DEVELOPMENT OF AN IMB MODEL-BASED EDUCATIONAL MODULE FOR QUITTING TRAMADOL ABUSE AND ITS EFFECTIVENESS AMONG YOUTHS IN BENUE STATE, NIGERIA

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Abstract

The purpose of this study was to develop and assess the effectiveness of an IMB model-based educational module for quitting tramadol abuse. Sidek module development model (SMDM) guided the development of the module, and the content was sourced from literature and FGD with experts. The organization of the module contents was based on the information-motivation-behavioural skills (IMB) model. Six experts validated the content of the module. Item-level content validity index (I-CVI) and content validity achievement (CVA) of the module were determined with cut-off points set at 0.83 and 70% respectively. The effectiveness of the module was assessed in a quasi-experimental study using intervention and control groups with 51 participants each. The validation results indicated that items 4, 8, 9, 10, 11 and 16 had I-CVIs below 0.83 and were removed from the module. Overall, the module had good CVA of 85.8% and a reliability coefficient of 0.76. The results of the intervention study showed a significant difference in the knowledge about tramadol between the intervention and the control group [F (1.4, 130.1) = 480.6, $p < .001$] with the intervention group recording higher mean knowledge scores after the intervention. A significant difference in the mean self-efficacy scores was also observed [F (1.3, 126.4) = 185.8, $p < .001$] with the intervention group scoring higher on self-efficacy for quitting tramadol use than the control group. A significant difference in the mean behaviour scores was also observed between the two groups [F (1.9, 173.9) = 104.1, $p < .001$) with the intervention group scoring lower on tramadol consumption than the control group. The newly developed module is effective in enabling those persons who struggle with tramadol addiction to quit. The module could serve as an important intervention tool for community health educators, addiction counsellors, officials of rehabilitation centres and researchers interested in drug abuse interventions

Keywords: development, IMB model, educational module, tramadol abuse, effectiveness

Introduction

Tramadol (popularly known as tramol in Nigeria) is a pharmaceutical opioid indicated for moderate to moderately severe pain. However, the prescription analgesic has become a major substance of abuse among youths due to its' euphoric, energetic, and aphrodisiac effects (Bashirian et al., 2014; Bassiony et al., 2015; Fuseini et al., 2019).

Tramadol abuse involves the use of the analgesic contrary to the medical and legal guidelines. Simply put, it is the use of tramadol without medical prescription and for purposes other than pain treatment. Tramadol abuse has become a public health concern issue in many countries in sub-Saharan Africa. For instance, a report by the International Narcotics Control Board (INCB) listed many countries in sub-Saharan Africa (including Nigeria) where there is illicit manufacture of tramadol and heavy non-medical use (Ahmed et al., 2018). Another report identified tramadol as the most abused substance second to cannabis with about 71% of opioid consumers in Nigeria (National Bureau of Statistics, 2018). The approved quota for tramadol in Nigeria is 6000 kg, however, the amount in circulation is about 91000 kg (Klein & Ane, 2019) far exceeding the approved quota. Reasons commonly advanced for use of tramadol among Nigerian youths include delayed ejaculation, prolonged orgasm, prolonged hours at work, and increased boldness and bravery (Chia et al., 2015; Chikezie & Ebuenyi, 2019; Ibrahim et al., 2017; Orhero, 2018). These perceived benefits have contributed to the popularity and massive use of tramadol among Nigerian youths.

The National Council on Health (NCH) in its 59th Meeting held in 2013 put tramadol, (a hitherto prescription-only-medicine) under national control based on national trends of abuse, harm to public health and social well-being (Adeyeye, 2018). This was an intervention to control supply which required the manufacturer, importer, distributor, and retailer to document all transactions involving the drug including its disposal. The schedule in Nigeria regulated tramadol at 50 mg and 100 mg dosage strength; but very high dosages of 200 mg, 225 mg, 250 mg and even 400 mg have infiltrated the market (National Drug Law Enforcement Agency, 2018). In as much as the Government of Nigeria has made efforts to checkmate illicit use of tramadol, the drug still finds its way in large quantities to the nook and crannies of the country. There is also illicit production of tramadol with forged labels in the country to meet the high consumption demands. This is a pointer that laws and force cannot effectively curb tramadol abuse among youths unless supported with an educational intervention that could address the knowledge, attitude, self-efficacy, and behavioural skill deficits regarding tramadol use (Fuseini et al., 2019; Geramian et al., 2012; Wright et al., 2014 and Nickmanesh et al., 2017).

An educational module is a document or tool that contains learning experiences and activities systematically organised to transmit knowledge, values and skills required to carry out some specific tasks for the achievement of some specific objectives (Dimopoulos et al., 2009). Behavioural change theories including the theory of planned behaviour (TPB), the health belief model (HBM), the transtheoretical model (TM), and the information-motivation-behavioural skills (IMB) model have frequently been used to develop educational modules for behavioural change (Copenhaver & Lee, 2006; Chang et al., 2014). The IMB model in particular, has received much attention because of its simple explanation of the complexity of health behaviours and the identification of the constructs (information, motivation, and behavioural skills) that are necessary for behavioural change. The IMB model was developed by Fisher and Fisher (1992) to explain HIV/AIDS-related behaviours and to guide the development of interventions by conceptualizing the psychological determinants of achieving behaviour change. The IMB model includes three primary constructs that influence behaviour

change: (1) information about the risky behaviour; (2) motivation to change the risky behaviour; and (3) the behavioural skills necessary for change (Rongkavilit et al., 2010).

Consistent with the IMB model, providing information about tramadol (first construct of IMB) would facilitate quitting its use. This is because studies have documented that lack of accurate information about substances is one of the factors inducing substance use among young people and an effective intervention should address the knowledge gaps (Elliason, 2018; Embleton et al., 2012; Shamsi et al., 2008). Studies have also shown the importance of motivation (second construct of IMB) in quitting drug use, as there may be favourable attitudes towards drug use which may require the use motivation for change to occur (DiClemente, 1999; DiClemente et al., 2017; Hughes & Naud, 2016; Jardin et al., 2014). It is also needful to include specific behavioural skills (third construct of IMB) in any intervention in substance use. This is justified by literature evidence that refusal and resistant skills are necessary for quitting drug use (Botvin et al., 2001; Scheier et al., 1999; Waldron et al., 2007). The behavioural skill construct of the model emphasises the enhancement of an individual's skills, and perceived self-efficacy to facilitate behaviour change.

Several educational intervention studies have utilized the IMB model which effectively reduced unhealthy and risky behaviours (Copenhaver & Lee, 2006; Fisher et al., 1996; Rongkavilit et al., 2010). However, to the best of the researchers' knowledge, none of these interventions had focused on reducing illicit use of drugs like tramadol. The choice of this model was based on its comprehensive and theory-based strategy for addressing the major correlates of substance use (knowledge, attitudes, and self-efficacy) identified in the literature (Fuseini et al., 2019; Geramian et al., 2012; Wright et al., 2014 and Nickmanesh et al., 2017). Therefore, developing an educational module based on the IMB model to be used by community health educators, addiction counsellors and officials of rehabilitation homes in community settings would be important, particularly for out of school youths who may not have the opportunity to learn about drugs and substances of abuse in school settings.

Methods and Material

This study was conducted in two phases: (1) module development and validation, and (2) community-based intervention study.

Phase One: Module Development and Validation

The module was developed following the steps outlined in Sidek module development model (SMDM) comprising the preparation of the draft module and its validation (Sidek & Jamaludin, 2005). Consistent with the SMDM, the needs for the development of the module were assessed through two sessions of focus group discussions (FGD) with regular tramadol users (eight participants each) who were drawn from areas of profound tramadol abuse in Benue State of Nigeria using snow-ball sampling. The content of the module was sourced from literature review and FGD with psychiatrists, addiction counsellors and health educators. The module's contents were selected and organized in units based on the three constructs of the IMB model: information, motivation, and behavioural skills (Fisher et al., 2003).

Information unit: this unit was developed to address the deficiency in information and knowledge about tramadol. The unit contains basic information on origin of tramadol, description of different types of tramadol, medical use of tramadol, prescription status and regulation of tramadol in Nigeria, tramadol abuse, effects of tramadol abuse and safe withdrawal from tramadol use among other vital informations.

Motivation (affective) unit: this unit was developed to address the attitudinal-related needs identified from the FGD with tramadol abusers. The unit focuses on helping individulas to decide quitting tramadol abuse by motivating them with stories and drama about tramadol abuse and counselling them on how to change attitudes towards tramadol use.

Behavioural skills unit: this unit was developed to address the deficiency in the ability to resist peer pressure and cravings associated with continuous use of tramadol as identified from the FGD with tramadol abusers. The unit covers demonstration of practical skills to build self-efficacy for quitting tramadol abuse. This unit is equally important because it is believed that the shortcomings of young people's self-efficacy could cause continuous abuse of drugs (Chavarria et al., 2012). Studies have also established that lack of refusal and craving-resistant skills could make quitting drug use a challenging or nearly impossible task (Fauziah et al., 2011; Nikmanesh et al., 2017; Olubunmi & Adedotun, 2020).

The information from the literature search combined with the FGD findings were used to generate nine topics for the module: (1) basic information on tramadol (2) description of tramadol, modes of action and routes of administration (3) tramadol abuse and related terms (4) effects of tramadol abuse (I) (5) effects of tramadol abuse (II) (6) effects of tramadol abuse (III) (7) withdrawing from tramadol use (8) changing positive attitudes towards tramadol abuse, and (9) behavioural/self-efficacy skills for quitting tramadol use. The module was initially organized into three units with nine sessions, nine topics and 39 subtopics.

Thereafter, copies of the draft module were emailed along with content validation forms to six experts including two psychiatrists, two addiction counsellors and two health educators for content validation. The validation form was developed around the topics and activities in the module. The experts were requested to rate the relevance of the 39 items on a 4-point Likert scale ranging from 1 (item is highly irrelevant) to 4 (item is highly relevant). The rating scores were entered into Microsoft excel to compute the item-content validity index (I-CVI) and the content validity achievement (CVA) of the module (Madihie & Sidek, 2013). The cut-off point for retaining items was set at 0.83 (Polit, Beck, & Owen, 2007). The percentage formula for module validation by Sidek and Jamaludin (2005) was applied to determine the content validity achievement (CVA) of the module. According to Sidek and Jamaludin (2005), if the percentage of content validity is more than 70%, then the module has good content validity, and if less than 70%, the module does not have a good validity result and it is advisable to re-check the content according to the objectives of the module. The experts were also requested to make a qualitative judgement of the items and make comments and observations.

Module Reliability: Consistent with the SMDM, a pilot test of the module was conducted using 30 long-term tramadol users in Makurdi Local Government Area of Benue State for three days. Participants were exposed to some selected topics under each unit of the module. A 20-item questionnaire constructed based on the objectives of the selected topics was

administered to determine the module's reliability. Since the data collected for this pilot study were continuous using Likert scale, Cronbach alpha was used to measure the module's reliability. The cut-off point was set at 0.70 (Talib et al., 2015).

Phase two: Community-based Intervention Study

A community-based intervention study using quasi-experimental design was conducted to test the effectiveness of the newly developed module. The sample for the study consisted of 51 participants for the intervention group and another 51 for the control group. The effect size of a quasi-experimental study (0.40) by Molina et al. (2012) was used to determine the sample size. Participants were recruited through snow-ball method and were screened for tramadol using Q-cup urine drug test kit (Q-CUDTK). Only those who tested positve for tramadol abuse were recruited. Data were collected at the baseline, two weeks and three months after the intervention using tramadol use and misuse knowledge assessment questionnaire (TUMKAQ) (Zwawua et al., 2021), attitudinal scale for tramadol use (ASTU), tramadol misuse quitting self-efficacy scale (TMQSS) (Zwawua et al., 2021) and tramadol abuse measurement scale (TAMS) (Zwawua et al., 2021).

The intervention and the control groups were located in two different locations of about 70 km distant apart to avoid contamination of information during the intervention. While the intervention group received education about tramadol and the necessary skills for quitting its abuse, the control group was engaged in aerobic dance only throughout the period of the intervention. The intervention lasted for three months covering eight sessions. Data for the intervention study were entered and analysed using IBM SPSS statistics version 26.0 (SPSS Inc., 2013). Negatively skewed items were reverse scored before analysis. An independent t-test and Pearson chi-square statistics were used to compare the sociodemographic characteristics and tramadol use history between the intervention and control groups at baseline. The between group repeated measures analysis of variance (RM ANOVA) was applied to compare the mean knowledge, attitude, self-efficacy, and behaviour scores on tramadol between the intervention and the control groups at baseline, two weeks, and three months after the intervention.

Ethical Considerations

Informed consents were obtained from each participant prior to the commencement of the intervention. During the consent process, the confidentiality of the research data was explained to each potential subject. Participants who gave their consent to participate in the study were conveyed to the laboratory for a urine test. They were assured that the urine sample for screening using the Q-CUDTK test was not to be used for any purpose other than the study purpose. Participants were also advised to go for medical detoxification before quitting tramadol to avoid risks. 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 Buruku and Gboko before the intervention and data collection.

Results and Material

Module Development

The module's contents were selected and organized in units based on the three constructs of the IMB model: information, motivation, and behavioural skills (Fisher et al., 2003).

Information and knowledge unit: this unit was developed to address the deficiency in information and knowledge about tramadol identified from the FGD with tramadol abusers. The unit contains information on facts about tramadol use and abuse.

Motivation (affective) unit: this unit was developed to address the attitudinal-related needs identified from the FGD with tramadol abusers. The unit focuses on helping individulas to decide quitting tramadol abuse by motivating them with stories and drama about tramadol abuse and counselling them on how to change attitudes towards tramadol use.

Behavioural skills unit: this unit was developed to address the deficiency in the ability to resist peer pressure and cravings associated with continuous use of tramadol as identified from the FGD with tramadol abusers. The unit covers demonstration of practical skills to build self-efficacy for quitting tramadol abuse. This unit is equally important because it is believed that the shortcomings of young people's self-efficacy could cause continuous abuse of drugs (Chavarria et al., 2012). Studies have also established that lack of refusal and craving-resistant skills could make quitting drug use a challenging or nearly impossible task (Fauziah et al., 2011; Nikmanesh et al., 2017; Olubunmi & Adedotun, 2020).

The information from the literature search combined with the FGD findings were used to generate nine topics for the module: (1) basic information on tramadol (2) description of tramadol, modes of action and routes of administration (3) tramadol abuse and related terms (4) effects of tramadol abuse (I) (5) effects of tramadol abuse (II) (6) effects of tramadol abuse (III) (7) withdrawing from tramadol use (8) changing positive attitudes towards tramadol abuse, and (9) behavioural/self-efficacy skills for quitting tramadol use. The module was initially organized into three units with nine sessions, nine topics and 39 subtopics as shown in Table 1:

Table 1

Content Structure of the Module

Unit	Session	Topic	Sub-topic	Objectives	Evaluation	Duration
Information and Knowledge	One	Basic Information on Tramadol	1. Origin of tramadol 2. Medical use 3. Prescription status 4. Availability in Nigeria 5. Regulation in Nigeria 6. Dosage requirement 7. Contraindications	Participants should be able to: 1.State where tramadol originated 2. Describe the medical use 3. State the prescription status 4. Mention the regulated milligrams in Nigeria 4. State the dosage requirement 5. Mention conditions of contraindications	1. Where did tramadol originate? 2. What is the medical use of tramadol? 3. What is the prescription status of tramadol? 4. At what milligrams is tramadol regulated in Nigeria? 5. What is the daily maximum dosage for tramadol? 6. Mention 5 conditions for which tramadol is contraindicated	90 Min.
	Two	Description of tramadol, Modes of Action and Routes of Administration	8. Physical appearance of tramadol 9. Pharmacokinetics of tramadol 10. Pharmacodynamics of tramadol 11. Routes of tramadol administration	1. Describe different forms of tramadol 2. State the number of hours tramadol lasts in the body system before craving starts 3. Describe how tramadol functions in the body 4. Mention the routes of tramadol administration	1. Mention any 3 forms of tramadol 2. How long does tramadol lasts in the body system before craving starts? 3. How does tramadol function in the body? 4. Mention any 3 routes of tramadol administration	90 Min.
	Three	Tramadol Abuse and Related Terms	12. Meaning of tramadol abuse 13. non-medical uses of tramadol 14. non-medical routes for tramadol administration 15. Factors influencing tramadol abuse 16.Perceived benefits of tramadol use 17. Tramadol tolerance 18. Tramadol dependence 19. Tramadol addiction	1. Define tramadol abuse 2. Mention the non-medical uses of tramadol 3. Mention the non-medical routes of tramadol administration 4. Mention factors that influence tramadol abuse 5. Define tolerance 6. Define dependence 7. Describe addiction	1. What is tramadol abuse? 2. Mention any 5 non-medical uses of tramadol 3. Mention any 3 non-medical routes of tramadol administration 4. Mention any 4 factors that influence tramadol abuse 5. What is tolerance? 6. What is dependence? 7. What do you understand by addiction?	90 Min.
	Four	Effects of Tramadol Abuse (I)	20. Immediate effects of tramadol abuse 21. Effects on the central nervous system 22. Effects on the digestive system	1. State the immediate effects of tramadol abuse 2. Mention effects of tramadol abuse on the central nervous system 3. State the effects of tramadol abuse on the digestive system	1. Mention any 5 immediate effects of tramadol abuse 2. Mention any 3 effects of tramadol abuse on the central nervous system 3. State any 3 effects of tramadol abuse on the digestive system	90 Min.

	Five	Effects of Tramadol Abuse (II)	23. Effects on the cardiovascular system 24. Effects on the respiratory system 25. Effects on the reproductive system	1. State the effects of tramadol abuse on the cardiovascular system 2. Mention the effects of tramadol abuse on the respiratory system 3. State the effects of tramadol abuse on the reproductive system	1. State any 3 effects of tramadol abuse on the cardiovascular system 2. Mention any 3 effects of tramadol abuse on the respiratory system 3. State any 3 effects of tramadol abuse on the reproductive system	90 Min.
	Six	Effects of Tramadol Abuse (III)	26. Effects on the immune system 27. Psychological effects 28. Social effects	1. Mention the effects of tramadol abuse on the immune system 2. State the psychological effects of tramadol abuse 3. Mention the social effects of tramadol abuse	1. Mention any 3 effects of tramadol abuse on the immune system 2. State any 3 psychological effects of tramadol abuse 3. Mention any 3 social effects of tramadol abuse	90 Min.
	Seven	Safe Withdrawal from Tramadol Use	29. Tramadol withdrawal 30. Withdrawal symptoms 31. Tramadol detoxification 32. Medical methods of detoxification 33. Personal habits for detoxification	1. Describe tramadol withdrawal 2. Mention the withdrawal symptoms 3. Define tramadol detoxification 4. Mention medical methods of detoxification 5. State personal habits for tramadol detoxification	1.What is tramadol withdrawal? 2. Mention any 5 withdrawal symptoms 3.What is tramadol detoxification? 4. Mention any 2 methods of medical detoxification 5. Mention any 3 personal habits for tramadol detoxification	90 Min.
Motivation (Affective)	Eight	Changing Positive Attitudes towards Tramadol Use to Negative	34. Emotional stories and drama on tramadol abuse 35. Counselling on tips to change positive attitudes towards tramadol abuse	1. Express feelings that tramadol abuse is harmful 2. Express feelings of remorse over involvement in tramadol abuse 3. Express willingness to withdraw from tramadol use 4. Appreciate living a tramadol-free life	1. How is your feeling about tramadol? 2. How do you intend to live your life?	90 Min.
Behavioural Skills	Nine	Behavioural/self-efficacy skills for quitting tramadol use	36. Drama and story on confidence-building skills 37. Counselling on confidence-building tips 38. Refusal skills 39. Craving resistant skills	1. Demonstrate confidence for quitting tramadol 2. Develop tramadol refusal skills 3. Develop craving resistant skills	1. Do you have confidence in your ability to quit tramadol use? 2.What will you do if you are offered tramadol by a friend at a time you want to quit? 3. What will you do if you are having strong cravings for tramadol, and you don't want to take it again?	90 Min.

Validity of the Module

The results of the expert validation indicated that the module items had acceptable I-CVIs except items 4, 8, 9, 10, 11 and 16 with I-CVIs of 0, 0.2, 0, 0.3, 0.3 and 0, respectively. Based on the cut-off point of 0.83, items 4, 8, 9, 10, 11 and 16 were removed from the module. The entire session two was removed from the module because all items under it had I-CVIs below 0.83. The CVA of the module is as presented in Table 2. The content validity achievement of the Edu-MATA was 85.8%. This result shows that the Edu-MATA has good content validity achievement (85.8% > 70%).

Table 2

Content Validity Achievement of the Module

Expert	Total Score	Maximum Score	CVA
Expert 1	134	156	85.9%
Expert 2	135	156	86.5%
Expert 3	134	156	85.9%
Expert 4	134	156	85.9%
Expert 5	135	156	86.5%
Expert 6	131	156	84.0%
Cluster CVA			**85.8%**

Reliability of the Module

The result of the reliability analysis based on the responses in the module reliability questionnaire form using Cronbach alpha showed that the module had a reliability coefficient of .76. This reliability coefficient was accepted because it was more than the recommended reliability coefficient for a newly developed module (Talib et al., 2015).

Effectiveness of the Module

Table 3 presents comparison on the sociodemographic characteristics and tramadol use history between the intervention and control groups at the baseline. The results showed that there were no significant differences in the sociodemographic characteristics and tramadol use history between the intervention and control groups ($P > .05$) at the baseline. This means that the two groups were comparable.

Table 3
Comparison of the Sociodemographic Characteristics and Tramadol Use History between the Intervention and Control Groups

Variables	Intervention	Control	*P-value*
	n (%)	n (%)	
Age			
Mean (SD)	27.7 (3.92)	27.2 (4.27)	.516[a]
Gender			
Male	43 (42.2)	42 (41.2)	.790[b]
Female	8 (7.8)	9 (8.8)	
Marital Status			
Single/separated/widowed	41 (40.2)	34 (33.3)	.116[b]
Married	10 (9.8)	17 (16.7)	
Level of Education			
Primary	5 (4.9)	9 (8.8)	.250[b]
Secondary/tertiary	46 (45.1)	42 (41.2)	
Occupational Status			
Farming	26 (25.5)	29 (28.4)	.656[b]
Construction/fishing/hunting	9 (8.8)	8 (7.8)	
Transportation	7 (6.9)	5 (4.9)	
Trading/white-collar job	7 (6.9)	9 (8.8)	
Tramadol Use Prescription Status			
Not prescribed	49 (48.0)	47 (46.1)	.400[b]
Prescribed	2 (2.0)	4 (3.9)	
Influencing Factor			
Peer pressure	30 (29.4)	31 (30.4)	.879[b]
Sex partner	10 (9.8)	12 (11.8)	
Family relatives	4 (3.9)	3 (2.9)	
Curiosity/experimentation	7 (6.9)	5 (4.9)	
Period of Tramadol Use			
Less than one year	8 (7.8)	11 (10.8)	.449[b]
More than one year	43 (42.2)	40 (39.2)	

a t-test
b Pearson Chi-square

The results of the intervention study as presented in Table 4 showed a significant statistical difference in mean knowledge scores on tramadol between the intervention and control groups after the intervention (F (1.4, 130.1) = 480.6, P < .001). Significant differences were also recorded in the mean attitude scores (F (2, 190) = 360.3, P < .001), self-efficacy scores (F (1.3, 126.4) = 185.8, P < .001), and behaviours scores (F (1.9, 173.9) = 104.1, P < .001) on tramadol between the intervention and control groups at two weeks and three months post-intervention.

Table 4

Effect of Time-Group Interaction on Total Mean Knowledge, Attitude, Self-efficacy, and Behaviour Scores

Outcome measure	Time	Intervention (n = 49)	Control (n= 48)	*F*	*P-value*
		M (95% CI)	*M* (95% CI)		
Knowledge					
	Baseline	13.4 (12.2, 14.5)	14.8 (13.6,15.9)	480.6(1.4,130.1)	>.001
	Two weeks	30.6 (29.6, 31.5)	15.5 (14.6,16.4)		
	Three months	30.4 (29.6, 31.2)	15.8 (15.0,16.6)		
Attitude					
	Baseline	59.2 (58.4, 60.1)	58.2 (57.4, 59.1)	360.3 (2, 190)	>.001
	Two weeks	49.8 (48.8, 50.9)	58.0 (56.9, 59.1)		
	Three months	41.6 (40.6, 42.5)	59.2 (58.2, 60.1)		
Self-efficacy					
	Baseline	36.1 (33.6, 38.6)	35.5 (32.9, 38.0)	185.8 (1.3, 126.4)	>.001
	Two weeks	52.5 (50.6, 54.4)	36.2 (34.2, 38.1)		
	Three months	55.0 (53.8, 56.3)	37.5 (36.2, 38.8)		
Behaviour					
	Baseline	49.5 (47.4, 51.6)	49.9 (47.8, 52.0)	104.1 (1.9, 173.9)	>.001
	Two weeks	46.6 (44.6, 48.6)	50.1 (48.0, 52.1)		
	Three months	35.3 (33.8, 36.8)	50.7 (49.2, 52.3)		

*Repeated measures ANOVA between group analysis regarding time was applied followed by pairwise comparison with 95% confidence interval adjustment by Bonferroni correction.

The pairwise analysis showed that the mean knowledge, attitude, self-efficacy, and behaviour scores on tramadol for the intervention and control groups were almost same at the baseline. However, for the intervention group, there was a marked increase in the mean knowledge and self-efficacy scores on tramadol from baseline to three months post-intervention, and a marked decrease in the mean attitude and behaviour scores on tramadol from baseline to three months post-intervention. On the other hand, the control group recorded almost same mean knowledge, attitude, self-efficacy, and behaviour scores on tramadol throughout the trial.

The results in Table 5 shows that after three months of the intervention, 12 (24.5%) of the participants in the intervention group still tested positive for tramadol, while 37 (75.5%) tested negative. On the other hand, 42 (87.5%) of the participants in the control group still tested positive for tramadol, while 6 (12.5%) tested negative.

Table 5

Result of the Q-Cup Urine Drug Test for Tramadol Use after Three Months of the Intervention

Group	Positive	Negative
	n (%)	n (%)
Intervention (n = 49)	12 (24.5)	37 (75.5)
Control (n = 48)	42 (87.5)	6 (12.5)

Discussion

The content of the module was selected and organized under three units: information and knowledge, motivation, and behavioural skills. The first unit supports the results of studies that have shown that providing young people with accurate information about the negative effects of drugs could encourage withdrawal and abstinence from drug use (Holtz & Twombly, 2007; Sussman et al., 2007; Twombly & Holtz, 2008). The second unit of the module is equally important in changing tramadol abuse behaviour. This unit assumes that drug information plays only a minor role in drug abuse cessation (Allara et al., 2015) and that drug abuse to some extent has its cause in the inability to make rational decisions and express feelings and poor value clarification (Chavarria et al., 2012). Therefore, the goals of an educational intervention should also include a demonstration that drug use is inconsistent with a useful value structure.

The behavioural skills unit of the module could improve the self-efficacy for quitting tramadol use. This is because this unit largely focuses on the confidence-building tips and inculcating the peer pressure and craving resistant skills required for quitting tramadol use. The unit encompasses storytelling and drama-acting involving refusal and craving resistant skills to build the confidence required for quitting tramadol use. The inclusion of the peer pressure and craving resistant skills in the module was considered expedient due the recognition of the influencing role of peer groups in the continuation of tramadol use as reported by Fuseini et al. (2019), and the cravings associated with tramadol use (Stoops et al., 2012; Zacny, 2005). As reported in the literature, the peer pressure/refusal and craving resistant skills are fundamental in developing the confidence required for quitting or abstaining from drug use (Choi et al., 2013; Kadden & Litt, 2011).

The result of the content validity test by experts showed that the module items met the required I-CVIs for inclusion in the final draft of the module except for items 4 (availability of tramadol in Nigeria), 8 (physical appearance of tramadol), 9 (pharmacokinetics of tramadol), 10 (pharmacodynamics of tramadol), 11 (routes of tramadol administration), and 16 (perceived benefits of tramadol). These items were dropped from the module because, in the experts' opinions, items 8, 9, and 10 were too technical for the target population and their inclusion in the module was not necessary. Items 4, 11, and 16 were also deemed unnecessary because, according to experts' opinions, they could induce curiosity and experimentation in the tramadol users, thus causing more harm than good. However, the overall content validity achievement of the Edu-MATA showed that the content could achieve what the module was intended to achieve.

There was a marked increase in the mean knowledge scores on tramadol in the intervention group after the intervention with the control group showing no improvement. The finding is consistent with the result of an intervention study by Martin et al. (2013), which recorded a significant improvement in the knowledge about benzodiazepine among participants in the intervention group, with the control group demonstrating no change in knowledge after one week of the intervention. In the present study, a greater number of participants in the intervention group demonstrated better knowledge about the medical use of tramadol, its prescription status, dosage requirement, contraindications, abuse, and effects of abuse of tramadol, as well as safe ways of quitting tramadol use as compared to the participants in the control group. The significant improvement in the knowledge about tramadol could be attributed to the effectiveness of the module. This confirms the observation in the literature that educational interventions could increase awareness about drug use and misuse, as well as the consequences of drug abuse, thus paving the way for informed decision-making (Cuijpers, 2002; Espada & Hernández, 2015; Faggiano et al., 2008; Giannotta et al., 2014; McBride, 2003; Newton et al., 2017).

A significant decrease in the mean attitude scores on tramadol was recorded in the intervention group at two weeks and three months post-intervention, while it was not same with the control group. The finding is consistent with the result of a study by Arevian and Khasholian (2014) which reported a significant decrease in the overall positive attitudes towards drug use among Lebanese/Armenian youths after participating in an educational program on drug abuse. The finding, however, contrasts a study among adolescents in Benin, Nigeria, which reported no significant changes in the subjects' attitudes towards drug use after participating in a health education program on drug abuse (Chukwuka & Agoreyo, 2015). The reason for this variation could be attributed to the application of affective strategies in the Edu-MATA such as drama acting and storytelling about tramadol abuse and its consequences and useful tips on how to change positive attitudes towards tramadol use to negative to appeal to the emotions of the tramadol users. The finding affirms the assumption that drug information plays only a minor role

in attitudinal change and drug abuse cessation (Allara et al., 2015). It further buttresses the observation that the incorporation of drama in drug education triggers an emotional response to the informational content, and the combination of emotion and information works together to alter positive attitudes towards drug use (Stephens et al., 2007).

There was an increase in the mean self-efficacy scores on tramadol in the intervention group but no increase in the control group after the intervention, indicating a higher level of self-efficacy for quitting tramadol use among the participants in the intervention group. In line with this finding, a study by Sheykhnezhad and Seyedfatemi (2019) indicated that group education could improve the quitting skills of drug abusers through enhancing their self-efficacy and reducing craving beliefs. The higher level of self-efficacy for quitting tramadol use exhibited by the intervention group could be attributed to their exposure to the confidence-building tips in the module. The high confidence level could also be attributed to the pressure-resistant skills and craving-resistant skills in the module. These are fundamental in developing self-efficacy. These results are consistent with other studies (Choi et al., 2013; Kadden & Litt, 2011).

There was a significant drop in the mean behaviour scores in the intervention group after the intervention. This result indicated less consumption of tramadol in terms of frequency and intensity among the participants. This finding is consistent with a quasi-experimental study in Tehran, Iran which reported a significant reduction in the use of substances among the participants in the intervention group, with increased consumption of the substances observed among the control group after implementation of a skill-based substance abuse intervention (Allahverdipour et al., 2009). However, the finding contrasts the result of a study among university students in Kenya that reported no significant difference in drug consumption between the intervention and the control groups after drug abuse awareness campaigns (Mbuthia et al., 2017). The variation in the findings could be attributed to the fact that the drug abuse intervention among the university students in Kenya was solely an awareness campaign about drugs, without affective and skill-based strategies suggesting that only information and awareness campaigns against substance use cannot do enough in reducing substance use. The decrease in the number of those who tested positive for tramadol in the intervention group may be attributed to the effectiveness of the module.

Conclusion

An effective educational module for quitting tramadol abuse with information, motivation and behavioural skill components has been developed to enable those individuals who abuse tramadol to quit. We named this module “Educational Module Against Tramadol Abuse Edu-MATA”. The Edu-MATA may serve as an important tool for community health educators, addiction counsellors and researchers interested in drug abuse interventions. It can also be directly used by those individuals who are struggling with tramadol addiction as it provides useful information on safe withdrawal from tramadol use.

References

Abdollahi, Z., Taghizadeh, F., Hamzehgardeshi, Z., & Bahramzad, O. (2014). Relationship between addiction relapse and self-efficacy rates in injection drug users referred to Maintenance Therapy Center of Sari, 1391. *Global journal of health science*, *6*(3), 138-144. doi:10.5539/gjhs.v6n3p138

Adeyeye, M. C. (2018). The problem of drugs/substance abuse in Nigeria: a symposium. Retrieved from http://www.nafdac.gov.ng/the-problem-of-drugs-substance-abuse-in-nigeria-symposium

Ahmed, A. I., El-Dawy, K., Fawzy, M. M., Abdallah, H. A., & Elsaid, H. (2018). Retrospective review of tramadol abuse. *Slov Vet Res*, *55*(55), 471-483.

Allahverdipour, H., Bazargan, M., Farhadinasab, A., Hidarnia, A., & Bashirian, S. (2009). Effectiveness of skill-based substance abuse intervention among male adolescents in an Islamic country: case of the Islamic Republic of Iran. *Journal of Drug Education*, *39*(2), 211-222. https://doi.org/10.2190/DE.39.2.g

Allara, E., Ferri, M., Bo, A., Gasparrini, A., & Faggiano, F. (2015). Are mass-media campaigns effective in preventing drug use? a cochrane systematic review and meta-analysis. *BMJ Open*, *5*(9), e007449. https://doi.org/10.1136/bmjopen-2014-007449

Arevian, M., & Khasholian, T. K. (2014). Impact of a peer-led educational program on knowledge and attitudes about prevention of substance abuse among Lebanese/Armenian adolescents. *Journal of Community Medicine and Health Education*, *4*(5), 1-6.

Barbosa, E., & Maldonado, J. (2011). \mathcal{IMA}–\mathcal{CID}: an integrated modeling approach for developing educational modules. *Journal of the Brazilian Computer Society*, *17*. https://doi.org/10.1007/s13173-011-0043-5

Bashirian, S., Barati, M., & Fathi, Y. (2014). Prevalence and factors associated with Tramadol abuse among college students in west of Iran: an application of the Theory of Planned Behavior. *Avicenna Journal of Neuro Psycho Physiology*, *1*(1), 26-30.

Bassiony, M. M., M, S. E. G., Yousef, U., Raya, Y., Abdel-Ghani, M. M., El-Gohari, H., & Atwa, S. A. (2015). Adolescent tramadol use and abuse in Egypt. *The American Journal Of Drug And Alcohol Abuse*, *41*(3), 206-211. https://doi.org/10.3109/00952990.2015.1014959

Chang, S. J., Choi, S., Kim, S., & Song, M. (2014). Intervention strategies based on information-motivation-behavioral skills model for health behavior change: A systematic review. *Asian Nursing Research*, *8*(3), 172-181. https://doi.org/10.1016/j.anr.2014.08.002

Chia, P. N., Awopetu, R. G., Ugese, J. I., & Apaa, T. (2015). *Prevalence and pattern of psychoactive substance substance use among in-patients at psychiatric unit of Federal Medical Centre, Makurdi.* Paper presented at the CRISA Symposium on Drugs Control.

Chikezie, U. E., & Ebuenyi, I. D. (2019). Tramadol misuse in the Niger Delta; A review of cases presenting within a year. *Journal of Substance Use*, *24*(5), 487-491. https://doi.org/10.1080/14659891.2019.1604842

Choi, H. J., Krieger, J. L., & Hecht, M. L. (2013). Reconceptualizing efficacy in substance use prevention research: refusal response efficacy and drug resistance self-efficacy in adolescent substance use. *Health communication*, *28*(1), 40-52. https://doi.org/10.1080/10410236.2012.720245

Chukwuka, L. O., & Agoreyo, F. (2015). Influence of health education on prevention of drug abuse. *Journal of Applied Sciences and Environmental Management*, *19*(2), 291-293.

Cuijpers, P. (2002). Effective ingredients of school-based drug prevention programs. A systematic review. *Addictive Behaviors*, *27*(6), 1009-1023.

Espada, J., & Hernández, S. O. (2015). Effects of the Saluda prevention program: a review of controlled evaluation studies. *Electronic Journal of Research in Educational Psychology*, *1*(13), 171-188. https://doi.org/10.14204/ejrep.35.14052

Faggiano, F., Vigna-Taglianti, F. D., Versino, E., Zambon, A., Borraccino, A., & Lemma, P. (2008). School-based prevention for illicit drugs use: a systematic review. *Preventive Medicine*, *46*(5), 385-396. https://doi.org/10.1016/j.ypmed.2007.11.012

Fauziah, I., Naresh, K., & Bahaman, A. S. (2011). Self-efficacy and relapsed addiction tendency: An empirical study. *The Social Sciences, 6*(4), 277-281.

Fisher, W. A., Fisher, J. D., & Harman, J. (2003). The information-motivation-behavioral skills model: A general social psychological approach to understanding and promoting health behavior. *Social psychological foundations of health and illness, 22*, 82-106.

Fuseini, A. G., Afizu, A., Yakubu, Y. H., & Nachinab, G. (2019). Facilitators to the continuous abuse of tramadol among the youth: A qualitative study in Northern Ghana. *Nurs Open, 6*(4), 1388-1398. https://doi.org/10.1002/nop2.353

Giannotta, F., Vigna-Taglianti, F., Rosaria Galanti, M., Scatigna, M., & Faggiano, F. (2014). Short-term mediating factors of a school-based intervention to prevent youth substance use in Europe. *J Adolesc Health, 54*(5), 565-573. https://doi.org/10.1016/j.jadohealth.2013.10.009

Ibrahim, A. W., Yerima, M. M., Pinda, S. K., Onyencho, V. C., Ahmed, H. K., Machina, B. K., & Wakil, M. A. (2017). Tramadol abuse among patients attending an addiction clinic in north-eastern Nigeria: outcome of a four year retrospective study. *Journal of Advances in Psychology Neuroscience, 2*(2), 31-37. https://doi.org/10.11648/j.apn.s.2017020201.16

Kadden, R. M., & Litt, M. D. (2011). The role of self-efficacy in the treatment of substance use disorders. *Addictive behaviors, 36*(12), 1120-1126. https://doi.org/10.1016/j.addbeh.2011.07.032

Kasim, N. H., & Ahmad, C. N. (2018). PRO-STEM module: the development and validation. *International Journal of Academic Research in Business and Social Sciences, 8*(1), 728-739. https://doi.org/10.6007/IJARBSS/v8-i1/3843

Kayode, A. (2019). *Trends in opioid use, harms, regulation and treatment and the health implications of prescription drugs abuse.* . Paper presented at the conference organized by Society for Development & Community Empowerment, Port Harcourt, Nigeria. https://www.unodc.org/documents/hlr//follow-up-process/2019-thematic-discussions/18-October/thematic-debate/Kayode_Adedoye.pdf

Klein, A., & Ane, M.G. (2019). Tramadol in Africa: scarcity and excess of pain medication in a poorly regulated market. [Accessed 20th January 2020]. Available from https://www.fileserver.idpc.net>library>Tram

Madihie, A., & Sidek, M. N. (2013). An Application of the Sidek Module Development in Rebt Counseling Intervention Module Design for Orphans. *Procedia - Social and Behavioral Sciences, 84*, 1481-1491. doi:https://doi.org/10.1016/j.sbspro.2013.06.777

Mahmood, N., Othman, S., Al-Tawil, N., & Al-Hadithi, T. (2018). Impact of an education intervention on knowledge of high school students concerning substance use in Kurdistan Region-Iraq: A quasi-experimental study. *PloS one, 13*(10), e0206063. https://doi.org/10.1371/journal.pone.0206063

Martin, P., Tamblyn, R., Ahmed, S., & Tannenbaum, C. (2013). A drug education tool developed for older adults changes knowledge, beliefs and risk perceptions about inappropriate benzodiazepine prescriptions in the elderly. *Patient Education and Counseling, 92*(1), 81-87. https://doi.org/10.1016/j.pec.2013.02.016

Mbuthia, G., Wanzala, P., Ngugi, C., & Nyamogoba, H. (2017). Assessing the effectiveness of alcohol and drug abuse awareness campaigns among University students in Kenya: A quasi-experimental study. *Medicine Science, 6*(3), 464-470. https://doi.org/10.5455/medscience.2017.06.8593

McBride, N. (2003). A systematic review of school drug education. *Health Education Research, 18*(6), 729-742. https://doi.org/10.1093/her/cyf050

Müller, K., & Roodt, G. (2013). Content validation: The forgotten step-child or a crucial step in assessment centre validation? *2013, 39*(1). https://doi.org/10.4102/sajip.v39i1.1153

National Bureau of Statistics. (2018). Drug use in Nigeria. Retrieved from https://www.proshareng.com/news/General/NBS-Publishes-Drug-Use-in-Nigeria-2018-Survey-Report/43749

National Drug Law Enforcement Agency. (2018). Tramadol menace: NDLEA to rescue. Retrieved from https://www.ndlea.gov.ng/new-and-event/tramadol-menace-ndlea-to-rescue

Newton, N. C., Champion, K. E., Slade, T., Chapman, C., Stapinski, L., Koning, I., . . . Teesson, M. (2017). A systematic review of combined student- and parent-based programs to prevent alcohol and other drug use among adolescents. *Drug Alcohol Rev, 36*(3), 337-351. https://doi.org/10.1111/dar.12497

Nikmanesh, Z., Baluchi, M. H., & Pirasteh, M. A. (2017). The role of self-efficacy beliefs and social support on prediction of addiction relapse. *Internatioinal Journal of High Risk Behavior and Addiction, 6*(1), 201-209. https://doi.org/10.5812/ijhrba.21209

Olubunmi, M., & Adedotun, A. (2020). Impact of self-efficacy and social support on intention to quit drug use among people with drug abuse cases. *Advances in Research, 21*(1), 67-74. doi:https://doi.org/10.9734/air/2020/v21i/30182

Orhero, M. (2018). Prevalence and factors responsible for tramadol abuse among patients in hospital in Nigeria. Retrieved from http://www.academia.edu/38157854/prevalence-and-factors-responsible-for-tramadol-abuse-among-patients-hospital-in-nigeria

Osikoya, K. A., & Alli, A. (2006). perception of drug abuse among Nigerian undergraduates. *World Journal of Medical Sciences, 1*(2), 133-139.

Polit, D. F., Beck, C. T., & Owen, S. V. (2007). Is the CVI an acceptable indicator of content validity? Appraisal and recommendations. *Research in Nursing & Health, 30*(4), 459-467. https://doi.org/10.1002/nur.20199

Porcaro, D., & Carrier, C. (2014). Ten guiding principles for designing online modules that involve international collaborations. *International Journal of Education and Development using ICT, 10*(2), 142-150.

Sheykhnezhad, F., & Seyedfatemi, N. (2019). Effect of group education on self-efficacy and craving tendencies in drug abusers in 5th Azar Drug Abuse Treatment Center of Gorgan. *Cogent Psychology, 6*(1). https://doi.org/10.1080/23311908.2019.1587818

Sidek, M. N., & Jamaludin, A. (2005). *Pembinaan modul : bagaimana membina modul latihan dan modul akademik*. Serdang: Penerbit Universiti Putra Malaysia.

Stephens, A. B., Livingston, J. N., Dacons, B. K., Craft, H. L., Cameron, A., Franklin, S. O., & Howlett, A. C. (2007). Drama-based education to motivate participation in substance abuse prevention. *Substance Abuse Treatment, Prevention, and Policy, 2*(1), 11. https://doi.org/10.1186/1747-597X-2-11

Stoops, W. W., Lofwall, M. R., Nuzzo, P. A., Craig, L. B., Siegel, A. J., & Walsh, S. L. (2012). Pharmacodynamic profile of tramadol in humans: influence of naltrexone pretreatment. *Psychopharmacology, 223*(4), 427-438. https://doi.org/10.1007/s00213-012-2739-4

Tupper, K. W. (2008). Drugs, discourses and education: a critical discourse analysis of a high school drug education text. *Discourse: Studies in the Cultural Politics of Education, 29*(2), 223-238. https://doi.org/10.1080/01596300801966864

Zacny, J. P. (2005). Profiling the subjective, psychomotor, and physiological effects of tramadol in recreational drug users. *Drug Alcohol Depend, 80*(2), 273-278.

Zwawua, O., Ismail, R., Azhar, M.Y., Noor, M.N., & Iorvaa, T. (2021). Development and psychometric validation of a scale to measure tramadol abuse. *African Journal of Drug & Alcohol Studies,* 20 (2), 119-131. https://dx.doi.org/10.4314/ajdas.v20i2.2

Zwawua, O., Ismail, R., Azhar, M.Y., Noor, N.M., Iorvaa, T. (2020). Development, validity and reliability of a tramadol use and misuse knowledge assessment questionnaire. *African Journal of Drug & Alcohol Studies,* 19(1), 11-24.

Zwawua, O., Ismail, R., Azhar, M.Y., Noor, N.M., Iorvaa, T. (2021). Development and validation of a tramadol misuse quitting self-efficacy scale: a Nigerian version. *Journal of Substance Use*. https://doi.org/10.1080/14659891.2021.1884296