Effects of meta-emotions on worry in coronary heart disease patients and normal individuals

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Abstract

The study aimed to elucidate the effects of positive meta-emotions and negative meta-emotions on worry in CHD patients with hypertension, CHD patients without hypertension and control individuals. Two hundred respondents (28 to 78 years old) (clinically diagnosed 50 patients with hypertension and 50 patients without hypertension, and 100 individuals without CHD here referred as 'Control'] were purposively sampled from three hospitals of Varanasi city of Uttar Pradesh, were individually administered the Hindi version of Meta-emotions Scale (MES-H) and Penn State Worry Questionnaire. Results revealed significant main effects of groups and levels of meta-emotions on worry. CHD with hypertension group on positive and negative meta-emotion displayed significantly higher levels of worry in comparison to control, however, CHD with hypertension group did not differ significantly from CHD without hypertension groups. High as compared to low scorer participant on negative meta-emotions facet of meta-emotions displayed significantly enhanced worry.

Key words: *Meta-emotions, Positive Meta-emotions, Negative Meta-emotions, Worry, Coronary Heart disease.*

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INTRODUCTION

Not only in India but all over the world cardiovascular disease (CVD) is a major health problem and its high prevalence and mortality have been rated everywhere. At present, it is one of the leading causes of death in India (Srinath Reddy et al, 2005). In fact, in India CVD affects Indians at least a decade earlier than Europeans (Joshi et al., 2007; Xavier et al., 2008) and in comparison, to 525 deaths in India only 23% deaths occur before the age of 70 in European countries (Harikrishnan et al., 2014). It had been reported that coronary heart disease (CHD) may be considered as an epidemic worldwide (WHO, 2014; Fuster& Kelly, 2010) and in contrast to developed countries where mortality from CHD is declining; it is increasing in developing countries. Over the years from 1960s the prevalence of CHD has increased 6 to 9- fold in India (Gupta & Gupta, 1996; Gupta et al., 2008). Recently, 1 to 2% and 2 to 4% CHD prevalence rates have been reported respectively in rural urban populations in India (Gupta, Mohan & Narula, 2016). A number of biological and psychosocial risk factors have been reported including dyslipidaemia, tobacco use, diabetes, hypertension, obesity, physical inactivity, unhealthy food habit and heredity (Joshi et al., 2007) among biological risk factors, and strong emotions, especially negative emotions, such as hostility, anger, depression, and anxiety, stress, acute and chronic stressors, social isolation and social support, psychological work characteristics and some personality characteristics (for example Type-A behaviour) among psychological risk factors (Tunstall-Pedoe H; 2001, Gouni-Berthold, Krone and Berthold, 2009; Khayyam-Nekouei et al., 2013) which may trigger CHD. In contrast, positive emotions, promote health benefits and drive to lower level of CHD and other diseases (Koelsch, Enge and Jentschke; 2012, Cha et al., 2014). Worry can be defined as "a chain of thoughts and images, which is overloaded with negative affect and almost uncontrollable." It delineates an effort to engage in mental problem solving on an issue whose outcome is uncertain but accommodate the possibility of one or more negative outcomes; thus, worry relates closely to the fear process (Borkovec et al., 1990). However, worry may be the cognitive process during anxiety that aims to prepare the individual for a possible future threat (Barlow, 1988; Craske1989). Worry would precipitate increased negative emotions and arousal level, and individuals with high levels of worry tend to interpret ambiguous situations as a threat

(Hayes, Hirsch and Mathews, 2010). Studies have indicated that the tendency to engage in rumination or worry is related with reduced cognitive flexibility and perseverative thoughts have adverse consequences on cardiovascular, autonomic and endocrine systems (Ottaviani et al., 2016). Worrying individuals may be vulnerable to emotionally stressful situations, which may trigger a cardiovascular event. Meta-emotions are recurrent emotional reactions about one's own emotions (e.g., anger about being anxious) that are fuelled by but not limited to personal attitudes about emotions and are involved in the executive control of emotions. The quality of meta-emotions provides information on regulatory processes operating on the target emotion. Whenever we elicit a certain emotion, we also deal with subsequent emotions regarding how we felt the primary emotion. Some psychologists have examined the influence of meta-emotions on how individuals deduce and deal with their own and others' emotions. It is suggested that meta-emotions influence the experience of the primary emotions. For example, being anxious about anxiety might produce a different experience than being angry about anxiety. As stated earlier, many psychological factors may underlie in the causation of CHD, however, hitherto the role of meta-emotions have not been investigated in CHD wherein meta-emotions have been hypothesised to modulate primary emotions.

The objective of this study was to elucidate the effects of facets of meta-emotions (positive and negative meta-emotion) on worry in CHD patients with hypertension, CHD patients without hypertension and control individuals.

Hypothesis

1. CHD patients with hypertension and without hypertension would exhibit significantly higher levels of trait worry than control participants.
2. High as compared to low levels of positive meta-emotions would cause significantly more trait worry in CHD patients with hypertension and without hypertension than control participants.
3. High as compared to low levels of negative meta-emotions would cause significantly more trait worry in CHD patients with hypertension and without hypertension than controls participants

Materials and Methods

Participants

Two hundred respondents (28 to 78 years old) (clinically diagnosed 100 CHD patients [50 patients with hypertension and 50 patients without hypertension) and 100 individuals without CHD here referred as 'Control'] from Varanasi city of Uttar Pradesh were purposively sampled for the conduct of the present study. One hundred respondents suffering from hypertension with CHD (N=50) and without CHD (N=50) were identified in the out-patient wards of Galaxy Hospital, B.K. Heart Hospital and Arunodaya Hospital of Varanasi city and age matched 100 healthy respondents were selected for conduct of the study. The mean disease history of CHD with hypertension patients and CHD without hypertension patients were 50.90 years and 4.42 years respectively. Finally, 200 respondents (100 CHD patients and 100 Control individuals) were purposively sampled for the conduct of the study. The mean age (±SD) of participants was 55.93±9.60 years (Control = 55.24±8.95 years; CHD with hypertension = 58.26±10.13 years; CHD without hypertension = 57.96±10.10 years). The whole sample comprised of 89% men and 11% women (Control = 90% men, 10% women; CHD with hypertension = 100% men, 0% women; CHD without hypertension =94% men, 6% women), 98.5% married and 1.5% unmarried participants (Control = 97% married, 3% unmarried; CHD with hypertension = 100% married, 0% unmarried; CHD without hypertension = 100% married, 0% unmarried), 30.5%, 56.5% and 13% participants respectively with rural, urban and semi-urban background (Control = 24% rural, 61% urban and 15% semi-urban; CHD with hypertension = 34% rural, 52% urban, 14% semi-urban; CHD without hypertension = 40% rural, 52% urban, 8% semi-urban), and 59.5% and 40.5% participants respectively from joint and nuclear

family structure (Control = 58% joint, 42% nuclear; CHD with hypertension = 70% joint, 30% nuclear; CHD without hypertension = 52% joint, 48% nuclear). Informed written consents were obtained from all participants. Participants received no incentives for participation in the study.

Design of the study

Initially the three groups of participants (CHD with hypertension, CHD without hypertension and Control) were divided into two groups (low and high scorer groups) on the basis of their meta-emotion scores. The participants scoring below and above median values of positive meta-emotions and negative meta-emotions of the three groups were respectively designated as low scorers and high scorers, thus giving rise to a 3 X 2 factorial design and six groups - three groups (CHD with hypertension, CHD without hypertension and Control groups) and two levels (low and high scorers).

Instruments: A biographical sheet was prepared by the researcher to get the appropriate sample. This sheet helped to control the extraneous variables. Information regarding the subjects was coded in this sheet, which helped to find out the control participants of similar status.

Meta-emotion Scale-Hindi: The present study employed MES-H, the Hindi version of Meta-emotion Scale, (Jaiswal et al., 2020). MES (Mitmansgruber et al., 2009) was standardized and validated on Hindi speaking sample after exploratory and confirmatory factor analysis by AMOS that resulted in Meta-emotions Scale (MES-H) comprising 19 items: consisting 10 items of positive meta-emotions like interest and compassionate care, and 9 items of negative meta-emotions like anger, contempt, anxiety, sadness, shame or guilt (Jaiswal et al., 2020). These items are rated on a 6-point scale (1 = "is not at all true for me" to 6 = "is completely true for me"). Participants were instructed to rate the statements not as they think they should react but as their actual experiences were. The scale generates scores for the following two sub-scales - (1) Positive Meta-emotions (2) Negative Meta-emotions. Fairly high reliability coefficients have been reported for positive meta-emotions (split-half = 0.85, Cronbach's α = 0.84) and negative meta-emotions (split-half = 0.73, Cronbach's α= 0.77).

Pennsylvania State Worry Questionnaire-Hindi: Hindi translation of PSWQ (Jaiswal, personal communication; PSWQ; Mayer et al. 1990) has been employed in this study. The Penn State Worry Questionnaire (PSWQ) is a self-report scale of pathological worry which contains 16 items. Respondents are asked to rate each item on a 5-point Likert scale ranging from 1 to 5. Eleven of the items are positively scored in the direction of pathological worry, while the remaining five items (Items 1, 3,8,10 and 11) require reverse scoring and indicate worry is not a problem. The scores from each item are added together to yield a total score that ranges from 16-80, with higher scores representing higher levels of pathological worry (Meyer et al., 1990).Split-half and Cronbach's alpha reliability coefficients were 0.821 and 0.774 respectively.

Procedure: First of all, good rapport was established with the respondent, kept relaxed and pleasant in order to elicit the most frank or candid answers possible, advised not to dwell for any length of time on any given item, to give his overall reaction, were informed that there is no right or wrong answer to any item, and encouraged to respond rapidly and the way they really feel.

Statistical Analysis: The obtained data were analyzed by SPSS version 20. Mean and SD values were calculated for the six groups of participants and the data were analyzed by two-way (3X2) ANOVA to elucidate the state of meta-emotions in the three groups (CHD patients with and without hypertension and control group) and controls.

RESULTS

The mean and SD values of worry (the dependent variable) for low and high scorer CHD with hypertension, CHD without hypertension and Control groups on positive and negative meta-emotions sub-factor of meta-emotions (the independent variable) are depicted in Table – 1.

Table 1: Mean ± SD values of trait worry for two levels (high and low) of positive meta-emotions and negative meta-emotions X three groups (CHD with hypertension, CHD without hypertension and Control groups)

Facets of meta-emotions	Groups	Levels	N	Mean ±SD
Positive meta-emotions	CHD with hypertension	High	25	54.80 ± 9.52
		Low	25	53.80 ± 12.89
	CHD without hypertension	High	26	55.00 ± 13.39
		Low	24	48.04 ± 11.89
	Control	High	47	47.11 ± 9.52
		Low	53	47.81 ± 10.62
Negative meta-emotions	CHD with hypertension	High	25	57.72 ± 9.77
		Low	25	50.88 ± 11.72
	CHD without hypertension	High	24	53.83 ± 13.55
		Low	26	49.65 ± 12.49
	Control	High	48	49.79 ± 10.59
		Low	52	45.35 ± 9.39

The 3 X 2 ANOVA performed on the scores of trait worry to highlight the main and interaction effects of groups and levels of positive meta-emotions on trait worry. Results of 3 X 2 ANOVA revealed significant main effects of 'Groups' ($F(2,194) = 6.73$, $p < 0.01$) and non-significant effect of 'Levels of Positive Meta-emotions' ($F(1,194) = 2.11$, $p > 0.05$) and interaction effect of 'Groups X Levels of Positive Meta-emotions ($F(2,194) = 1.99$, $p > 0.05$). Post hoc mean comparisons for difference between worry in groups for positive meta-emotions indicated that patients of CHD with hypertension group (mean = 51.52) displayed significantly higher levels of worry in comparison to Control group (mean = 47.46) whereas CHD with hypertension group and CHD without hypertension group (mean 47.48) did not differ from each other with respect to worry.

Table 2: Relationship between worry and positive and negative meta-emotions

Measures of Meta-emotions	Positive Meta-emotions	Negative Meta-emotions
r	0.097	0.397**

** indicates statistical significance at $p< 0.01$

A 3 X 2 ANOVA over the levels of analyses: three groups (CHD with hypertension, CHD without hypertension and Control) and two levels (low and high) of negative meta- emotion performed manifested significant main effects of 'Groups' ($F(2,194) = 6.81$, $p < 0.01$) and 'Levels of negative meta-emotion' ($F(1,194) = 9.87$, $p < 0.01$) and non-significant interaction effect of 'Groups X Levels of negative meta-emotion' ($F(2,194) = 0.241$, $p > 0.05$). Post hoc analysis revealed that the CHD with hypertension group (mean = 54.30) displayed significantly enhance worry in comparison to Control group (mean = 47.48), while no significant difference was observed in worry exhibited by CHD with hypertension and CHD without hypertension(mean = 51.66) groups. Significant effect of levels of negative meta-emotion indicated that high levels of negative meta-emotions caused significantly higher levels of worry (mean = 53.78) as compared to low levels of negative meta-emotions (mean = 48. 63). The observed non-significant correlation (r = 0.097 between positive meta-emotions versus worry and significant positive correlation (r = 397, $p< 0.01$) between negative meta-emotions versus worry also supported the aforementioned findings.

The salient findings of the present study are that in general, CHD patients with hypertension displayed high levels of worry, and high levels of negative meta-emotions caused higher levels of worry in patients of CHD with

hypertension and CHD without hypertension as compared to Controls.

DISCUSSION

There is a significant body of knowledge regarding the relation between health and emotions (Gross, 2013; Kubzansky, 2011).Negative emotions appear to be strongly associated with cardiac events. Research evidence of non-heart disease patients has revealed that worry was associated with increased activity of the autonomic nervous system (Brosschot, 2010) and cardiac activity such as decreased heart rate variability (Chalmers, 2016; Pieperet al., 2010). Thus, it may be linked to coronary heart disease through physiological (cardiovascular and neuroendocrine) responses related to these negative emotions. Most risk factors that intimidate the disease can be influenced by negative emotions, such as stress, anger, anxiety, resentment and depression (Das & O'Keefe, 2006; Sirois & Burg, 2003). Psychological research has suggested that worry may function as a coping mechanism, as an attempt to control unwanted experiences (future catastrophes, perceived threats). However, negative emotions and thoughts along with other important risk factors may cause disease, while positive emotions can improve health and eliminate disease. Worrying can be a beneficial process, when problem-solving strategies are thwarted by personality or situational factors, despite worrying may have negative effects, including negative cognitions, defining problems as catastrophes, and increased anxiety and/or depression levels (Davey, 1994). At the same time the coping mechanism (worry) can itself become an unwanted experience that is difficult to control (Roemer and Borkovec, 1993).Some researchers have hypothesized that the negative cognitions and perceived lack of control associated with ineffective problem solving have deleterious consequences for health (Tallis, Davey and Capuzzo, 1994), although these consequences have never been empirically examined. Verkuilet al., (2010) also revealed that worry, as well as rumination or repetitive negative thinking (a form of negative meta-emotion), predicted delayed cardiac recovery (reviewed in Ottaviani et al., 2016). On the other hand, it has been shown that anxiety is associated with increased risk of cardio vascular diseases (Emdin et al. 2016; Janszkyet al., 2010; Roest et al., 2010). Having said that worry is a distinctive feature of generalized anxiety disorder, as well as the sole impact of the worry on cardiac activities (Ottaviani et al., 2016) one can infer that worry might be a distinguishing factor predicting problems of adjustment to heart disease. Since, meta-emotions have executive function on primary emotions it can be hypothesized that negative meta-emotions would enhance subsequent expression of negative emotions like worry in both normal individuals and CHD patients.

Financial support and sponsorship

This project was supported by ICSSR, New Delhi, India (The Indian Council of Social Science Research) under the program, Post-Doctoral Fellowship (3-158/2015-16 PDF) awarded to the first author.

Conflicts of interest

The authors report no conflicts of interest.

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