is tolerance and not a cause of tolerance.	The question was rephrased: Increasing the consumption of tramadol to get desired effects is known as tolerance.
Q49	Eating fruits and vegetables helps in detoxifying (removing) tramadol from the body system. Select one	Fruits were removed from the question: Eating vegetables helps in detoxifying (removing) tramadol from the body system.
Q34, Q38, Q40, Q42 Q44	The word 'chronic' should be replaced with a better and friendlier word.	The word 'chronic' was replaced with 'prolonged' in some of the items affected and in others it was replaced with 'long-term'.

Table 3. Result of item response theory (IRT) analysis (n = 200)

Domain	S/N	Item	b	a	χ² (df=8)	p-values
Medical Use	Q1	Tramadol was originally produced to boost sexual stamina	0.3372698	0.8205658	150.5090	**< .0001**
	Q7	Tramadol is medically used for relieving tiredness	-2.0373397	-0.2115521	196.3006	**< .0001**
	Q16	Tramadol is meant for pain treatment	3.5212039	-0.2300538	195.4775	**< .0001**
Prescription	Q2	Tramadol is strictly a prescription drug	3.1710875	0.3656307	17.7908	**.0229**
	Q3	Tramadol is good for pregnant women	1.1685897	1.2410745	83.7627	**< .0001**
	Q4	Tramadol should not be used by people younger than 18 years	0.1264903	18.3399667	1.5203	.9924
	Q6	The maximum recommended dose for tramadol is 800 mg per day	1.3708777	1.1952604	57.6510	**< .0001**
	Q15	Tramadol is an over-the-counter drug	2.2620281	0.4234638	40.2409	**< .0001**
Misuse	Q5	Using tramadol for sexual satisfaction is not misuse of the drug	0.3757775	1.58385094	27.0159	**.0007**
	Q8	Dissolving tramadol tablets in energy drinks before taking is non-medical	0.5943807	1.20083421	31.5248	**.0001**
	Q9	Using tramadol to get energy for work constitutes tramadol misuse	1.3196685	2.20039265	8.5999	.3772
	Q10	Using tramadol without doctor's prescription is tramadol misuse	0.2208292	2.61161240	27.5748	**.0006**
	Q11	Increasing the consumption of tramadol to get desired effects is known as tolerance	1.1548817	2.39031969	13.6745	.0907
	Q12	Continuous use of tramadol makes one physically dependent on it	20.9823943	0.09512118	16.2105	**.0395**
	Q13	Taking larger amounts of tramadol over time is a sign of tramadol addiction	-0.0199840	1.0579246	30.8196	**.0002**
	Q17	Peer pressure can influence one into tramadol misuse	-1.5435334	0.14382681	10.1388	.2504
	Q18	Experimentation is one of the factors that influence tramadol misuse	1.7208307	0.26438267	10.2131	.2504
Effects of Misuse	Q19	Itchy skin is one of the effects of prolonged use of tramadol	0.6074271	1.63150974	12.7815	.1196
	Q20	Excessive sweating is not an effect of misusing tramadol	0.5527224	1.60791053	13.3562	.1002
	Q21	Tramadol misuse does not cause psychiatric disorder	0.5346347	2.27490307	15.4608	.0508
	Q22	Tramadol misuse causes convulsion	0.6349961	3.17671897	12.3739	.1353
	Q23	Indigestion could be caused by prolonged use of tramadol	0.2735393	2.21463403	12.0749	.1479
	Q24	Prolonged use of tramadol does not cause difficulty in passing stools	1.0810489	1.26108238	9.2759	.3196
	Q25	Prolonged use of tramadol could cause heart attack	0.5979380	0.82665471	24.3748	**.002**
	Q26	Irregular heart rate is not associated with tramadol misuse	0.9210071	0.83079090	11.6639	.1668

Table 3. Result of item response theory (IRT) analysis (n = 200) *(continued)*

Domain	S/N	Item	b	a	χ^2 (df=8)	p-values
	Q27	Long-term use of tramadol decreases breathing rate	0.8408041	0.51405934	30.6380	**.0002**
	Q28	Erectile dysfunction is not an effect of long-term tramadol use	1.2717371	0.36377542	12.7014	.1225
	Q29	Prolonged use of tramadol by women of reproductive age could cause amenorrhea (absence of menstruation)	0.9470038	0.30539529	13.3240	.1012
	Q30	A new-born baby whose mother was using tramadol during pregnancy could suffer from seizure	1.3964453	0.44861039	16.5485	**.0352**
	Q31	Long-term use of tramadol delays the healing of a wound	1.2556181	0.21118082	7.7164	.4616
	Q32	Tramadol misuse increases chances of contracting viral diseases	5.2470163	0.05769508	4.6151	.7978
	Q33	Prolonged use of tramadol can disrupt social relationship	2.5201954	0.93047012	10.0230	.2634
	Q34	Anxiety is associated with prolonged use of tramadol	-4.4003098	0.06877541	17.5300	**.025**
	Q35	Prolonged use of tramadol does not lure one into stealing	-4.9314309	-0.04890723	9.1893	.3266
	Q36	Tramadol misuse can disintegrate a family	-3.6190233	0.19103041	13.6657	.0909
Withdrawal/ Detoxification	Q14	Body pain is a withdrawal symptom of tramadol	-4.2205771	0.2084812	21.2238	**.0066**
	Q38	Tapering tramadol is good for safe withdrawal	0.4648767	1.7619706	73.3110	**< .0001**
	Q39	Eating vegetables helps in clearing tramadol from the body system	0.2621256	3.2987172	40.9371	**< .0001**
	Q40	Regular physical exercise can help clear tramadol from the body system	0.1781576	1.4107788	58.4245	**< .0001**

b = difficulty, **a** = discrimination, χ^2= chi-square, **p-values** < 0.05 are highlighted in **bold**

and Q35 that were deleted, only Q31 and Q36 had poor discrimination abilities but were retained based on their good performances in the difficulty parameter. All the items in the effects of misuse domain indicated fitness in the model (*p* > .05) except Q25, Q27 and Q30 (*p* < .05). In the withdrawal/detoxification domain, all the items indicated unfitness in the model (*p* < .05) but were all retained because they performed well in both the difficulty and discrimination parameters except Q14 that was deleted. A valid 35-item

TUMKAQ was produced after deleting five items. The amount of information tapped by the items in the five domains were 70.3%, 96.3%, 95.9%, 89.9% and 97.6% respectively.

After deleting Q12, Q14, Q32, Q34 and Q35, the modified parallel analysis was applied to check the unidimensionality of the items in the domains. The assumption of unidimensionality was confirmed in the medical use, prescription and withdrawal/detoxification domains (*p* = .7525, .4059 and .396 respectively which were greater

than .05). The assumption of unidimensionality was however violated in the misuse domain (p = .0099 < .05) and the effects of misuse domain (p = .0099 < .05).

Reliability

After deleting Q12, Q14, Q32, Q34 and Q35, Cronbach alpha was computed to assess the internal consistency of the TUMKAQ. The result yielded a reliability coefficient value of 0.78. This value is above the acceptable reliability coefficient value of 0.70 (Taber, 2018) indicating that TUMKAQ has good internal consistency.

DISCUSSION

A 35-item TUMKAQ in a self-report format has been developed to assess tramadol users' knowledge about the drug they use. The analysis has shown that the questionnaire has satisfactory content and psychometric properties as it consists of relevant items with adequate coverage, good difficulty and discrimination indices. However, the chi-square goodness-of-fit results showed that many items (Q1, Q7 and Q16 in the medical use domain; Q2, Q3, Q6 and Q15 in the prescription domain; Q5, Q8, Q10 and Q13 in the misuse domain; Q25, Q27 and Q30 in the effects of misuse domain; and Q37, Q38, Q39 and Q40 in the withdrawal/detoxification domain) were not fit in the IRT models. The misfit was, however, ignored. The decision for retaining the misfit items was taken in accordance with the observation that both the content validity and the psychometric quality of a test as a whole may be affected by removing misfit items, and this may have an effect on the important outcome measures (Crişan, Tendeiro, & Meijer, 2017).

The psychometric properties of TUMKAQ were evaluated and its face validity was determined unlike the KAP questionnaire on tramadol (Tafesh, 2013) and knowledge on drug abuse questionnaire (Geramian et al., 2012). Compared with the Brief Opioid Overdose Knowledge (BOOK) questionnaire (Dunn et al., 2016), TUMKAQ is longer (35 items) and specifically related to tramadol, while BOOK (12 items) is concerned with overdose knowledge on opioids generally without the mention of tramadol.

TUMKAQ has been developed to cover the important knowledge areas about tramadol. Assessing individuals' knowledge about the medical use of tramadol as covered by this questionnaire is vital considering the critical role knowledge of indications for medications play in the correct use of drugs (Bosch-Lenders et al., 2016). The assessment of knowledge on the prescription status of tramadol as covered by TUMKAQ is equally important. This is because, knowing that a particular drug is strictly a prescription drug could help in avoiding self-medication and its attendant consequences (Singh, Trivedi, Elnour, & Patel, 2015). TUMKAQ also covers assessment of knowledge on what constitutes tramadol misuse and the adverse effects. This is based on the belief that knowing the non-medical purposes and methods of drug use as well as its adverse effects could encourage abstinence (Sussman, Miyano, Rohrbach, Dent, & Sun, 2007; Twombly & Holtz, 2008). The questionnaire also assesses the knowledge about the withdrawal process and detoxification of tramadol. This will determine the knowledge status on safe-withdrawal from tramadol use, as abrupt withdrawal without medical detoxification could be catastrophic.

TUMKAQ can help specialists in health promotion, drug education, addiction counselling and even clinical identification of individuals who may be in need of educational interventions. Using this questionnaire for assessing individuals' baseline knowledge about tramadol can help in determining the kind of information they need as well as the method of delivery and the duration. The questionnaire may as well serve as a valid and reliable tool for evaluating the effectiveness of educational interventions in tramadol misuse among those who use the drug and the at-risk groups. The TUMKAQ is primarily intended to be used in communities, rehabilitation centres and in clinics managing patients with tramadol addiction.

CONCLUSION

A 35-item TUMKAQ in a self-report format with adequate content and satisfactory psychometric properties, and good internal consistency has been developed to assess knowledge about tramadol in the areas of medical use, prescription, misuse, effects of misuse and withdrawal/detoxification. It can be used in identifying individuals who may be in need of educational interventions. TUMKAQ can also help in determining the nature and content of educational interventions to correct misinformation about tramadol. The questionnaire can as well be used for the pre-test and post-test evaluation of educational interventions in tramadol abuse.

LIMITATIONS

The ability of this questionnaire to measure change in knowledge after an educational intervention has not been studied. It is, therefore, recommended that its' ability should be studied before subjecting it to a wider application and epidemiological research. The factor structure has also not been verified, thus creating the need for a confirmatory factor analysis (CFA) in future to confirm the construct validity of the TUMKAQ.

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