

Comparing anxiety sensitivity and metacognition beliefs in patients with irritable bowel syndrome and coronary heart diseases; a case-control study

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Summary

Aim of the study: Two important diseases related to Psychological Factors Affecting Medical Condition (PFAMC) are Irritable bowel syndrome (IBS) and Coronary Heart Diseases (CHD). Relation between PFAMC and new psychological factors is still unknown. The present study aimed to compare anxiety sensitivity (AS) and metacognition beliefs in patients with functional gastrointestinal disorders, coronary heart diseases and healthy individuals in Isfahan, Iran.

Material and Methods: This case-control study was conducted on 50 patients with IBS and 50 patients with CHD who diagnosed by cardiologists and gastroenterologists and 50 healthy individuals were matched by the same demographic variables (Gender, Education level, Marital status, Occupational status). The data collection tools consisted of the Anxiety Sensitivity Index (ASI) and Metacognition Questionnaire – 30 items (MCQ-30). The data were analyzed using multivariate analysis of covariance (MANCOVA).

Results: The results showed CHD group has more significant physical concerns and mental incapacitation concerns compare to IBS and control groups. It means CHD patients have more fear of physical symptoms related to anxiety (such as rapid heart rate, shortness of breath, trembling and feeling faint) and physical symptoms related to anxiety (such as lack of concentration and nervousness). Also IBS group has significantly higher positive metacognitive beliefs than CHD and control groups.

Discussion: The results showed that AS and metacognitive beliefs about worry play a crucial role in PFAMC such as IBS and CHD. Hence, the management of AS and metacognitive beliefs by clinicians in the treatment of these disorders is recommended.

psychosomatic disorder, anxiety sensitivity, metacognitive beliefs, irritable bowel syndrome, coronary heart diseases

INTRODUCTION

Psychological Factors Affecting Medical Condition (PFAMC) or psychosomatic disorders are diagnosed in the presence of a general medical condition and of psychological factors that adversely affect the course or treatment of the condition, or that increase physical or emotional risk for the patient [1]. IBS and CHD are the two most common PFAMC.

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Mind – body connection and the role of personality and perceived stress underlie many physical illnesses and PFAMC. So neurologic, autonomic, endocrine, gastrointestinal and other systems in our body have interaction to each other. Many studies showed the common pathogenic mechanisms in various diseases through these interactions. Accordingly, recent studies have reported a link between small intestinal bacterial overgrowth (SIBO) – that manifests with a variety of gastrointestinal symptoms – and cardiovascular disease [2,3].

IBS is the first rank among medical disorders associated with psychiatric consultation [4]. It accounts for about 50% of patients referred to gastrointestinal diseases service centers in Iran [5]. Also CHD causes about one-third of all deaths in people older than 35 years [6]. Both IBS and CHD are often associated with affective disorders such as depression and anxiety [7, 8] Raphael.

In recent years, the concept of anxiety sensitivity (AS) has attracted much attention as a mediator in a significant number of emotional disorders, anxiety disorders, somatic symptom disorders, and PFAMC [9]. AS has been defined as excessive fear of anxiety-related sensations (e.g., blushing, tachycardia, dizziness) and the individual's belief about the potential physical, psychological, and social traumatic consequences of these symptoms [10]. Research has shown the role of AS in IBS [11, 12] and a significant difference in AS between patients with IBS and healthy subjects [13]. On the other hand, some recent studies have shown the association of AS with cardiovascular outcomes [14-17]. Also it has been showed higher AS was associated to more carotid plaques [18].

Anxiety sensitivity causes a person afraid of physical symptoms of anxiety and worry and considers them as the beginning of a disaster. This concept of worry about worry (meta-worry) is based on meta-cognitive theories (meta-cognition therapy; MCT). MCT is based on the self-regulatory executive function model (S-REF model) (19) of psychological disorders. In the S-REF model, anxiety, depression, and adjustment difficulties are maintained by the activation of a maladaptive thinking style called the cognitive attentional syndrome (CAS). The CAS is characterized by worrying, rumination, inflexible at-

tention to threat, and maladaptive coping strategies. The CAS is driven by underlying metacognitive beliefs, which can be differentiated into positive and negative subtypes. Positive metacognitive beliefs refer to the advantages and benefits of engaging in worry (e.g. “worrying helps to detect problems before it is too late” or worry about the future helps me that I better plan for the future) while negative metacognitive beliefs are related to beliefs about uncontrollability and dangerousness of thoughts and cognitive experiences [10] (e.g. “I cannot stop worrying about the future” or “worrying will cause a heart attack”). Negative beliefs have a paradoxical effect, through inducing attempts to suppress unwanted thoughts or worries and leading to increase of their salience and emotional distress [20]. Also, anxiety sensitivity and metacognitive beliefs have interactions with each other [21].

Meta-cognitive variable is considered as the base of many psychological disorders especially those related to anxiety such as generalized anxiety disorder, social phobia, panic disorder and obsessive-compulsive disorders [22]. However, studies have shown the relationship between metacognition construct and physical health conditions [23-25] but study of this construct in IBS and diseases with physical origin such as CHD has only recently begun.

Some study reported relationship between metacognitive beliefs, emotional problems and symptom severity in patients with IBS [2, 26]. Also some articles have been published based on MCT-PATHWAY study about the metacognition variables in cardiac patients. This study was a single-blind randomized controlled trial with a four month and 12 month follow up comparing Group-Metacognitive Therapy plus usual CR (Cardiac Rehabilitation) with usual CR alone (control group). The study took place at three UK National Health Service sites over a five-year period. It has shown the important role of metacognitive beliefs and effectiveness of MCT in alleviating anxiety and depression in CR patients [27, 30].

Studies related to the role of metacognition in PFAMC are still at the beginning of the path. Beyond that, comparative studies between different affected groups are very limited. Therefore, the aim of this study was to determine whether there are significant differences in acceptance

of internal events and AS between patients with IBS and CHD and healthy individuals in Isfahan, Iran.

METHODS

The present case-control study was conducted on 50 patients with IBS and 50 patients with CHD who were diagnosed by a gastroenterologist or cardiologist and referred to health centers related to Isfahan University of Medical Sciences (included Noor Hospital Clinic, Al-Zahra Hospital Clinic and Shariati clinic) from May to July 2017. The subjects were randomly selected. The participants' age ranged from 20 to 65 years. They matched based on the same demographic variables (Duration of illness, Gender, Education level, Marital status, Occupational status) except age.

Their healthy matched individuals (n= 50) were assessed based on the examiner's questions about not having a medical record and a history of diagnosed heart or gastrointestinal disease. Also according to the interview, they did not have a psychiatric disorder. They were selected among attendants of patients with IBS and CHD and health care staff based on similar demographic characteristics of CHD and IBS patients (Gender, Education level, Marital status, Occupational status) except age. Because CHD patients are typically older than gastrointestinal patients, age-based matching was difficult. After signing informed consent forms, the participants in three groups completed the Anxiety Sensitivity Index (ASI) and the 30-item Metacognition Questionnaire (MCQ-30).

QUESTIONNAIRES

Anxiety Sensitivity Index: The initial version of this scale was developed in 1985 by Reiss & McNally. This questionnaire consists of 16 items rated on a 5-point Likert type scale ranging from 0 to 4 (0: very low-4: very high) and 3 subscales. The basic subscales of ASI include physical concerns, mental incapacitation concerns (or psychological concerns) and social concerns [31, 32]. Physical concerns refer to fear of somatic anxiety symptoms, which are believed to lead to a cat-

astrophic physical issue. Mental incapacitation concerns refer to the fear of the mental correlates of anxiety symptoms, considered as signals of a mental disorder. Social concerns refer to the belief that a public exhibition of anxiety symptoms will result in public ridicule and rejection [32]. In the previous our study the internal consistency of the Persian version of ASI was obtained at 0.89. Furthermore, the reliability of the 3 subscales of physical concerns, mental incapacitation concerns and social concerns was 0.86, 0.84, and 0.85, respectively [33].

Metacognition Questionnaire – 30 items (MCQ-30): This measure assesses individual differences in metacognitive beliefs, judgments and monitoring tendencies. It consists of five factors assessed by 30 items in total. These subscales were labeled Positive Beliefs about Worry (POS), which measures the extent to which a person thinks that perseverative thinking is useful; negative beliefs about worry concerning uncontrollability and danger, which assess the extent to which a person thinks that perseverative thinking is uncontrollable and dangerous (Uncontrollability and Danger, UD); Cognitive Confidence (CC), which measures confidence in attention and memory; Need to Control (NC), which assesses the extent to which a person believes that certain types of thoughts need to be suppressed (e.g., "I should be in control of my thoughts all of the time"). and Cognitive Self-Consciousness (CSC), which measures the tendency to monitor one's own thoughts and focus attention inward [34]. Respondents were asked to rate whether they "generally agreed" with the statements. The original MCQ [34] and its Persian version [35] possess good internal consistency and convergent validity, as well as acceptable test-retest reliability. Persian version of MCQ-30 [35] was used in this study.

ETHICAL CONSIDERATIONS

This study was approved by the Behavioral Sciences Research Center of Isfahan University of Medical Sciences (Grant no: 294270). In addition, before the beginning of the study, informed consent was obtained from all participants, and they were assured of the confidentiality of all their personal information.

STATISTICAL ANALYSIS

All analyses were performed in SPSS software (version 24, SPSS Inc., Chicago, IL, USA). Descriptive statistics were used to present the demographic data. ANOVA was used for the comparison of age variable between the three groups, t-test was used for the comparison of illness duration between IBS and CHD groups and chi-square was used for the comparison of other demographic variables. Also multivariate analysis of covariance (MANCOVA) was used for comparing participants scores in ASI and MCQ-30 subscales. MONCOVA assumptions were made. Box test results showed matrices variance – covariance are homogeneous ($F= 72.75, p=0.64$). Lewin test results showed

equality of variances between 3 groups in anxiety sensitivity and metacognitive beliefs. Results for checking mean differences in the 3 groups showed there is significant differences between 3 groups in physical concerns ($F=3.16, p= 0.049$), mental incapacitation concerns ($F=3.45, p= 0.034$) and positive metacognitions ($F= 4.69, p=0.011$).

RESULTS

Table 1 shows the analysis of demographic data in patients with IBS, CHD and control subjects. The results showed that there was no significant difference between demographic variables in three groups except of age and occupation (CHD participants are older than others).

Table 1. Demographic characteristics of the subjects

Variable	Patients with IBS	Patients with CHD	control	P value
Age	35.36 (12.3)	50.62 (11.62)	34.51 (11.72)	<0.001
Duration of illness	3.9 (3.91)	5.85 (5.72)	—	0.83
Gender				0.56
Male	37 (74)	29 (19.4)	33 (73.3)	
Female	13 (26.7)	21 (14)	12 (26)	
Education level				0.61
<High school	29 (59.2)	36 (34.1)	23 (50)	
Bachelor	15 (30.6)	10 (6.6)	16 (34.8)	
>Bachelor	5 (10.2)	4 (2.6)	7 (15.2)	
Marital status				0.133
Single	11 (22.9)	13 (8.6)	16 (35.6)	
Married	37 (77.1)	36 (24.5)	29 (64.4)	
Occupation				0.06
Workless	25 (58.1)	16 (33.3)	24 (61)	
Self-employed	7 (16.3)	16 (33.3)	7 (17.9)	
Salaried-employee	11 (25.6)	16 (33.3)	8 (20.5)	

Data are presented as mean (SD) or No. (%)

As three groups had significant differences in age variable for comparison of them in MC and AS, the age was considered as a covariate variable and MANCOVA was used.

Table 2 provides the mean scores and standard deviations of the dependent variables (AS and MC subscales) and pairwise comparisons of the measures in 3 groups. These results have been presented in Table 2 separately.

Table 2. Means, standard deviations, and comparison of anxiety sensitivity and metacognitive beliefs in the IBS, CHD and control groups

		Mean (SD)	Mean differences		
			IBS-CHD	IBS-control	CHD – control
Physical concerns	IBS	21.02 (8.45)	-2.549	2.660	-5.209*
	CHD	23.56 (7.52)			
	control	18.36 (6.19)			
Mental incapacitation concerns	IBS	9.74 (4.22)	-.593	1.340	-1.933*
	CHD	10.33 (4.12)			
	control	8.40 (3.45)			
Social concerns	IBS	12.62 (3.08)	-.439	-.060	-.379
	CHD	13.05 (3.16)			
	control	12.68 (3.09)			
POS	IBS	18.05 (3.85)	1.87	2.55*	0.67
	CHD	16.18 (4.32)			
	control	15.96 (4.91)			
UD	IBS	14.88 (4.39)	0.085	0.381	-0.504
	CHD	13.39 (4.05)			
	control	14.48 (4.24)			
CC	IBS	16.18 (4.14)	-1.15	0.928	2.087*
	CHD	17.34 (4.60)			
	control	15.25 (4.02)			
NC	IBS	14.40 (3.74)	.707	0.897	-0.189
	CHD	12.90 (3.25)			
	control	13.48 (3.71)			
CSC	IBS	15.98 (3.90)	.542	0.99	-0.448
	CHD	14.47 (4.48)			
	control	14.96 (4.31)			

Abbreviations: IBS: Irritable Bowel Syndrome; CHD: Coronary Heart Disease; SD: Standard Deviation; POS: Positive Beliefs about Worry; UD: Uncontrollability and Danger; CC: Cognitive Confidence; NC: Need to Control; CSC: Cognitive Self-Consciousness

*: $P < 0.05$.

Table 2 shows the CHD and control groups have significant differences in physical concerns and mental incapacitation concerns subscales of ASI and CC subscale of MCQ-30 compare to IBS and control groups. Only significant difference between IBS and control groups is the mean scores of POS of MCQ-30.

DISCUSSION

The aim of this study was comparing anxiety sensitivity and metacognition beliefs in patients

with IBS, CHD and Healthy Individuals. The results indicated there were no differences in AS subscales between IBS and control groups. No difference in AS subscales in these groups is inconsistent with other studies in this field [11-13].

Also our study showed significant differences in physical concerns and mental incapacitation concerns subscales of ASI in CHD and control group. This finding is consistent with other studies have shown higher AS especially physical concerns in patients with cardiovascular disease [14-17]. Furthermore, Carmela et al [14] study showed AS, generally, and fear of

the physical sensations of anxiety (i.e., “fear of shortness of breath”), specifically, are important correlates of physical inactivity in adults with a history of myocardial infarction. Also, Ghasemi et.al [15] showed cardiac patients with chest pain had higher scores in all subscales of AS compare to control group. However, that study [15] had used the another AS scale with 36 items and 6 subscale included Fear of cardiac symptoms, fear of respiratory symptoms, fear of symptoms visible to the public, fear of gastrointestinal symptoms, fear of dissociative and neurological symptoms and fear of signs of lack of cognitive control. Also the type of heart disease was not identified in that study and some other studies.

Regarding the results of our research, our hypothesis is that part of this difference is due to the content of ASI questionnaire questions. A look at the questions shows that 3 of 8 questions of physical concerns scale are related to cardiac symptoms directly (question 6: “It scares me when my heart beats rapidly”, question 9: “When I notice that my heart is beating rapidly, I worry that I might have a heart attack”, question 10: “It scares me when I become short of breath”). Also 3 questions are related to a cardiac situation rather than gastrointestinal situations (question 3: “It scares me when I feel shaky or trembling”, question 4: “It scares me when I feel faint”, question 14: “Unusual body sensations scare me”) [36]. Thus, it appears the high scores of CHD group are related to the content of the questions of physical concerns subscale.

The mental incapacitation concerns (or psychological) subscale measures a person’s fear of certain cognitive symptoms, such as lack of concentration, and emotional symptoms such as nervousness. That refers to concerns related to mental manifestations of anxiety (e.g., “When I am nervous, I worry that I might be mentally ill”) [37]. The person with high scores fears that these problems are indicative of a serious mental or physical illness. So, these problems are more worrying in a CHD patient than in a IBS patient or a control one. This finding is consistent with other studies [14,15].

In our study, there were no significant differences between 3 groups in social concerns. This subscale of ASI with 4 questions measures fear of symptoms visible to others (social fear). How-

ever, one’s symptoms must be severe enough to be visible by others (e.g. question 7: “It embarrasses me when my stomach growls or question” or question 13: “Other people notice when I feel shaky”) [38]. This finding is not consistent to Ghasemi et.al [15]. The reasons for this inconsistency are the different AS scale used and uncertainty of the type of disease.

Overall our finding showed CHD patients had higher physical and psychological concerns not social concerns compare to IBS and control group. In CHD patients, it seems that worrying about cardiac symptoms (physical concerns) is important itself because it is a sign of a serious problem for patients, and incidentally, the fact that these symptoms are visible to others makes it easier for patients to get help. Therefore, the patient is not ashamed or worried about the symptoms being seen by others.

Our study showed IBS group had more POS compare to CHD and control groups. POS is about the usefulness of worry, rumination, threat monitoring and other coping strategies [27]. Examples include: “If I worry I will be prepared.” “Focusing on danger will keep me safe.” “I must remember everything and then I’ll know if I’m to blame.” “If I analyze why I feel this way I’ll find answers.” “I must control my thoughts or I’ll do something bad.” POs is related to anxiety and selection of worry for coping with anxiety. Anxiety and worry are high level in IBS (39, 40). So in our study IBS patients because of greater anxiety compare to CHD and control group have greater POS scores too. On the other hand, Patients’ belief that preservative thinking is useful can increase anxiety and IBS symptoms. Studies showed a relationship between POS and anxiety in PFAMC [20, 25, 30] especially IBS [26]. Although, the study [26] showed all factors of metacognitive beliefs are significant in prediction of symptoms severity of IBS, but another study showed negative beliefs in IBS patients is lower than IBD (Inflammatory bowel disease; one of functional gastrointestinal diseases) and don’t have relations with basic emotions such as anxiety [2].

We didn’t found significant differences between CHD and control group in most subscales of MCQ. This our finding about CHD group is inconsistent with the studies showed metacognitive beliefs in coronary artery disease are more than control group [30].

Also our study showed participants in CHD group have greater scores in CC of MCQ-30 compare to IBS and control groups. Quattropani et.al. study [2] showed negative beliefs didn't have significant correlation with basic emotions in IBS patients too. The questions of CC measure confidence in attention and memory. They includes: I have little confidence in my memory for words (question 8), My memory can mislead me (question 14), I have a poor memory (question 17), Little confidence in my memory for places (question 24), I do not trust my memory (question 26), Lack confidence in memory for my actions (question 29). One factor that can reduce memory confidence is aging. Generally, heart disease begins at a higher age than gastrointestinal disease, and our study shows that CHD patients are older than the other two groups (CHD and control). It is therefore justifiable for the CHD group to have a higher score on cc subscale.

Generally, present study showed CHD group has more significant physical concerns and mental incapacitation concerns compare to IBS and control groups. Also IBS group has significantly higher positive metacognitive beliefs than CHD and control groups.

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