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PSYCHOMETRICS OF THE READINESS TO CHANGE QUESTIONNAIRE (RCQ): THE LITHUANIAN VERSION

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Abstract. ***Background:*** It is well known that unhealthy lifestyle is one of the most important risk factors for morbidity and mortality due to cardiac diseases. People who suffered or are suffering from heart related problems usually undertake cardiac rehabilitation procedures which help them improve their health and make lifestyle changes. So it is important to have a valid, short, clear measure of readiness to change health behavior in the native (Lithuanian) language as change in lifestyle can be a problematic field in rehabilitation of cardiac patients in Lithuania. According to the results of national study, smoking, unhealthy diet, low physical activity, overweight and risky alcohol consumption persist as actual problem among Lithuanian adults nowadays. The aim of this analysis is to examine psychometric properties of the "Readiness to change questionnaire" (RCQ, Rollnick et al., 1992) among cardiac rehabilitation patients. ***Methods:*** The internal consistency, test-retest reliability, concurrent validity and factor structure of the RCQ was examined for 59 cardiac patients aged between 35 and 70 years (Mean = 55.68, SD = 8.62). The questionnaires for alcohol consumption, smoking, physical activity and diet were completed at the beginning and end of rehabilitation. ***Results:*** Cronbach's alpha coefficients of the RCQ showed poor to good internal consistency (0.51–0.87) and test-retest reliability Pearson's correlations ranged from 0.31 to 0.84. Concurrent validity is supported for the stages of alcohol consumption and diet. An exploratory factor analysis of the RCQ indicated the three-factor solution for readiness to change alcohol consumption and diet data best. Confirmatory factor analysis indicated that models demonstrate approximate data–model fit. ***Conclusions:*** The Lithuanian version of the RCQ is a reliable measure for group testing. Further investigations regarding validity and factor structure are required with a bigger sample size.

Keywords: Readiness to change questionnaire, cardiac rehabilitation, readiness to change health behavior, lifestyle, validity, reliability.

INTRODUCTION

The rising life expectancy within the older population is one of the reasons why the number of chronic illnesses is increasing (Linden et al., 2010). One of the most frequent illnesses is cardiovascular system diseases, it is in the leading position according to the number of deaths in the World (WHO, 2011, 2014) as well as in Lithuania (HI, 2015). It is well known that unhealthy lifestyle is one of the most important risk factors for the morbidity and mortality from cardiovascular diseases (American Heart Association, 2012; Klumbiene et al., 2002). Risky alcohol consumption, smoking, low physical activity and unhealthy diet are contributing to the unhealthy lifestyle and development of major cardiovascular risk factors (Rinkūnienė et al., 2009; Pietrabissa et al., 2015). According to the results of national study, the same behaviors persist as actual problem among Lithuanian adults nowadays (Grabauskas et al., 2015). Furthermore, there is evidence that healthy lifestyle leads to a better health and more successful cardiovascular disease prevention and rehabilitation (Linden et al., 2010).

Usually, inpatient rehabilitation is a period when cardiac patients are improving their health after acute period in the hospital. Moreover, they are getting ready to change their lifestyle because it is a favorable time to improve and maintain their health behavior (Schwarzer et al., 2011). Health psychologists are the specialists who are working with patients towards lifestyle changes during rehabilitation. It is clear that patient's motivation and self-efficacy are related with participation in psychological interventions (Bray et al., 2013), that is why it is necessary to measure the expression of it. The problem regarding psychological inventories in rehabilitation exists. Health psychologists do not have specific tools which could identify and follow the readiness to change various unhealthy behaviors during rehabilitation. Moreover, there is a need to have an inventory which would be easy to understand and quick to fill considering the fact that neither patients nor practitioners have any spare time for questionnaires.

By having a valid, short, clear measure of readiness to change health behavior in the native (Lithuanian) language, proper interventions could be selected during cardiac rehabilitation which could lead to health and lifestyle improvement. For best of our knowledge, there is only one previous study using Readiness to Change Questionnaire for alcohol in Lithuanian (Fleming et al., 2000).

Readiness to Change Questionnaire (RCQ, Rollnick et al., 1992) is a widely used measure of readiness to change alcohol consumption during rehabilitation of addiction treatment (Rollnick et al., 1992; Fleming et al., 2000; Blume et al., 2005; Heather & Honekopp, 2008; Heather et al., 2008; Miller & Rollnick, 2013). Originally it was created on the basis of Transtheoretical model (TTM; Prochaska & DiClemente, 1986; Prochaska et al., 1992) for evaluation of alcohol consumption changes. This model offers an integrative framework for understanding the process of behavior change whether that change involves the initiation, the modification, or the cessation of a particular behavior (Miller, Rollnick, 2002). The stages of change represent a key component of the TTM and describe a series of stages through which people pass as they change their behavior (Prochaska, DiClemente, & Norcross, 1992; Miller, Rollnick, 2002): (1) precontemplation stage – the patient is not currently considering change; (2) contemplation – the patient undertakes an evaluation of considerations for or against change; (3) preparation – planning and commitment are carried; (4) action – the patient makes the specific behavioral change; (5) maintenance – the patient works to maintain and sustain long-term change.

The RCQ was developed as part of a larger study where a measure of stage of change was needed (Heather & Rollnick, 2000). It had to facilitate the accurate recording of stage of change from before to after the intervention. Moreover, there was a requirement to create an instrument which was short and easy to administer (Heather & Rollnick, 2000). As a result, there was created a reliable inventory consisting of three factors (precontemplation, contemplation and action stages of change) which original data for English population are available (Rollnick et al., 1992; Heather & Honekopp, 2008). The questionnaire provided a short and convenient measure of readiness to change which could be used in conjunction with brief, opportunistic interventions with excessive drinkers (Rollnick et al., 1992).

RCQ is a popular instrument for scientific research as well as clinical work and it has been translated to Swedish (Forsberg et al., 2003; Forsberg et al., 2004), Dutch (Defuentes-Merillas et al., 2002), German and Austrian (Hannover et al., 2002; Degen et al., 2014), Thai (Kheawwan et al., 2016). Application of the stages of change and support for the varied aspects of the process of change represented by these stages have been

demonstrated in many behavioral changes from cessation of smoking (Degen et al., 2014), alcohol, and drugs to mammography screening (Carney & Kivlahan, 1995 in Miller & Rollnick, 2002), dietary modification (Pullen & Walker, 2002), gambling (Carney & Kivlahan, 1995 in Miller & Rollnick, 2002), exercise adoption (Kheawwan et al., 2016), reducing driving speed (Ouimet et al., 2010), pain change (Nielson et al., 2003), condom use and pregnancy prevention (Carney & Kivlahan, 1995 in Miller & Rollnick, 2002). Thus, although the targets of behavioral change differ, the structure of the change process appears to be the same (Miller & Rollnick, 2002) and researchers have found that the original three–factor solution describes data the best (Defuentes-Merillas et al., 2002; Forsberg et al., 2003; Forsberg et al., 2004; Heather & Honekopp, 2008; Ouimet et al., 2010). On the other hand, some studies have failed to replicate original factor solution proposed by Rollnick et al. (1992) (Bombardier & Heinemann, 2000; Rodriguez-Martos et al., 2000; Hannover et al., 2002; Nielson et al., 2003; Kheawwan et al., 2016).

However, translation of the original instrument and its adaptation to other health behavior does not mean that it can be applied to another cultural group, is valid or matches with the original instrument. Therefore, the aim of this study is to evaluate psychometric properties of the Lithuanian version of the RCQ, evaluating readiness to change risky alcohol consumption, smoking, low physical activity and unhealthy diet.

METHOD

Research procedure

Study was approved by the Lithuanian Kaunas Regional Bioemedical Research Ethics Committee (No. BE-2-39) and Lithuanian State Data Protection Inspectorate (No. 2R-2346). Cardiac patients were invited to participate in the study on the first three days of their inpatient rehabilitation. Participants were asked to fill RCQ and answer demographic questions. At the end of cardiac rehabilitation, patients had to complete RCQ for the second time. The questionnaires were anonymous, participants were familiar with the instructions, the goal of the study, confidentiality terms and provided a written consent.

Participants

The study sample consisted of 59 cardiac patients aged between 35 and 70 years with a mean age of 55.68 years (SD = 8.62) years. There were 47 (79.7%) men and 12 (20.3%) women in the sample, with the age means of 55.36 (SD = 8.19) and 56.92 (SD = 10.45) years, respectively. The majority were receiving treatment for myocardial infarction (50.9%) and angina pectoris (25.4%). Most were married (72.9%), had secondary (45.8%) or higher (62.5%) education, and were working (69.5%) or retired (20.3%). The duration of rehabilitation program varied between 12 and 35 days. This study took place at Abromiškės rehabilitation hospital, Lithuania, from November 2014 to April 2016. All patients admitted to cardiac unit for inpatient rehabilitation were invited to participate in the study if they met inclusion criteria. Inclusion criteria were patients' disease (I20-I25 according to ICD-10), arrival time (only newly arrived) and written consent to participate in the study. 8 patients did not complete follow-up measures because of the early leave.

Measures

Readiness to change questionnaire (RCQ) (Rollnick et al., 1992). RCQ is a twelve items self-report questionnaire for evaluating readiness to change alcohol consumption, smoking, physical activity and diet at the beginning and at the end of cardiac rehabilitation (items example: 1. I don't think I drink too much; 6. I have recently changed my drinking habits; 12. Drinking less alcohol would be pointless for me.). All items in a 5 point Likert scale ranging from (1) "strongly disagree" to (5) "strongly agree" evaluate (1) precontemplation, (2) contemplation and (3) action stages (scales) for each behavior. The stage which has the maximum item sum is the predominant stage of readiness to change particular behavior encoded as categorical variable. Originally, the RCQ was created on the basis of the Transtheoretical model (Prochaska & DiClemente, 1986; Prochaska et al., 1992) for evaluating alcohol consumption changes (Rollnick et al., 1992). On the basis of its Lithuanian version (Fleming et al., 2000), there were made separate 12-item questionnaires for smoking, physical activity and diet by the authors of the present article. Some items were slightly modified in order to suit the Lithuanian context.

Statistical analysis. The internal consistency, test-retest reliability, concurrent validity and exploratory factor analysis were conducted using the SPSS for Windows 20.0 software. The confirmatory factor analysis was conducted using the Mplus 7 program (Muthén & Muthén, 1998–2012).

RESULTS

Reliability

The *internal consistency* of the RCQ was established by calculating Cronbach's alpha coefficient for three of the 4-item scales representing the three stages of change (Precontemplation, Contemplation, and Action) for alcohol, smoking, physical activity and diet separately. The scales of the RCQ showed poor to good internal consistency (Cronbach's α = 0.51–0.87, Table 1). Confidence intervals show that all scales are appropriate at least for a group testing. The internal consistency of readiness to change alcohol consumption action stage was similar to the original sample (Rollnick et al., 1992). None of the smoking, physical activity and diet stages' internal consistency could be compared to the original sample because the current was made only to measure the readiness to change alcohol consumption.

Table 1. *Internal consistency of the RCQ subscales and test-retest reliability between the RCQ subscales according to different health behavior*

Readiness to change health behavior (stages)		*Cronbach's alpha*		*Pearson's correlation (p 2-tailed)*	
		Lithuanian sample (N=59)	*RCQ original sample (N=141)*	*Lithuanian sample (N=55)*	*RCQ original sample (N=26)*
Alcohol	Precontemplation	0.52 CI[0.09; 0.77]	0.73	0.31 (0.306)	0.82
	Contemplation	0.64 CI[0.31; 0.83]	0.80	0.55 (0.052)	0.86
	Action	0.87 CI[0.76; 0.94]	0.85	0.84 (0.000)**	0.78

Smoking	Precontemplation	0.61 CI[0.24; 0.82]	–	0.75 (0.001)**	–
	Contemplation	0.63 CI[0.27; 0.83]	–	0.82 (0.000)**	–
	Action	0.57 CI[0.16; 0.81]	–	0.41 (0.110)	–
Physical activity	Precontemplation	0.58 CI[0.32; 0.75]	–	0.60 (0.000)**	–
	Contemplation	0.51 CI[0.11; 0.68]	–	0.62 (0.000)**	–
	Action	0.65 CI[0.44; 0.80]	–	0.65 (0.000)**	–
Diet	Pre-contemplation	0.68 CI[0.53; 0.80]	–	0.52 (0.000)**	–
	Contemplation	0.69 CI[0.54; 0.80]	–	0.71 (0.000)**	–
	Action	0.77 CI[0.66; 0.85]	–	0.78 (0.000)**	–

Note: CI – confidence interval; RCQ – readiness to change questionnaire; N – study's sample.
** The difference is significant at the 0.001 level (2-tailed).

Test-retest reliability of the RCQ was established by calculating correlations between baseline and follow-up scales among 55 cardiac patients who completed T1 and T2 questionnaires. Pearson's correlations examining the association between the scores of each subscale at the two assessments were 0.31 – 0.84 (Table 1), most of them exceeded 0.5.

Concurrent Validity

The validity of the RCQ was examined analyzing relationships among scale scores. Pearson's correlation coefficients were calculated among three scale scores of each behavior to test the prediction, correlations of which between adjacent scales (i.e. between Precontemplation and Contemplation, and between Contemplation and Action) would be higher than the correlation between non-adjacent scales (i.e. between Precontemplation and Action). This prediction was confirmed for alcohol consumption and diet behavior but not for smoking and physical activity (Table 2). This suggests that there is an orderly movement from one alcohol and diet stage of change to the next as the model would predict, and that there is a need for further investigations for smoking and physical activity behavior with a bigger sample. The prediction for drinking behavior was confirmed by Rollnick et al. (1992) too.

Table 2. *Concurrent validity between the RCQ adjacent and non-adjacent scales according to different health behavior*

Readiness to change health behavior stages	*Pearson's correlation (p 2-tailed)*		
	Adjacent (between P & C)	*Adjacent (between C & A)*	*Non-adjacent (between P & A)*
Alcohol	-0.72 (0.000)	0.68 (0.000)	-0.57 (0.005)
Smoking	-0.57 (0.007)	**-0.05 (0.837)**	-0.38 (0.093)
Physical activity	-0.27 (0.092)	**0.17 (0.271)**	-0.21 (0.179)
Diet	-0.27 (0.038)	0.39 (0.002)	-0.14 (0.276)

Note: P – Precontemplation; C – Contemplation; A – Action stages.

Factor Structure

Exploratory Factor Analysis. After performing Principal Component Analysis with Varimax rotation for the RCQ for alcohol consumption items, 4 factors were extracted explaining 78.91% of total variance. Kaiser–Meyer–Olkin value was 0.718. Bartlett's test of sphericity reached statistical significance ($\chi^2 = 149.59$, $p = 0.000$). Scree plot suggested 3 factors.

Performing Principal Component Analysis with Varimax rotation for the RCQ alcohol, smoking, physical activity and diet items, fixed number of three factors was selected as this structure was reported for original RCQ (Rollnick et al., 1992). The extracted factors explained 70.3% of alcohol (original sample 68.6%; Rollnick et al., 1992), 65.3% of smoking, 51.7% of physical activity and 63.75% of diet total variance.

Three factors were extracted from 12 items about alcohol consumption: 1st factor explained 37.8% of variance, 2nd – 17.0%, 3rd – 15.5%. Kaiser–Meyer–Olkin value was 0.718, exceeding the recommended value of 0.6 (Cekanavičius & Murauskas, 2002). Bartlett's test of sphericity reached statistical significance ($p = 0.000$) meaning that variables are correlated and suitable for factor analysis. However, only six items (2, 3, 4, 6, 7, 11) out of twelve (Table 3) match the original data of the RCQ (Rollnick et al., 1992).

Table 3. *Item loadings for the first three components extracted from Varimax rotation with percentage variance accounted for each loadings following principal components analysis for alcohol behavioral items*

Item	Factor I		Factor II		Factor III	
	Lithuanian sample (37.8%)	*Original sample (A) (46.1%)*	*Lithuanian sample (17.0%)*	*Original sample (C) (12.6%)*	*Lithuanian sample (15.5%)*	*Original sample (P) (9.9%)*
1. „I don't think I drink too much" (P)	0.03	-0.20	0.02	**-0.51**	**-0.81**	0.35
2. „I am trying to drink less than I used to" (A)	**0.82**	**0.74**	-0.07	0.16	0.14	-0.22
3. „I enjoy my drinking, but sometimes I drink too much" (C)	-0.01	0.02	**-0.49**	**0.77**	**0.67**	-0.05
4. „Sometimes I think I should cut down on my drinking" (C)	**0.66**	0.35	**-0.56**	**0.72**	0.15	-0.27
5. „It's a waste of time thinking about my drinking" (P)	-0.03	-0.15	**0.84**	-0.08	-0.30	**0.88**
6. „I have just recently changed my drinking habits" (A)	**0.75**	**0.84**	-0.35	0.12	-0.06	-0.09
7. „Anyone can talk about wish to do something about drinking, but I am actually doing something about it" (A)	**0.85**	**0.86**	-0.33	0.14	0.00	-0.12

8.„I am at the stage where I should think about drinking less alcohol“ (C)	**0.82**	0.52	0.01	**0.64**	0.12	-0.23
9.„My drinking is a problem sometimes“ (C)	0.28	0.14	-0.08	**0.77**	**0.70**	-0.09
10.„There is no need for me to think about changing my drinking“ (P)	**-0.52**	-0.23	**0.56**	-0.52	-0.00	**0.63**
11.„I am actually changing my drinking habits right now“ (A)	**0.83**	**0.76**	0.07	0.34	0.22	-0.14
12.„Drinking less alcohol would be pointless for me“ (P)	**-0.65**	-0.15	**0.47**	-0.20	0.28	**0.84**

Note: P – Precontemplation (Factor III); C – Contemplation (Factor II); A – Action (Factor I) stages.

Three factors were extracted from 12 items about smoking behavior: 1st factor explained 26.9% of variance, 2nd – 25.0%, 3rd – 13.4%. Kaiser–Meyer–Olkin value was 0.458, not exceeding the recommended value of 0.6. Bartlett's test of sphericity reached statistical significance ($p = 0.000$) meaning that variables are correlated and suitable for factor analysis. The current data mean that Principal Component Analysis is not suitable for indicating readiness to change smoking behavior.

Three factors were extracted from 12 items about physical activity behavior: 1st factor explained 19.8% of variance, 2nd – 17.3%, 3rd – 14.5%. Kaiser–Meyer–Olkin value was 0.504, not exceeding the recommended value of 0.6. Bartlett's test of sphericity reached statistical significance ($p = 0.000$) meaning that variables are correlated and suitable for factor analysis. The current data mean that Principal Component Analysis is badly suitable for indicating readiness to change physical activity behavior.

Finally, three factors were extracted from 12 items about diet behavior: 1st factor explained 24.4% of variance, 2nd – 20.9%, 3rd – 18.5%. Kaiser–Meyer–Olkin value was 0.656, exceeding the recommended value of 0.6. Bartlett's test of sphericity reached statistical significance (p = 0.000), variables are correlated and suitable for factor analysis. The current data mean that Principal Component Analysis is suitable for diet (Table 4).

Table 4. *Item loadings for the first three components extracted from Varimax rotation with percentage variance accounted for each loadings following principal components analysis for diet behavior items*

Item	*Factor I*		*Factor II*		*Factor III*	
	Lithuanian sample (24.4%)	*Original sample (A)*	*Lithuanian sample (20.9%)*	*Original sample (C)*	*Lithuanian sample (18.5%)*	*Original sample (P)*
1. „I think my nutrition is suitable for health" (P)	0.15		**-0.76**		0.27	+
2. „I am trying to eat healthier than I used to" (A)	**0.74**	+	-0.04		-0.03	
3. „I don't like eating healthy food, but sometimes I eat unhealthy food too much" (C)	-0.05		**0.74**	**+**	0.10	
4. „Sometimes I think I should eat healthier" (C)	0.32		**0.64**	**+**	-0.07	
5. „It's a waste of time to think about my nutrition" (P)	0.12		-0.08		**0.84**	**+**
6. „I have just recently changed my nutritional habits" (A)	**0.74**	+	0.25		0.10	
7. „Anyone can talk about wish to do something about healthier nutrition, but I am actually doing something about it" (A)	**0.70**	**+**	-0.38		-0.29	
8. „I am at the stage where I should think about changing my nutritional habits" (C)	**0.63**		**0.53**	**+**	-0.03	
9. „My unhealthy nutrition is a problem sometimes" (C)	0.29		**0.64**	**+**	-0.02	

10. „There is no need for me to think about changing my unhealthy nutrition" (P)	-0.19		-0.00		**0.74**	+
11. „I am actually changing my nutritional habits right now" (A)	**0.82**	+	0.26		-0.18	
12. „Eating healthier would be pointless for me" (P)	-0.12		-0.06		**0.87**	+

Note: P – Precontemplation (Factor III); C – Contemplation (Factor II); A – Action (Factor I) stages. (+) – Factor loading which should match the original RCQ stage (Rollnick et al., 1992).

Confirmatory Factor Analysis. A confirmatory factor analysis of the RCQ was conducted in order to identify whether the data fit the original RCQ instrument model of Rollnick's et al. (1992). The statistics of the RCQ model was evaluated using the following indices (Cekanavičius & Murauskas, 2011): 1) χ2 test (*p* should be > 0.05) and NC (normed Chi-square = χ2 /df) – NC ≤ 2 represents a good fit; NC ≤ 3 represents an acceptable fit); 2) RMSEA (root mean square error of approximation) and its lower and upper limits of a 90% confidence interval – RMSEA ≤ 0.05 indicates a good fit of the model; RMSEA ≤ 0.08 is acceptable; 3) CFI (comparative fit index) – CFI ≥ 0.95 indicates a good fit; CFI ≥ 0.90 indicates an acceptable fit.

Table 5. *Summary of RCQ statistics for readiness to change alcohol consumption, smoking, physical activity and diet behaviors.*

Model	χ^2	*df*	*NC* (χ^2/*df*)	*p*	*RMSEA [90% CI]*	*CFI*
Readiness to change alcohol consumption	78.568	51	**1.54**	0.008	**0.050** [0.050-0.136]	**0.997**
Readiness to change smoking	64.913	51	**1.27**	**0.091**	0.274 [0.000-0.113]	**0.998**
Readiness to change physical activity	87.132	51	**1.71**	0.001	**0.013** [0.069-0.148]	**0.992**
Readiness to change diet	181.917	51	3.57	0.000	**0.000** [0.176-0.242]	0.737

Note: NC – Normed Chi-square; RMSEA – Root mean square error of approximation; CI – lower and upper limit of 90% confidence interval for the population value of RMSEA; CFI – Comparative fit index.

It was hypothesized that the 3 scales (Precontemplation, Contemplation, Action) would adequately represent complete original model of the readiness to change alcohol consumption and newly created questionnaires for smoking, physical activity and diet. The results show (Table 5) that only model for smoking behavior was found to be a good fit of the data ($p > 0.05$), but it's root mean square error of approximation does not indicate a good fit of the model (RMSEA > 0.08). Further, models for readiness to change alcohol consumption and physical activity demonstrated approximate data–model fit (NC < 2; RMSEA ≤ 0.05; CFI > 0.95). Finally, model for readiness to change diet was found to be a worst fit of the data ($p < 0.05$; NC > 2; CFI < 0.95). The original data of the RCQ for alcohol behavior (Heather & Honekopp, 2008) presented a good model fit with CFI = 0.966 and RMSEA = 0.045 and the *p* value not provided.

DISCUSSION

The present study examined the psychometric properties of the Readiness to Change Questionnaire for alcohol consumption, smoking, physical activity and diet behaviors among Lithuanian adults during cardiac rehabilitation. The results of the Lithuanian version of the RCQ indicate that Cronbach's alpha coefficients are acceptable for group testing. The internal consistency of readiness to change alcohol consumption action stage is similar comparing to the original RCQ data (Rollnick et al., 1992) and to those found in other studies of the RCQ validation for other cultures (Defuentes-Merillas et al., 2002; Hannover et al., 2002; Forsberg et al., 2003). Furthermore, the internal consistency of readiness to change alcohol consumption precontemplation and contemplation stages and of readiness to change smoking, physical activity and diet stages are lower comparing to other studies (Defuentes-Merillas et al., 2002; Hannover et al., 2002; Pullen & Walker, 2002; Forsberg et al., 2003; Degen et al., 2014; Kheawwan et al., 2016). Overall, low internal consistency could be determined by small number of items in each stage.

The instrument demonstrated a good test-retest reliability, statistically significant correlation coefficients between two measurements ranged from 0.52 to 0.84. However, test-retest reliability for readiness to change alcohol consumption precontemplation ($r = 0.31$) and

contemplation (r = 0.55) stages, and for readiness to change smoking action (r = 0.41) stage between the 1st and the 2nd testing were quite poor and did not correlate significantly (p > 0.05). Test-retest reliability for readiness to change alcohol consumption precontemplation and contemplation stages are lower but for action stage is higher comparing to the original instrument (Rollnick et al., 1992). As there is a quite good test-retest reliability for other scales, we assume that instability of the results for alcohol and smoking scales is possible because of the specific situation in the rehabilitation hospital regarding alcohol and smoking restrictions during treatment period. Thus, the lack of match between the results of the two RCQ measurements is not the result of problems with comprehension of the questions. Moreover, according to a small sample size and psychological intervention held between two measurements, we shouldn't expect very high correlation coefficients matching excellent test-retest reliability.

Results of higher correlations between adjacent scales (i.e. between Precontemplation and Contemplation, and between Contemplation and Action) compared to the correlation between non-adjacent scales (i.e. between Precontemplation and Action) supported concurrent validity of the Lithuanian RCQ for alcohol consumption and diet. These relationships strengthen confidence that the RCQ is measuring what it purports to measure – the readiness to change drinking and diet behaviors. The results of correlations between alcohol consumption scales are similar comparing to the original and other RCQ data (Rollnich et al., 1992; Defuentes-Merillas et al., 2002). However, concurrent validity of the Lithuanian RCQ for smoking and physical activity was not confirmed because of the low correlation between adjacent scales contemplation and action.

The results of the Dutch (Defuentes-Merillas et al., 2002), Swedish (Forsberg et al., 2003; Forsberg et al., 2004) and other (Heather & Honekopp, 2008; Ouimet et al., 2010) versions of the RCQ for alcohol consumption revealed that the three–factor solution models were best for their data. EFA of the 12 items indicated that three factors most meaningfully describe the data of our study; however, the CFA proved just approximate data–model fit. The explained variance of RCQ for alcohol consumption was similar to the original data of the RCQ (Rollnick et al., 1992), also replicated results of other studies (Defuentes-Merillas et al.,

2002; Forsberg et al., 2003; Forsberg et al., 2004; Heather & Honekopp, 2008; Ouimet et al., 2010). Six items of twelve, according to factor loadings, did not relate to factors which match the original sample (Rollnick et al., 1992). Moreover, according to factor loading values, 3rd item could be assigned for both Contemplation and Precontemplation factors; 4th item to Action and Contemplation; 10th and 12th items to Action and Precontemplation factors.

EFA of the 12 items about smoking indicated that Factor Analysis is not suitable for indicating readiness to change smoking behavior; interestingly, the CFA proved that the model is a good fit of the data. Furthermore, EFA indicated that Factor Analysis is badly suitable for indicating readiness to change physical activity behavior and the CFA proved just approximate data–model fit. Finally, EFA of the 12 items about diet indicated that Factor Analysis is suitable for indicating readiness to change behavior of unhealthy diet; however, the CFA proved the worst data–model fit out of four behaviors. Surprisingly, only the 1st item, according to factor loadings, did not relate to factor which match the original sample (Rollnick et al., 1992). Besides, according to factor loading values, 8th item could be assigned for both Action and Contemplation factors. Unfortunately, no previous studies analyzing EFA and CFA of RCQ were found. It is likely that inconsistent results signify incomplete findings because of a small sample size. This is the reason why further investigations regarding exploratory and confirmatory factor analysis are necessary with a bigger sample size.

CONCLUSIONS

The Lithuanian version of the RCQ for alcohol consumption, smoking, physical activity and diet is a reliable measure for group testing. However, test-retest reliability for RCQ, measuring precontemplation stage of alcohol consumption and action stage of smoking, was not supported.

The RCQ supports concurrent validity for measuring readiness to change alcohol consumption and diet behaviors but not for smoking and physical activity.

An exploratory factor analysis indicated the three-factor solution but it fits only alcohol consumption and diet data best. Confirmatory factor analysis indicated that all four models for alcohol consumption, smoking, physical activity and diet demonstrate approximate data–model fit.

Further investigations regarding validity and factor structure are required with bigger sample size.

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PASIRENGIMO POKYČIAMS KLAUSIMYNO PSICHOMETRINIAI RODIKLIAI: LIETUVIŠKOJI VERSIJA

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Santrauka. ***Problema.*** Žinoma, jog nesveikas gyvenimo būdas yra vienas iš pagrindinių veiksnių, didinančių sergamumą bei mirštamumą nuo širdies ligų. Žmonėms, kurie susidūrė arba vis dar susiduria su širdies ligų problemomis, dažniausiai atliekamos kardiologinės reabilitacijos procedūros, padedančios pagerinti jų sveikatą bei koreguoti gyvenimo būdo įpročius. Gyvenimo būdo pokyčiai Lietuvos reabilitacijos įstaigų kardiologiniams pacientams yra sudėtinga sritis, todėl labai svarbu turėti patikimą, trumpą, aiškų metodą lietuvių kalba, galintį nustatyti pasirengimą keisti su sveikata susijusį elgesį. Remiantis Lietuvoje atliktos nacionalinės studijos duomenimis, rūkymas, netinkama mityba, žemas fizinis aktyvumas, viršsvoris bei rizikingas alkoholio vartojimas Lietuvoje vis dar yra aktuali problema tarp suaugusių. Pagrindinis šios analizės ***tikslas*** – išnagrinėti kardiologinės reabilitacijos pacientams taikyto *Pasirengimo pokyčiams klausimyno* (Rollnick et al., 1992) psichometrines charakteristikas. ***Metodai.*** *Pasirengimo pokyčiams klausimyno* vidinis bei išorinis patikimumas, sutampantis validumas ir faktorių struktūra buvo analizuojami naudojant 59 kardiologinių pacientų duomenis, kurių amžius svyravo nuo 35 iki 70 metų (vidurkis = 55,68, SD = 8,62). Klausimynai apie alkoholio vartojimą, rūkymą, fizinį aktyvumą ir dietą buvo pildomi reabilitacijos pradžioje ir pabaigoje. ***Rezultatai.*** Kronbacho alfa koeficientai rodo vidinį patikimumą, patenkantį į ribas tarp prasto ir gero (0,51–0,87). Pirsono koreliacijos koeficientais apskaičiuotas išorinis patikimumas patenka į ribas nuo 0,31 iki 0,84. Sutampantis validumas buvo patvirtintas alkoholio vartojimo ir mitybos stadijoms. Taikant aiškinamąją faktorinę analizę nustatytas trijų faktorių modelis, kuris geriausiai pagrindžia pasirengimą keisti alkoholio vartojimą ir mitybą. Pagal patvirtinančios faktorinės analizės rezultatus modeliai duomenis atitinka tik apytiksliai. ***Išvados.*** Lietuviškoji *Pasirengimo pokyčiams klausimyno* versija, matuojanti pasirengimą keisti alkoholio vartojimo, rūkymo, fizinio aktyvumo ir mitybos įpročius, yra patikimas metodas, tačiau tik kalbant apie grupių matavimus. Siekiant tiksliau nustatyti klausimyno validumą bei faktorių struktūrą, reikia atlikti tolesnius tyrimus su didesne imtimi.

Pagrindiniai žodžiai: *Pasirengimo pokyčiams klausimynas*, kardiologinė reabilitacija, pasirengimas keisti su sveikata susijusį elgesį, gyvenimo būdas, validumas, patikimumas.

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