The Impact Of Psychological Characteristics On The Effectiveness Of Motivational Interviewing Based Psychological Counseling

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Abstract

It is well known that in order to control the morbidity and mortality of cardiovascular disease patients, their lifestyle should be taken into account (American Heart Association, 2012; Klumbiene et al., 2002). Studies of various disease patients' manners (Knight et al., 2006; Thompson et al., 2011) confirm that motivational interviewing (Miller & Rollnick, 2013) is an effective method for changing unhealthy behavior. Nevertheless, our practical experience of motivational interviewing based psychological counseling with rehabilitation hospitals' cardiac patients' (Sinkariova et al., 2015) revealed noteworthy observations about some participants lack of motivation to change unhealthy behavior. This observation encouraged us to start a study with the aim to find out if cardiac rehabilitation participants' personality traits and emotional state are related to the effectiveness of motivational interviewing based psychological counseling. The study used a quasi-experiment where cardiac rehabilitation patients were assigned to control (regular rehabilitation, n=55) or experimental (rehabilitation plus motivational interviewing based psychological counseling intervention, n=64) groups. A total of 119 participants (male=83, female=36, M age=60.47, SD=8.762) attended a survey, which included NEO-FFI, HADs, and "Readiness to change questionnaire" at the beginning and end of cardiac rehabilitation. Nonparametric data analysis showed that patients' personality traits are not related to the effectiveness of motivational interviewing based counseling, whereas depression is positively related to the effectiveness of intervention to change alcohol consumption. Conclusions/Implications:

Depression as an expression of emotional state is an important feature for the effectiveness of motivational interviewing based counseling to change cardiac patients' alcohol consumption. Further understanding of relationships between psychological characteristics and the effectiveness of intervention could help to improve cardiac diseases prevention, treatment, and rehabilitation.

Keywords: Cardiac rehabilitation, personality traits, emotional state, health behavior, motivational interviewing.

Introduction

Nowadays, chronic illnesses such as cardiovascular disease, diabetes, or cancer are the most prevalent all over the world (Linden et al., 2010). Furthermore, cardiovascular disease is the leading cause of death in the world (WHO, 2011, 2014). This disease is killing about 17 million people every year (WHO, 2009). Mentioned statistics testify that cardiovascular disease is a huge problem nowadays. Thus, more focus and attention should be given for primary, secondary, and even tertiary prevention of this disease. It is well known that in order to control the morbidity and mortality of cardiovascular disease patients, their lifestyle should be taken into account (American Heart Association, 2012; Klumbiene et al., 2002). Unhealthy lifestyle includes changeable risk factors such as smoking, high blood pressure, high cholesterol, lack of physical activity, unhealthy diet, harmful use of alcohol, etc. (Pietrabissa et al., 2015). Still, physical inactivity, smoking, alcohol consumption, and unhealthy diet are contributing to the development of major cardiovascular risk factors (Chingatichifwe et al., 2014; Pietrabissa et al., 2015). Consequently, healthier lifestyle leads to a more successful cardiovascular disease prevention, treatment, and rehabilitation (Linden et al., 2010).

For people with cardiovascular disease, behavioral change can be an effective way to prevent further morbidity and mortality. In addition, medical rehabilitation is a good chance in helping them to learn how to improve and maintain their health behaviors (Schwarzer et al., 2011). Thus, inpatient cardiac rehabilitation could be the best way not only to strengthen patients' health, but to change their unhealthy lifestyle as well. There are no doubts that patients' motivation to change unhealthy lifestyle is one of the main factors for successful rehabilitation (Pietrabissa et al., 2013). Prior work (e.g., Jusinskaite et al., 2014; Knight et al., 2006; Lundahl et al., 2010; Lundahl et al., 2013; Martins & McNeil, 2009; Morton et al., 2015; Petroliene & Sinkariova, 2013; Sinkariova et al., 2015; Thompson et al., 2011) suggests that motivational interviewing based psychological counseling (Miller & Rollnick, 2013) is an effective way to change

unhealthy behavior. This is because it helps to increase patients' motivation, self-efficacy, and readiness to change. Some studies emphasized that greater attention should be given to the underlying processes that influence behavioral outcomes (Martins & McNeil, 2009; Gaube & Kern, 2015; Morton et al., 2015). However, what patients would benefit most from motivational interviewing and how self-efficacy differs according to personal characteristics is unclear (Thompson et al., 2011). Sometimes, readiness to change stays in the same low stage after cardiac rehabilitation as before it and there are no explanations to it (Jusinskaite et al., 2014; Petroliene & Sinkariova, 2013; Sinkariova et al., 2015). Finally, there is a lack of studies which analyze factors that is influencing readiness to change health behavior. As a result, the question arises: what factors could influence it during cardiac rehabilitation?

One of the reasons for inefficient rehabilitation of cardiovascular disease patients is ignorance of healthier lifestyle recommendations (Linden et al., 2010). This study highlighted the contribution of patient motivation to unhealthy behavior during rehabilitation period. Furthermore, involvement in treatment, rehabilitation and health improvement (Falvo, 2014), like intentions on health behavior (Chatzisarantis & Hagger, 2008) and the quality of the rehabilitation specialist-patient relationship (Farin & Meder, 2010), are found to be influenced by personality characteristics. Moreover, there is evidence about particular personality traits' relationship with cardiovascular disease. For instance, one of the most important personality traits hostility is highly related to difficulties in the change of unhealthy habits (Costa & McCrae, 2012; Koroboki et al., 2011). In addition, personality trait resilience decreases the size of the myocardial infarction in patients with acute coronary syndrome (Arrebola-Moreno et al., 2014). Type D personality is related to some cardiovascular risk factors, cardiac symptom severity (Kupper et al., 2013), increased number of complications, and mortality in patients with cardiovascular disease (Grande et al., 2012; Sumin, 2010). However, there is a lack of studies which analyzes a complex of five big personality traits influence on health behavior change for cardiac patients. Current trends and evidence allows us to hypothesize that the five big personality traits are related to the effectiveness of motivational interviewing. This interview is based on psychological counseling during cardiac rehabilitation.

Furthermore, the cognition that you have cardiovascular disease usually brings patients into low mood or anxiety. Approximately, 15-23% heart patients are in deep depression, while only 4.6% of the people have depression in all population (Simmonds et al., 2013). Moreover, there are findings that depression and anxiety symptoms could be found in 40-60% heart patients. However, these symptoms usually stay undiagnosed by

primary health care specialists or cardiologists (Kamarck et al., 2002; Musselman et al., 1998; Paca et al., 2013). Finally, depression and anxiety are the most common emotions after myocardial infarction and ischemic cardio pathology (Paca et al., 2013). Thus, patients who have cardiovascular disease and feel depressive or anxious are not able to appropriately deal with actual problems, stay up to treatment plan, remain fit, physically active, or even change unhealthy habits (Musselman et al., 1998; Schwartzman & Glaus, 2000; Vaiciuniene, Brozaitiene & Bunevicius, 2007). Consequently, we hypothesized that higher anxiety and depression states should be related to ineffective motivational interviewing based psychological counseling during cardiac rehabilitation.

It is known that motivational interviewing based psychological counseling is an effective intervention for increasing patients' readiness to change health behavior. Despite the fact that this effectiveness could be influenced by various factors, we will analyze only the personality traits and emotional state. Consequently, the main objective of this study is to find out if cardiac rehabilitation participants' personality traits and emotional state are related to the effectiveness of motivational interviewing based psychological counseling.
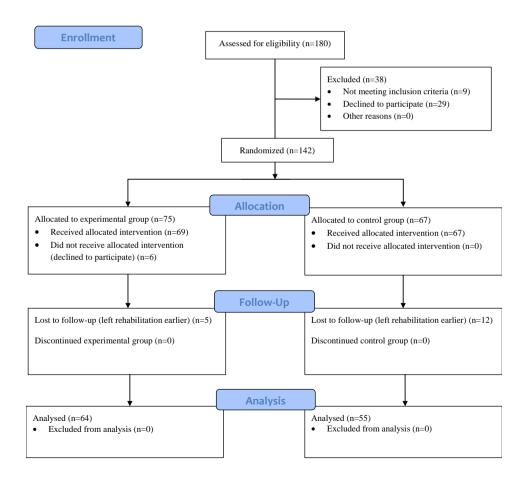
Method
Research Procedure

This study was approved by the Lithuanian Kaunas region bioethics committee (No. BE-2-39) and the Lithuanian data protection inspectorate (No. 2R-2346). A quasi-experiment design was employed with psychological variables being assessed at two points in time (see Figure 1). Firstly, trial participants from hospitals' database were randomly separated into two groups: experimental and control group. All participants were invited to participate in the study on the first three days of their cardiac rehabilitation period. After agreeing to participate, they provided written consent and filled demographics, "Readiness to Change Questionnaire", and the HADs and NEO-FFI questionnaires. Experimental group had a regular cardiac rehabilitation program plus motivational interviewing based psychological counseling. Hence, this is aimed at changing their unhealthy behavior. The control group had regular cardiac rehabilitation. At the end of cardiac rehabilitation, all participants completed "Readiness to Change Questionnaire" for the second time.

Participants

180 cardiovascular disease patients were invited to participate in the study. They attended hospital-based inpatient cardiac rehabilitation program in Abromiškės Rehabilitation Hospital, Lithuania. 142 patients agreed to

participate in this study. They completed all baseline measures, and only 119 participants [male = 83 (69.7%), female = 36 (30.3%)] completed the study till the end (baseline measures and measures before leaving the hospital). However, the participants ages varies from 39 to 79 (M age = 60.47, SD = 8.762). Majority of the participants had a myocardial infarction (57.5%), coronary artery bypass graft surgery (22.5%), and an angina pectoris (12.5%). Most were married (74.8%), had secondary (44.5%) or higher (54.6%) education, and were working (44.5%) or retired (34.5%). The duration of the rehabilitation period varied between 10 to 25 days. The judgment for the eligibility of the patients was done by the psychologists. Therefore, the main criteria for research suitability include the patients' disease (I20-I25 according to ICD-10), arrival time (only newly arrived), and their agreeableness to participate in the study.

Figure 1. Flowchart of research participants. Note: MI = motivational interviewing

Intervention

Patients in the control group proceeded regular cardiac rehabilitation program. On the other hand, patients in the experimental group had rehabilitation program plus motivational interviewing based psychological consultations – "a person-centered counseling style for addressing the common problem of ambivalence about change" (Miller & Rollnick, 2013). Sessions were conducted by trained health psychologists only with those patients who were thinking about health behavior changes. Health psychologists received an introductory two day motivational interviewing training including reading of motivational interviewing books (Arkowitz et al., 2008; Miller & Rollnick, 2013; Rollnick et al., 2008) and articles, watching video-taped material, and meeting in supervision groups. The main target of motivational interviewing based sessions was to elicit and reinforce the patient's in-session change talk in order to decrease sustain talk, minimize resistance, and go through ambivalence to change (Michie et al., 2011; Miller & Rose, 2009). Hence, the process of the sessions was carried on according to four overlapping motivational interviewing processes (Miller & Rollnick, 2013):

(1)   Engaging – establishing a helpful connection and working relationship.

(2)   Focusing – counselor develops and maintains a specific direction in the conversation about change.

(3)   Evoking – eliciting the patient's own motivation for change. It is the essence of motivational interviewing.

(4)   Planning – encompasses both the development of commitment to change and the formulating of a concrete plan of action.

For each session, five key communication skills were used: open questions, affirming, reflecting, summarizing, and providing information and advice with permission (Miller & Rollnick, 2013). Intervention was applied only on one harmful health behavior chosen by the patient at the beginning of the motivational interviewing based psychological sessions. It was finished when the patient started to plan his actions for the change. The length of one session was 45 minutes. The maximum number of consultations for one patient was 4, while the minimum number was 1. There were 9 (14.3%) patients who had one session, 29 (46.0%) had two, 22 (34.9%) had three, and 3 (4.8%) patients had four motivational interviewing based psychological sessions.

Measures
Demographical Data
Demographical data such as gender, age, education, family status, job status, and the duration of rehabilitation were asked at the beginning of cardiac rehabilitation.

Personality Traits
Personality was assessed using the NEO Five Factor Inventory questionnaire (NEO-FFI) at the beginning of cardiac rehabilitation. However, this is the short version of the Revised NEO Personality Inventory questionnaire (NEO PI-R) (Costa & McCrae, 1992). This instrument is a 60-item inventory which measures the Five Big personality traits. Hence, these traits include neuroticism, extraversion, openness, agreeableness, and conscientiousness. There are twelve items for each scale. All items in the NEO-FFI are in a 5 point Likert scale ranging from (0) "strongly disagree" to (4) "strongly agree". Furthermore, NEO-FFI was translated and standardized into the Lithuanian NEO-FFI by editorial board from Vilnius University in 2012 (Costa & McCrae, 2012). Cronbach's alphas ranged as follows: neuroticism 0.72, extraversion 0.71, openness 0.59, agreeableness 0.69, and conscientiousness 0.76.

Emotional State
Hospital Anxiety and Depression Scale (HADs) (Zigmond & Snaith, 1983) was used to assess patient's emotional state at the beginning of cardiac rehabilitation. The scale is commonly used to determine the levels of anxiety and depression that a patient is experiencing. It is a fourteen item scale with responses being scored on a scale of 0-3 where 3 is indicating highest symptom frequencies. Seven items evaluate anxiety symptoms and seven depression symptoms. In 1991, HAD was translated and standardized into Lithuanian (Bunevicius & Zileniene, 1991). Cronbach's alpha for anxiety is 0.70 and it is 0.74 for depression.

Readiness to Change Health Behavior
At the beginning and end of the cardiac rehabilitation lasting an average of 17 days, the patients were asked to fill out a questionnaire. This questionnaire includes The Transtheoretical model's (Prochaska et al., 1992) "Readiness to Change Questionnaire" (Rollnick et al., 1992) for alcohol, smoking, physical activity, and diet behavior. Subsequently, the results of the questioners were used to evaluate the readiness to change health behavior at the beginning and at the end of cardiac rehabilitation. In the model, change is viewed as a progression from an initial precontemplation stage to contemplation, preparation, taking of actions. This occurs especially when

the person is not currently considering any change. However, if it is successful, action leads to the maintenance stage by which the person works to maintain and sustain long-term change (Miller & Rollnick (2002) quotes DiClemente & Prochaska (1998); Prochaska et al. (1992)). Originally, "Readiness to Change Questionnaire" was created for evaluating changes in alcohol consumption. Therefore, it was translated and standardized in Lithuanian in 2000 (Fleming et al., 2000). Psychologists of the study made three similar versions of this questionnaire for smoking, exercise, and diet behavior assessment. Thus, there are twelve items for each behavior which evaluate (1) precontemplation, (2) contemplation, and (3) action stages. There are four items for each scale. All items in the "Readiness to Change Questionnaire" are in a 5 point Likert scale ranging from (1) "strongly disagree" to (5) "strongly agree". The stage which has the maximum item sum is the predominant stage of the readiness to change particular behavior. This behavior is encoded as categorical variable. In the study measurements' difference of the readiness to change, health behavior between follow-up and baseline was used (furthermore, it will be known as "the effectiveness of intervention"). It was computed as follows: follow-up readiness to change a particular health behavior predominant stage minus baseline. Consequently, alcohol consumption and smoking were the least actual behaviors of the patients (see Table 1).

Table 1. Health related behavior and readiness to change it at the beginning of cardiac rehabilitation

Readiness to change health behavior (stage)	Alcohol consumption N (%)	Smoking N (%)	Physical activity N (%)	Diet N (%)
Precontemplation	25 (21.0%)	3 (2.5%)	21 (17.6%)	17 (14.3%)
Contemplation	5 (4.2%)	7 (5.9%)	46 (38.7%)	50 (42.0%)
Action	19 (16.0%)	17 (14.3%)	50 (42.0%)	51 (42.9%)
Not actual (missing)	70 (58.8%)	92 (77.3%)	2 (1.7%)	1 (0.8%)
Total	119 (100.0%)	119 (100.0%)	119 (100.0%)	119 (100.0%)

Internal consistency Cronbach's alpha of the "Readiness to Change Questionnaire" scales are as follows: alcohol consumption – precontemplation 0.56, contemplation 0.62, action 0.74; smoking – precontemplation 0.67, contemplation 0.77, action 0.84; physical activity – precontemplation 0.51, contemplation 0.55, action 0.51; diet – precontemplation 0.60, contemplation 0.66, action 0.71.

Statistical Analysis

Descriptive statistics, independent T-test, nonparametric independent Kruskal-Wallis and Mann-Whitney test, and the nonparametric Spearman's rho correlations were conducted in SPSS version 20. To address personality traits and emotional state differences at baseline and the effectiveness of

intervention between the experimental and control groups, an independent T-test was conducted. Considering the fact that readiness to change health behavior is a categorical variable, nonparametric independent Kruskal-Wallis and Mann-Whitney tests were conducted. This was done based on its differences at baseline and the effectiveness of intervention between the experimental and control groups.

Logistic and ordinal regressions were performed to determine the effects of personality traits, emotional state, and intervention condition on the likelihood that participants have positive difference of readiness to change health behavior between follow-up and baseline. However, none of the regression models were statistically significant ($p > 0.05$). Consequently, to address cardiac rehabilitation, participants' personality traits and emotional state which indicate the effectiveness of motivational interviewing based psychological counseling, nonparametric Spearman's rho correlation, and independent Mann-Whitney test were conducted.

Results
Differences between Groups and Descriptive Statistics

Two groups of data were analyzed: experimental ($n = 64$, 53.8%) and control ($n = 55$, 46.2%) group. T-tests revealed no differences between the experimental and the control groups on personality traits and emotional state ($p > 0.05$) at baseline (see Table 2).

Table 2. T-tests for personality traits and emotional state differences between experimental and control groups at baseline

Personality traits and emotional state	Groups	N	Min-Max	*M*	SD	T	*p*
Neuroticism	Experimental	49	36.60-77.74	51.42	8.66	-0.338	0.737
	Control	33	39.73-67.03	52.04	7.31		
Extraversion	Experimental	48	27.98-63.66	46.10	8.44	-0.708	0.481
	Control	32	34.06-65.22	47.43	7.92		
Openness	Experimental	50	28.67-70.94	47.85	10.37	1.030	0.256
	Control	31	33.53-58.42	45.71	6.46		
Agreeableness	Experimental	50	31.49-72.54	50.87	8.90	-0.443	0.659
	Control	32	23.37-70.59	51.78	9.48		
Conscientiousness	Experimental	49	27.58-64.14	49.20	7.86	0.960	0.340
	Control	29	14.78-65.97	47.13	11.19		
Anxiety	Experimental	23	0-10	4.74	2.88	-1.618	0.113
	Control	23	1-16	6.30	3.64		
Depression	Experimental	23	0-13	3.91	3.67	-1.096	0.279
	Control	23	0-13	5.13	3.87		

Personality Traits: neuroticism, extraversion, openness, agreeableness, conscientiousness; Emotional state: anxiety, depression.

Therefore, nonparametric independent Mann-Whitney tests revealed no baseline differences between the experimental and control groups on the stages of the readiness to change health behavior ($p > 0.05$) (see Table 3).

Table 3. Mann-Whitney tests for readiness to change health behavior differences between experimental and control groups at baseline

Readiness to change health behavior	Groups	N	Min-Max	Mean Rank	U	p
Alcohol stage	Experimental	30	1-3	24.50	270.00	0.732
	Control	19	1-3	25.79		
Smoking stage	Experimental	15	1-3	13.20	78.00	0.494
	Control	12	2-3	15.00		
Physical activity stage	Experimental	63	1-3	60.90	1581.00	0.478
	Control	54	1-3	56.78		
Diet stage	Experimental	63	1-3	58.29	1656.50	0.655
	Control	55	1-3	60.88		

The current statistics indicates that patients in the experimental and control groups did not differ according to their psychological characteristics and readiness to change health behavior before motivational interviewing based psychological counseling.

Therefore, nonparametric independent Mann-Whitney tests revealed the differences of the effectiveness of intervention between the experimental and control groups on readiness to change alcohol consumption ($p < 0.05$) (see Table 4).

Table 4. Mann-Whitney tests for the effectiveness of intervention differences between experimental and control groups

The effectiveness of intervention	Groups	N	Min-Max	Mean Rank	U	p
Alcohol stage (T2-T1)	Experimental	24	0-1	22.44	121.50	0.039*
	Control	15	0-1	16.10		
Smoking stage (T2-T1)	Experimental	15	0-1	13.83	62.50	0.317
	Control	10	0-1	11.75		
Physical activity stage (T2-T1)	Experimental	61	0-1	60.34	1260.50	0.051
	Control	50	0-1	50.71		
Diet stage (T2-T1)	Experimental	61	0-1	60.61	1304.50	0.066
	Control	51	0-1	51.58		

*. The difference is significant at the 0.05 level (2-tailed).

The increment of readiness to change alcohol consumption was higher in the experimental group after rehabilitation compared with the control group. Moreover, there are tendencies of the effectiveness of intervention between the experimental and control groups on physical activity ($p = 0.051$) and diet ($p = 0.066$). This means that the increment of readiness to change physical activity and diet tends to be higher in the experimental group after rehabilitation compared with the control group. Consequently, the analysis of the intervention effectiveness will be implemented for both the experimental and control groups separately.

The Relationships between Psychological Characteristics and the Effectiveness of Motivational Interviewing Based Psychological Counseling

Nonparametric Spearman's rho correlations were calculated to see if there is any relationships between personality traits and the effectiveness of motivational interviewing based psychological counseling, and between emotional state and the effectiveness of intervention (see Table 5).

Table 5. Spearman's rho correlations (*p*) among cardiac rehabilitation patients' personality traits, emotional state, and the effectiveness of intervention in the experimental and control groups separately

	The effectiveness of intervention	Neuroticism	Extraversion	Openness	Agreeableness	Conscientiousness	HADS anxiety scale	HADS depression scale
Experimental group	Alcohol con. (T2-T1)	0.08 (0.745)	-0.40 (0.086)	0.01 (0.957)	0.18 (0.429)	0.19 (0.422)	0.37 (0.287)	0.73* (0.017)
	Smoking (T2-T1)	-0.18 (0.628)	0.56 (0.076)	-0.24 (0.483)	0.00 (1.000)	0.20 (0.548)	0.00 (1.000)	0.82 (0.184)
	Physical act. (T2-T1)	-0.12 (0.441)	0.14 (0.356)	0.14 (0.334)	0.10 (0.520)	-0.06 (0.694)	0.12 (0.624)	-0.15 (0.518)
	Diet (T2-T1)	0.26 (0.076)	0.09 (0.565)	-0.19 (0.207)	-0.10 (0.524)	-0.14 (0.356)	0.16 (0.510)	-0.08 (0.751)
Control group	Alcohol con. (T2-T1)	0.55 (0.125)	0.41 (0.310)	-0.42 (0.261)	-0.41 (0.272)	0.09 (0.842)	-	-
	Smoking (T2-T1)	-0.58 (0.312)	0.78 (0.225)	0.00 (1.00)	0.45 (0.450)	-0.82 (0.184)	-0.50 (0.210)	-0.28 (0.500)
	Physical act. (T2-T1)	-0.06 (0.766)	-0.07 (0.736)	0.20 (0.321)	0.15 (0.447)	0.06 (0.760)	0.04 (0.888)	-0.07 (0.781)
	Diet (T2-T1)	-0.13 (0.484)	0.10 (0.622)	-0.21 (0.286)	0.04 (0.849)	-0.24 (0.246)	-0.29 (0.224)	-0.27 (0.273)

*. Correlation is significant at the 0.05 level (2-tailed).

There is only one statistically significant positive correlation between the effectiveness of intervention to change alcohol consumption and depression in the experimental group (p = 0.017). However, there were no statistically significant correlations in the control group (p > 0.05). This

indicates that readiness to change patients' alcohol consumption increased more for those who were more depressed at the beginning. Also, they attended psychological intervention compared to those who were less depressed and did not attend intervention.

Nonparametric independent sample tests were implemented to analyze personality traits and emotional state differences by the effectiveness of motivational interviewing based psychological counseling. Each behavior (alcohol consumption, smoking, physical activity, and diet) was analyzed separately. The presumption was made that different expression of personality traits and emotional state should be related to different effectiveness of the intervention. Nonparametric independent Mann-Whitney test showed statistically significant differences of HADS depression calculated by the effectiveness of intervention to change alcohol consumption (p = 0.028) and the tendency of NEO-FFI neuroticism calculated by the effectiveness of intervention to change diet (p = 0.055) in the experimental group (see Table 6). This indicates that readiness to change patients' alcohol consumption at the end of the cardiac rehabilitation increased more for those who were more depressed at the beginning and attended intervention compared to the less depressed patients. Moreover, readiness to change patients' diet at the end of cardiac rehabilitation tends to increase more for those who were more neurotic at the beginning. In addition, they attended intervention compared to less neurotic patients. However, there were no statistically significant differences found in NEO-FFI and HADS. This is calculated by the effectiveness of intervention in the control group (p > 0.05).

Table 6. Mann-Whitney Test for neuroticism and depression scales by the effectiveness of intervention in experimental group

Personality trait and emotional state		The effectiveness of intervention	N	Mean Rank	U	p
Experimental group	NEO-FFI neuroticism	Diet changes:				
		Ineffective	28	20.46	167.00	0.055
		Effective	18	28.22		
	HADS depression	Alcohol changes:				
		Ineffective	7	4.14	1.00	0.028*
		Effective	3	8.67		

The table represents only statistically significant differences and trends.
*. The difference is significant at the 0.05 level (2-tailed).

Discussion

The aim of this study is to find out if cardiac rehabilitation participants' personality traits and emotional state are related to the effectiveness of motivational interviewing based psychological counseling. For this purpose, 119 cardiac rehabilitation patients were randomized into a

regular rehabilitation or rehabilitation plus motivational interviewing based psychological counseling program.

The Importance of Personality Traits on the Effectiveness of Motivational Interviewing Based Psychological Counseling in Cardiac Rehabilitation

Every of the participant filled the NEO-FFI questionnaire. Thus, there are five main personality traits which include: neuroticism, extraversion, openness, agreeableness, and conscientiousness. This was done only once, and it was at the beginning of the cardiac rehabilitation. Readiness to change alcohol consumption, smoking, exercise, and diet is shown as one of the precontemplation, contemplation, or action stages for each behavior separately. Whereas the effectiveness of motivational interviewing based psychological counseling was computed by follow-up readiness to change particular health behavior predominant stage minus baseline's stage. Basically, cardiovascular disease patients have unhealthy behavior such as alcohol consumption, smoking, physical inactivity, or unhealthy diet (Rinkuniene et al., 2009). In addition, their personality traits are related to difficulties in changing this unhealthy behavior (Costa & McCrae, 2012; Kupper et al., 2013). This was the reason we presumed that the five big personality traits should be related to the effectiveness of motivational interviewing based psychological counseling during cardiac rehabilitation.

According to earlier studies, personality traits are related to difficulties in changing unhealthy habits (Costa & McCrae, 2012) and cardiovascular risk factors (Kupper et al., 2013). However, the study's results revealed no statistically significant correlations between personality traits and the effectiveness of motivational interviewing based psychological counseling. Moreover, personality traits had no differences according to the effectiveness of intervention during cardiac rehabilitation. There is only one trend. Hence, this trend indicates that the effectiveness of intervention to change patients' diet tend to increase more for those who were more neurotic at the beginning. It also increased more for those who attended intervention compared to less neurotic patients. This trend, stating that higher neuroticism could be related with the effectiveness of intervention to change diet during rehabilitation, is inconsistent with the study of Costa & McCrae (2012). He opines that personality trait hostility, which belongs to neuroticism field, is highly related to difficulties in changing unhealthy habits.

When taken as a whole, these results highlight that personality traits are not important for the effectiveness of motivational interviewing based psychological counseling seeking in changing the unhealthy behavior of cardiac patients. As a result, our presumption was wrong. It opposes the study of Falvo (2014), stating that personality traits influence involvement in

treatment or rehabilitation. Costa & McCrae (2012) stated that it is related to difficulties in changing unhealthy habits. Moreover, despite the fact that earlier studies found some interactions among conscientiousness, extroversion, and physical activity (Chatzisarantis & Hagger, 2008), our study found no statistically significant results with these personality traits and the effectiveness of intervention during cardiac rehabilitation.

The Importance of Emotional State on the Effectiveness of Motivational Interviewing Based Psychological Counseling in Cardiac Rehabilitation
Every cardiac rehabilitation patient that participated in the study got to fill the HADs at the beginning of cardiac rehabilitation. The scale was used to assess patients' emotional state. This, however, refers to the levels of anxiety and depression that a patient is experiencing during the last week. Due to the fact that depression and anxiety symptoms could be found in 40-60% cardiac patients (Kamarck et al., 2002; Musselman et al., 1998; Paca et al., 2013), and knowing that patients who have cardiovascular disease and feel depressive or anxious are not able to appropriately adhere with the treatment plan or change unhealthy habits (Musselman et al., 1998; Schwartzman & Glaus, 2000; Vaiciuniene et al., 2007), it was presumed that higher anxiety and depression should be related to ineffective motivational interviewing based psychological counseling during cardiac rehabilitation.

Therefore, the results revealed one statistically significant positive correlation between depression and the effectiveness of motivational interviewing based psychological counseling to change alcohol consumption. Moreover, nonparametric independent sample analysis confirmed it. These results indicate the same conclusion – the effectiveness of intervention to change alcohol consumption increased more for those, who were more depressed at the beginning and attended intervention during rehabilitation. Furthermore, these findings are inconsistent with Musselman et al. (1998), Schwartzman & Glaus (2000), and Vaiciuniene et al. (2007) statement. They stated that patient who have cardiac rehabilitation and feel depressive or anxious, are not able to appropriately remain with the treatment plan. Also, these patients are unable to change unhealthy habits. The reason for this could be that patients who are depressed because of their illness tends to think about their diet changes for better health. Also, they aimed at mobilizing their strengths in doing this during cardiac rehabilitation. The assumption could be done such that motivational interviewing based psychological counseling helps in dealing with depression. Consequently, it helps to increase readiness to change patients' alcohol consumption. Bray et al. (2013) highlights that patient's motivation and self-efficacy is related with the participation in cardiac rehabilitation. Possibly, if psychologist helps

to deal with depression during rehabilitation, patient feels more ready to change his alcohol consumption habits.

The implication of the latter findings is that the relation between patients' emotional state and the effectiveness of motivational interviewing based psychological counseling exists. Therefore, this means that our presumption was partially right. Depression, as an expression of patient's emotional state, is related to the effectiveness of intervention for changing alcohol consumption.

In concluding this discussion, the results of this study show that personality traits are not important features for the effectiveness of motivational interviewing based psychological counseling during cardiac rehabilitation. Meanwhile, emotional state (depression) is important for the effectiveness of intervention to change alcohol consumption. On one hand, this is consistent with the opinion of Pietrabissa et al. (2015). Hence, their opinion was that psychosocial attributes, such as depression or anxiety, may influence health related behaviors and constitute barriers to adherence to treatment. On the other hand, it is inconsistent because there are no relations with personality traits. Hopefully, further interventions could reveal more statistically significant correlations, differences, and even prognosis of personality traits and emotional state with the effectiveness of motivational interviewing based psychological counseling in such population. Besides, Schwarzer et al. (2011) stated that such comorbidities, such as depression and anxiety, makes it more difficult to improve adherence to an intervention program. Thus, we had no knowledge about cardiac patients' psychiatric comorbidities, but it would be useful to understand it for the purpose of future researches. Finally, it would be interesting to test some other relations. For instance, there is an evidence that memory is linked with unhealthy behavioral changes (Blume, Schmaling & Marlatt, 2005). Also, personality is associated with the cardiac patients' emotional state (Kupper et al., 2013; Sumin, 2010).

Limitations and Perspectives

Despite the fact that the study is still going on, it provides some limitations even now. First of all, it is about the questionnaires. The NEO-FFI and "Readiness to change questionnaire" are quite complicated to understand for elderly patients. Moreover, it would be useful if "Readiness to change questionnaire" would measure not only readiness, but also the real expression of behavior. The second limitation is about the patients' motivation. Also, the procedure of the present study is quite complicated due to the lack of motivated patients to participate in the trial. However, the reason is as a result of high employment in rehabilitation program or patients' thoughts that some of them are too old to change.

Nevertheless, there are other perspectives too. Looking from a practitioners' perspective, it would be useful to measure patients' emotional state. Thus, personality traits at the beginning of cardiac rehabilitation cannot be measured because the results could provide information about patients' readiness to participate in psychological intervention. Moreover, Morton et al. (2015) advices that practitioner should assess patient's readiness to change and apply the most salient techniques for each patient. This information could be helpful for choosing appropriate psychological intervention during rehabilitation. Motivational interviewing based on psychological counseling seems to be a useful intervention for increasing patients' motivation to change their lifestyle. As such, this is why it should be included in cardiovascular disease patients' rehabilitation program. Finally, there should be emotional state measure at the end of cardiac rehabilitation. This is because this measure could provide important information about patients' psychological state at leave. In addition, it can help hospital's personnel to give useful recommendations for secondary or tertiary prevention.

Conclusion

In conclusion, the results of the current study shows that personality traits are not important for the effectiveness of motivational interviewing based psychological counseling seeking to change cardiac patients' alcohol consumption, smoking, physical activity, or diet. Secondly, it is clear that depression as an expression of emotional state is an important feature for the effectiveness of motivational interviewing based psychological counseling seeking to change cardiac patients' alcohol. Nevertheless, it is not important for smoking, physical activity, and diet. Anxiety, as an expression of emotional state, is not an important factor for the effectiveness of current intervention.

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