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To cite this article: Thea Liljeroos, Sophia Humphries, Soorej Jose Puthoopparambil, Fredrika Norlund & Erik M.G. Olsson (2023) Management of emotional distress following a myocardial infarction: a qualitative content analysis, *Cognitive Behaviour Therapy*, 52:1, 47-64, DOI: 10.1080/16506073.2022.2135591

To link to this article: <https://doi.org/10.1080/16506073.2022.2135591>



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Management of emotional distress following a myocardial infarction: a qualitative content analysis

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ABSTRACT

Myocardial infarction (MI) is one of the leading causes of mortality and disability worldwide. Emotional distress, such as anxiety and depression, are common among MI patients. The aim of this study was to investigate emotional reactions following MI and to explore how MI patients self-manage their emotional distress using the perspective of an explanatory behavioural model of depression and anxiety. Written testimonies from 92 MI patients starting an internet-based cognitive behavioural therapy (iCBT) were analysed using qualitative content analysis with a mixed deductive and inductive approach. Six themes were identified. The first three highlight the emotional reactions post-MI: Hypoarousal reactions and low mood; Hyperarousal reactions; and A changed sense of self and outlook on life. The following three themes describe strategies for managing emotional distress: Avoidance of potentially rewarding situations; Avoidance of heart relevant stimuli triggering anxiety; and Engaging in potentially positive activities and acceptance. The MI experience may trigger emotional reactions, with a particular emphasis on heart-focused anxiety, depression and a shift in the perception of one's identity. Patients tend to manage emotional distress through social withdrawal and experiential avoidance which likely maintains the distress. Applying a behavioural model to the management of emotional distress following MI is suited.

ARTICLE HISTORY

Received 19 May 2022

Accepted 7 October 2022


KEYWORDS

Myocardial infarction;
psychological distress;
depression; anxiety;
avoidance behaviour

Introduction

Cardiovascular disease (CVD) and its manifestation in cardiac events like myocardial infarction (MI) is relatively common and potentially lethal. Even though the prognosis after an MI has greatly improved over the last decades, ischaemic heart disease was in 2019 still among the leading causes of mortality and the top-ranked cause of disability among persons aged >50 years worldwide (Vos et al., 2020). Many MI patients experience emotional distress, such as anxiety and depression, after the event (Norlund et al., 2018). Emotional distress post MI is in turn a risk-factor for recurrent cardiac events and mortality (Lissåker et al., 2019; Meijer et al., 2011). Psychological interventions in CVD

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 Supplemental data for this article can be accessed online at <https://doi.org/10.1080/16506073.2022.2135591>.

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have been studied in several different CVD patient populations, with different outcomes and various treatment content. Partly due to the heterogeneity of the study methods, the results have also varied.

In the present article we explore the application of a behavioural model on emotional distress after surviving an MI. From a learning theory perspective, depression is best explained by Lewinsohn's behaviour model of depression (Lewinsohn, 1986), which in turn expands on the works of Ferster (Ferster, 1973). According to learning theory depression is related to a lack of response-contingent positive reinforcement and, avoidant behaviour, such as social withdrawal, has a central role in both the origin and maintenance of depression. According to Lewinsohn's model, depression starts with a disruption in the normal behavioural pattern leading to a change in contingent positive reinforcement (Carvalho & Hopko, 2011; Lewinsohn, 1986). An MI can be such a disruption. The MI may lead to withdrawal from formerly rewarding environments and behaviours due to low mood, fear, fatigue, physiological limitations or an altered financial or social situation. This can create a viscous cycle leading to a chronic state of low mood or depression. This theory of depression has been instrumental and forms the base of the well-used behavioural activation treatment approach where patients plan and do behaviours they once found reinforcing and that they do not do otherwise (Martell et al., 2013).

When it comes to anxiety, learning theory has been particularly influential and successful in generating effective exposure-based CBT-labelled treatments (Kaczurkin & Foa, 2015). These treatments can be traced back to Mowrer's two-factor theory (Krypotos, 2015; Mowrer, 1956). According to this theory, anxiety or fear is first coupled with stimuli through classical, or Pavlovian, conditioning. Thereafter avoidance of the conditioned stimuli is negatively reinforced through operant conditioning. As with the case of depression, this behavioural model for anxiety is also applicable in the CVD context. In the MI experience (serving as the unconditioned stimuli) fear and anxiety are coupled with several behaviours and environments related to the cardiac event, so-called heart focused anxiety (HFA), e.g. elevated heart rate, chest pain, being far from a hospital, stress, strenuous exercise etc. (Eifert et al., 2000). HFA has been defined as "excessive" and selective attention, fear and avoidance of cardiac related sensations and stimuli based on their perceived negative consequences for cardiac health (Eifert et al., 2000). The coupling is maintained through the avoidance of these activities and situations, as this prevents corrective learning and habituation (Krypotos, 2015). Depending on the manifestations, diagnoses such as post-traumatic stress disorder (PTSD), different phobias (e.g. kinesiophobia and agoraphobia), generalised anxiety disorder (GAD) or at least subclinical indications of the same, can also be expected after an MI (Brunetti et al., 2017; Bäck et al., 2018; Jacquet-Smailovic et al., 2021; Roest et al., 2012). When we refer to avoidance above, it is important to state that functionally it is the emotional experience that is being avoided. Certain strategies could facilitate experiential avoidance even when the conditioned stimuli is present. Experiential avoidance, such as withdrawal, rumination, distraction and safety behaviours, is thus important in the maintenance of both depression and anxiety. Avoidance of potentially rewarding activities may lead to, or maintain, depression, and avoidance of situations that elicit an anxious response may lead to, or maintain, anxiety (Lewinsohn, 1986; Mowrer, 1956). To illustrate this theory in the context of MI,

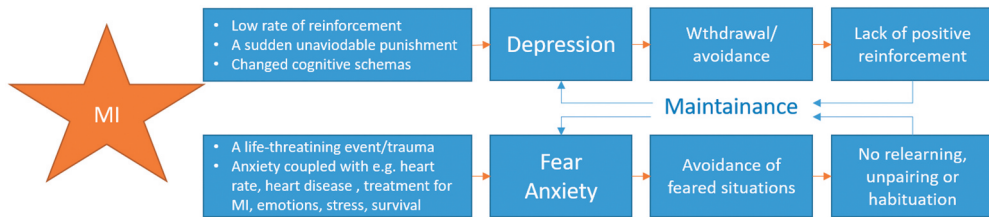


Figure 1. The behavioural model of depression and anxiety after a myocardial infarction.

we present a behavioural model of the development of depression and anxiety after an MI based on learning theory (Figure 1). There are of course many factors, e.g. social and cognitive, potentially influencing depression and anxiety after an event like an MI. The focus here is on learning theory.

U-CARE Heart, which is the base of the present study, was a clinical trial aiming at treating depressed and anxious MI patients with internet-based CBT (iCBT) (Norlund et al., 2018). It included 239 randomised participants and the intervention was not found to be more effective than standard care. The non-significant results were expected due to the low participant activity in the treatment. The low activity further highlights the question whether the needs were assessed properly and if the assumption of emotional reactions triggered by the MI and maintained by experiential avoidance, in line with learning theory, was correct. Previous research indicates that avoidant coping strategies are fairly common among MI patients (Du et al., 2020; Fuochi & Foà, 2018). In this study, this was investigated further using qualitative analysis.

Aim

The aim of this study was to investigate how patients describe their emotional reactions as well as their management of emotional distress following an MI and to consider these descriptions in terms of the behavioural model based on learning theory. Of special interest are patterns of avoidance and withdrawal in the daily life.

Method

U-CARE Heart

The randomised controlled trial U-CARE Heart had the overarching aim to evaluate the effectiveness of an iCBT treatment to reduce the self-reported symptoms of depression and anxiety among MI patients (Norlund et al., 2018). Patients with symptoms of depression or anxiety (a score of > 7 on one or both subscales of the Hospital Anxiety and Depression Scale (HADS) (Zigmond & Snaith, 1983) were randomised to either iCBT or to treatment as usual, two months following their cardiac event. The iCBT intervention consisted of a 14 week, therapist guided, MI-tailored version of the standard CBT therapy for anxiety and depression, and was delivered via an internet-based portal (U-CARE-portal) (Norlund et al., 2018). In the present study, data from the intervention group was analysed. The Standards for Reporting Qualitative Research (SRQR) was used to structure this manuscript (O'Brien et al., 2014).

Participants

Participants ($n = 239$) were recruited from 25 heart clinics in Sweden during the period of September 2013 to December 2016. The following inclusion criteria were applied: (1) age <75 years, (2) recent myocardial infarction <3 months, and (3) score >7 on one or both of the HADS subscales. Participants with symptoms of depression or anxiety were randomised to either take part in the iCBT treatment ($n = 117$), or to treatment as usual ($n = 122$) (Norlund et al., 2018). All participants randomised to the iCBT treatment were eligible for the present study.

Data collection

In the current study we analysed written work-sheet data provided by the participants in the introduction module of the intervention. The work-sheet consisted of eight open-ended questions where participants were asked to describe the circumstances under which the MI happened, the emotional impact of the MI and how they dealt with it, and their treatment goals (see Appendix 1). The questions were created by experienced psychologists and aimed at being the basis for an initial behavioural analysis of the problems at hand, and to guide the exposure for MI related content, which was believed to be a key factor in the treatment. The length of the answers varied between a single sentence, to approximately half a page. Of the 117 participants randomised to the intervention arm, 92 (79%) responded to the questionnaire. Of the possible 117 randomised participants, the demographics of the 92 responders were almost identical (Norlund et al., 2018). Of the responders 37% (34/92) were female and the average age was 58.4 years ($SD = 9.4$). For detailed participant characteristics, see Table 1. A total of 13 responses were missing over 5 different questions and 8 participants.

Table 1. Demographic characteristics of the participants.

Age (years), <i>mean</i> (range)	58.4 (31–74)
Female, <i>n</i> (%)	34 (37.0)
Marital status, <i>n</i> (%)	
Cohabiting/Married	74 (80.4)
Single	14 (15.2)
Other	4 (4.3)
Education, <i>n</i> (%)	
Elementary school	15 (16.3)
Upper secondary school	32 (34.8)
Higher education ≤ 3 years	20 (21.7)
Higher education >3 years	25 (27.2)
Country of birth, <i>n</i> (%)	
Sweden	76 (82.6)
Work situation, <i>n</i> (%)	
Full time	51 (55.4)
Part time	13 (14.1)
Sick leave	2 (2.2)
Retired, full time	23 (25.0)
Other	3 (3.3)

Ethical considerations

The U-CARE Heart trial was approved by the regional ethics committee in Uppsala (2011/217). Written informed consent was obtained from the participants at the time of recruitment. Each work-sheet was provided with a participant code generated in the parent study, thus ensuring the anonymity of the participants.

Data analysis

The 92 worksheets were imported into NVivo 12 Pro qualitative data analysis software for Windows (QRS International Pty Ltd., Australia), with the aim to facilitate data storage and management as well as continuous discussions within the research team. The study design adopted a narrative approach to enable the researchers to examine and understand how the participants perceived their subjective experiences of MI.

We conducted a conventional qualitative content analysis with a deductive approach (Elo & Kyngäs, 2008), as this allows for a qualitative descriptive analysis of the context and content of the data items, including an exploration of how themes were presented and the frequency of their occurrence (Spencer et al., 2014). The data analysis process followed the phases described by Elo and Kyngäs (2008): *preparation, organizing and reporting*. During the preparation phase, the analysts (TL and EO) familiarised themselves with the data by carefully and repeatedly reading each unit of analysis, i.e. the individual participant responses. When the analysts had obtained a deeper understanding of the data they entered the organization phase. During this phase a structured categorization matrix was developed, consisting of 4 categories of interests in relation to the specific research aim. The initial categorization matrix was based on Lewinsohn's integrative model of depression (Lewinsohn, 1986) and Mowrer's two-factor learning theory (Mowrer, 1956), highlighting avoidance and withdrawal behaviours as malfunctioning measures to cope with negative emotional reactions. Each data item, i.e. participant questionnaire, was then reviewed for content and coded according to the predefined categories (See Appendix 2).

When the data had been coded deductively, according to the initial coding frame, the analysts revisited the dataset in order to identify concepts of interest to the research aim that did not fit into the predefined categories. When new concepts were identified additional categories were constructed similarly to inductive content analysis (Elo & Kyngäs, 2008), hence facilitating analysis of the full dataset. In addition to the deductively generated categories, additional themes and categories were added inductively. The analysts performed the initial coding individually, where TL coded the entirety of the data items i.e. all eight questions, and EO analysed a sub-sample consisting of the two central questions for the analysis. TL has a clinical background as a registered nurse and EO is a psychologist and associate professor in clinical psychology in healthcare, both have experience caring for cardiac patients. When the data had been coded and categorised individually, TL and EO compared and discussed their interpretations of the findings to reach consensus with regard to final data categorization. The analysts then identified and formulated the overarching themes together. Initial brainstorming meetings for data analysis were held within the research team, when entering the reporting phase the themes were discussed further where authors 2 and 4 (SH and FN), who were

Table 2. Coding tree sample.

Theme	HYPOAROUSAL REACTIONS AND LOW MOOD			
Category	DEPRESSION			
Subcategory	Sadness	Low mood	Anhedonia	Guilt and shame
Codes	Being close to tears Feeling sad Feeling sorry for oneself Crying Having a need to mourn	Feeling numb Depression Feelings of emptiness Feeling unhappy	Having lost the spark Most things feel worthless Feeling unengaged Difficulties finding joy	Self-blame Embarrassing to be affected Limitations cause guilt Fatigue causes shame

familiar with the dataset, had the opportunity to provide their views on the findings and the analysts’ interpretations. The themes were finalised following a review by author 3 (SJP), who has considerable methodological experience. See [Table 2](#) for coding tree sample (see Appendix 3 for the full coding tree).

Moreover, a quantification of the data was performed using descriptive features in NVivo 12 Pro (QRS International Pty Ltd., Australia). The use of quantification in qualitative research can have several benefits (Maxwell, 2010). As a complement to the qualitative analysis, it can for example facilitate the identification of patterns within the data and thus provide a deeper understanding of the studied phenomenon. The aim of the data quantification was to provide an overview of the diversity of perceptions and experiences represented within the data set and to contribute to the internal generalizability of the findings, i.e. that the identified findings are characteristic of the study participants (Maxwell, 2010). For frequency table, see [Table 3](#) in the Results.

Rigour/Trustworthiness

The concepts of *credibility*, *dependability* and *transferability* are commonly used to describe trustworthiness in qualitative research (Graneheim & Lundman, 2004), and several measures were taken to ensure trustworthiness throughout the study process. Regarding the sampling strategy, gathering data from purposively selected patients, ensured that the participants had the knowledge and experiences necessary to provide a deeper understanding of the research questions at hand. Furthermore, the variation within the sample regarding for example age and gender (see [Table 1](#)), as well as the variety in recruitment context were deemed to facilitate an exploration of the research questions from different perspectives, and thus increase the credibility of the findings (Graneheim & Lundman, 2004).

As data is shaped by the context in which it was originally collected, performing a data analysis at a later point in time may pose a risk of misinterpretation (Ruggiano & Perry, 2019). As a measure to mediate this risk and increase the credibility of the findings further the research team included researchers involved in the parent study (EO and FN), contributing with extensive first-hand knowledge of the data. Combined with the uninfluenced outlook of the researchers immersing in the data for the first time (TL, SJP and SH), this composition facilitated a rich discussion within the research team. Moreover, by including a third coder to triangulate our analysis, we aimed to further strengthen the trustworthiness of our findings.

Table 3. Frequency table. Number of coding references and participants represented in each category presented according to the participants rank.

Research question, theme and category	Coding references, N	Participants, N (%)
Emotional reactions		
Hypoarousal reactions and low mood		
Depression*	135	54 (59)
Loneliness and social isolation	13	11 (12)
Fatigue and limited strength	23	19 (21)
Positive or mixed emotions following the MI	12	7 (8)
Hyperarousal reactions		
Heart-focused anxiety*	284	82 (89)
Difficulties sleeping	16	11 (12)
Stress	35	23 (25)
Anger and agitation	37	23 (25)
Difficulties concentrating	11	8 (9)
A changed sense of self and outlook on life		
Experiencing a changed reality	46	33 (36)
Experiencing a changed self-image	85	45 (49)
The MI as a motivation for change	36	24 (26)
Strategies for managing emotional distress		
Avoidance of potentially rewarding situations*		
Withdrawal from social situations	44	30 (33)
Withdrawal from positive activities	12	7 (8)
Avoidance of heart-relevant stimuli triggering anxiety*		
Avoiding emotions	33	27 (29)
Avoiding activities	12	8 (9)
Engagement in potentially positive activities and acceptance		
Engaging in pleasant activities	15	10 (11)
Engaging in physical activity	12	12 (13)
Relaxation	11	10 (11)
Adopting a mindful coping approach	21	19 (21)
Seeking support from loved ones	13	12 (13)
Seeking healthcare support	8	7 (8)
Doing nothing at all	7	7 (8)
Total	921	92

*= Initial deductively generated categories.

Results

In the analysis 6 themes and 23 categories were developed, the findings from the qualitative analysis are explored further below. Translated quotes are presented to support the findings

Research question 1: emotional reactions following an MI

Participants highlight how the MI experience can elicit a wide array of emotional reactions, varying in prevalence, intensity and impact on everyday life. These reactions were explored further in the first three themes: Hypoarousal reactions and low mood; Hyperarousal reactions; and A changed sense of self and outlook on life.

Theme 1. Hypoarousal reactions and low mood

Hypoarousal reactions, such as low mood, sadness and grief, are common among the participants and at times grounded in the disruptive nature of the MI-event and a sense

of disappointment and limitation in the daily life. In addition, the MI experience has left participants feeling more emotional and at times, “close to tears.” Following the MI, low mood is frequently described, presenting as negative and “dark” thoughts, indifference, hopelessness, and the perception of having lost the sense of happiness and joy in life. In addition, feelings of shame, guilt and self-blame can cause participants to keep their emotions to themselves. Consequently, several participants express a sense of isolation following their MI. At times, emotions are contradicting where the wish to be left alone comes together with feelings of loneliness.

In addition, an unfamiliar sense of fatigue can become overwhelming and exacerbate feelings of passivity further. Some portray the fatigue as long term and persistent despite well-functioning sleeping patterns.

The tiredness is numbing but incredibly difficult to explain to others, even to relatives. I have difficulties initiating things and therefore very little gets done. *(Female, 45 years)*

Theme 2. Hyperarousal reactions

Heart-focused anxiety is the dominating hyperarousal reaction among the participants and manifests in various ways. Physical vigilance is common, where participants describe being overly attentive to bodily symptoms in general and cardiac symptoms in particular. This kind of vigilance can take up a considerable amount of time and energy.

Thinking a lot as soon as something is happening in my body. Too large an extent of my day is devoted to interpreting everything that is happening in my body. *(Male, 53 years)*

Moreover, participants describe how they worry about their recovery, subsequent cardiac events, and the possibility to achieve future health and well-being. Thoughts of the risk of dying and death are prevalent and constitute a source of fear and anxiety, often grounded in the anticipated impact on family and loved ones.

Following the MI, worries and uncertainties regarding how much the body and heart can manage, at times limit the ability to live life to the fullest. Some participants describe a sense of safety during the rehabilitation and recovery period, as they have been shielded from the outside world. When this period ends, some patients fear being exposed to the stresses of their daily lives again while simultaneously having to maintain a healthy lifestyle and a balanced working life. In addition, lacking information as to why one has been affected can exacerbate this fear further, as they experience that they cannot prevent future cardiac events.

No one can explain WHY, so what shall I change in order to not have another one? No doctor can answer that, more than work stress, avoid that. How easy is that? Do I dare go back to work?. *(Female, 51 years)*

Fear frequently presents itself in the form of worry and rumination, a habit that is perceived to have increased following the MI. Worry and rumination are described in different terms among the participants, some describe it as necessary in order to move on from the MI event, while the vast majority perceive it as negative, time consuming and difficult to control. This is narrated by one participant, describing how nightly worry and rumination cause sleeping difficulties.

Ruminating is extremely wearisome if you get stuck in it, and in the worst case it will be long sleepless nights because you can't relax. If it isn't extremely bad you eventually get tired, but by then it's maybe 2–3 o'clock in the morning and you have lost a couple of hours of sleep.
(Male, 40 years)

Some participants highlight difficulties gathering their thoughts, concentrating, and focusing, with an impact on the ability to initiate and finish tasks. Moreover, anger and agitation, at times rooted in a sense of helplessness and of being unfairly affected due to a relatively young age and lack of risk factors, are described by some participants. Furthermore, limitations due to residual symptoms (e.g. physical impairments or cognitive difficulties), can cause irritation and frustration. Some participants describe how being easily irritated and angry have had major negative impacts on their daily lives, affecting work performance and relationships with family and friends.

Theme 3. A changed sense of self and outlook on life

The degree to which the MI event is perceived to be significant and unexpected, varies among the participants. Some describe their MI as primarily a practical issue with limited emotional impact, or as an anticipated event due to previous cardiac events or heredity to cardiovascular disease. To others, the MI constitutes an overwhelming and life-altering event, evoking feelings of shock, surrealism, and a sense of crisis.

A perceived impact on the self-image is frequently described among the participants, commonly connected to a shift in identity, from strong to vulnerable; healthy to sick; and active to restrained. Some participants narrate difficulties coming to terms with these changes and not feeling like their old selves anymore.

I have always been the strong one, have been out walking and cycling a lot. But now it feels like I have no energy and easily become sensitive [...].
(Male, 58 years)

This perception may be further aggravated by feelings of unfamiliarity with own emotional responses, which are frequently believed to be unpredictable and irrational, as well as uncertainties regarding own physical capability, stress-management or how to live life following an MI.

I don't know what to do, where's the line between "living a normal life without limitations" and exposing oneself to risks that can cause a new infarction ...
(Female, 51 years)

On the other hand, more positively, the MI may introduce a new outlook on life, and how it is being lived. Including a shift in priorities with an increased focus on what is important and on one's own well-being.

[...] like you have gotten a larger distance to all the small problems in life, which is positive. At least it feels like the ability to remain indifferent to things that really aren't so important has increased [...].
(Male, 40 years)

Even though negative emotions are found to dominate following an MI, the experience can also evoke positive or mixed emotions. In these cases a sense of sadness, anxiety and depression can be perceived on one hand, in contrast to happiness, relief and gratitude on the other.

I have become more subdued, careful and low and unstable but at times also feeling great happiness over little things and experiencing a strong will to live". (Female, 66 years)

Some participants describe the prevalence of positive emotions further, including an intense happiness to be alive, relief due to the positive cardiac outcomes, and gratitude for the opportunity to "get another chance" in life and more time together with loved ones. Furthermore, some participants describe how they are carrying out lifestyle changes following their MI, making efforts to live healthier by limiting stress exposure and altering negative habits.

Research question 2: strategies for managing emotional distress

Various strategies for managing emotional distress were identified in the analysis, these strategies will be explored further under the following themes: *Avoidance of potentially rewarding situations*; Avoidance of heart relevant stimuli triggering anxiety; and Engagement in potentially positive activities and acceptance.

Theme 4. Avoidance of potentially rewarding situations

Participants describe how they in their attempt to handle emotional reactions tend to withdraw, both socially and physically. For some, the ongoing management of distressing thoughts and emotions make social interactions more challenging. This can present as difficulties being close to others due to a sense of unease. In order to cope participants tend to stay at home or find a quiet place to manage their emotions.

A lot of times I withdraw from watching the TV and go to the laundry room where I can be left in peace. (Female, 39 years)

Furthermore, some participants describe how they become quiet and hide their emotions from family and friends. This behaviour can originate from a sense of embarrassment and fear of sympathy from others, or serve as a measure to spare loved ones from further worry.

In addition to a social withdrawal, some participants describe how they following the MI tend to withdraw from activities or don't initiate projects or tasks. This type of withdrawal frequently stems from a sensation of overwhelming mental or physical fatigue or a lacking motivation to engage in activities or interests.

The fact that I don't have the energy to do anything, I simply become exhausted. (Male, 58 years)

Theme 5. Avoidance of heart-relevant stimuli triggering anxiety

In the analysis, heart-focused fear and anxiety in particular were identified as drivers for avoidance. Among the participants, this could affect various situations generated by heart relevant stimuli such as the resumption of physical activity, acquirement of disease-related information, and engagement in activities.

I postpone or don't start tasks that I have planned because I feel stressed and worried that something will happen to my heart. (Male, 70 years)

Moreover, avoidant behaviours could be described as protective from situations that may elicit a distressing emotional response, e.g. sadness, fear or apathy, including the suppression of difficult thoughts or avoidance of certain types of media, such as emotionally moving books or films. In order to manage emotional distress participants describe utilising distractions or trying to divert their attention elsewhere, towards for example household chores or work. Some participants highlight how engagement in regular physical activity can give a sense of respite from, and in turn avoidance of, negative emotions and ruminating thoughts.

Trying to activate myself with exercise every day, working out pretty hard, listening to music etc. All to try and disconnect from the rumination.
(Male, 61 years)

Theme 6. Engaging in potentially positive activities and acceptance

When managing challenging thoughts and emotions, such as worry about the future and low mood, participants commonly try to change their focus towards other things in order to gain relief. Some of these activities and behaviours could be potentially positive in their nature, e.g. listening to music, reading, playing the piano, watching TV or crafting.

When I feel the most low I usually try to paint, crochet or tend to other things, it soothes me and I slowly come back.”
(Female, 44 years)

Moreover, participants describe how they are staying active in order to improve their emotional and physical well-being with activities including going for a walk, practicing yoga, playing with their children or going to the gym. Actively trying to calm down is another measure to stay in control of bodily symptoms, which often trigger troubling thoughts and emotions. This could be done by focusing on one's breathing or by performing relaxation exercises.

Yet another approach to manage emotional distress is to accept its presence and wait for it to pass. A few participants describe how they do nothing special to handle their emotions, some perceive the severity of the emotions as limited and therefore see no need to manage them at all. Others persist and keep on as normal despite the presence of troubling emotions. Having a mindful approach to emotional reactions can also be of help, and participants describe different strategies of emotional acceptance.

I think that the thoughts you have need to be thought, not neglected, but it is important to not get stuck in them, not brood, but look upon them without evaluation and try to understand them for what they are (worry, fear, sadness, guilt and so on). (Female, 50 years)

Positive thinking is one approach utilised to counteract negative and depressive emotions, where participants try to think positively and be mindful of what is possible instead of existing limitations. Moreover, thinking constructively is another approach, where participants analyse their thoughts and emotions in order to alter them in a more constructive direction.

[...] I remind myself that potential worries can only make things worse, and that I am most likely a little bit of a hypochondriac, so potential fear is mostly self-induced and not completely grounded in reality.
(Male, 59 years)

In contrast to the social withdrawal described in theme 4, some participants highlight social support as an important aspect of handling emotional distress. They often find support in their immediate proximity in the form of partners, family members and friends with whom they can share thoughts and emotions during the rehabilitation process and find reassurance. It is highlighted how trust, sincerity and a sense of being understood are important aspects when deciding in whom to confide.

We talk a lot, my wife and I, she has also had a rough journey, so when I'm sad we talk.

(Male, 68 years)

Support can also be found within the healthcare system. For example among fellow patients who share the same experiences. Moreover, some participants describe how they have reached out to healthcare professionals including cardiac nurses, psychologists, couples therapists, counsellors, and physical therapists in order to manage difficult emotions and reduce tension within close relationships.

Quantitative findings

The quantitative findings, presented in Table 3, provide an overview of the disparities within the data and indicate some trends within the participants' accounts. With regard to emotional reactions following the MI three categories had the largest proportion of participants represented: the deductively generated categories *Heart-focused anxiety* (89%) and *Depression* (59%); as well as the inductively generated category *Experiencing a changed self-image* (49%). Regarding the strategies used to handle emotional distress three categories had the largest proportion of participants represented: the two deductively generated categories *Withdrawal from social situations* (33%) and *Avoiding emotions* (29%) as well as the inductively generated category and *Adopting a mindful* coping approach (21%).

Discussion

In this study we have explored a variety of patient-reported emotionally stressful reactions following an MI, and strategies utilised to manage these. This was done with the background that psychological interventions for patients with CVD still lack focus and clear evidence of their effectiveness. A better understanding of the patients' experiences can hopefully lead to improved treatments. In the following, the findings will be discussed mainly in relation to a suggested behavioural model for emotional distress after an MI, based on learning theory (Figure 1). This model is a simplified description of the theory behind the behaviourally oriented interventions of the multicomponent general cognitive behavioural therapy (CBT) approach, stressing the focus on experiential avoidance, both for depression and anxiety.

The stressful and life-altering nature of an MI has been recognised in previous research (Andersson et al., 2013; Petriček et al., 2017) and is evident also in the results from the present study. Of the a priori expected depression-related symptoms, patients emphasised new onset sadness, anhedonia, low mood and feelings of guilt and shame. Further, a novel sense of fatigue and social isolation attributed to the MI were also mentioned. These latter factors could potentially lead to, or worsen depression in patients

as they change the reinforcement contingencies. This would then be in line with the disruption in the normal behavioural pattern that is described in Lewinsohn's theory. For example, this was supported in another recent qualitative study where an MI was suggested to cause habit-breaking (Amirova et al., 2022). When it comes to anxiety, participants described various triggering factors including thoughts about recurring cardiac events, uncertainties regarding how much strain the heart can manage, and bodily sensations such as chest pressure or pain, much in accordance with the heart relevant stimuli mentioned in the behavioural model. Worry and rumination were frequently reported. These often concerned the future (e.g. management of work stress, future health concerns and the situation of loved ones) and what could have been done differently in the past (e.g. a more healthy lifestyle). As expected, our results are thus in line with previous findings of elevated levels of HFA among cardiac patients (Hoyer et al., 2008; Rosman et al., 2015). Other hyperarousal symptoms were also mentioned, such as feeling stressed, problems with focus and concentration, difficulties sleeping, and anger and agitation. These are typical symptoms of anxiety and sometimes also of depression. More specifically, the reported nightmare disturbed sleep, is indicative of PTSD. Anger and agitation generally impacts on social relationships and may result in a loss of reinforcement, or worse, from the target object (Ferster, 1973). Participants describe how their agitation can be rooted in a sense of injustice (e.g. being too young for an MI), or helplessness (e.g. the MI being unpredicted). Helplessness, also unrelated to anger, has been linked to resignation and depression. The learned helplessness theory states that helplessness is learned after enduring aversive situations failing to control or prevent them (Maier & Seligman, 1976). Learned helplessness and low self-efficacy among MI-patients has been found also in previous research (Smallheer & Dietrich, 2019). Participants also described a changed sense of self and outlook on life after the MI. Being struck by a chronic illness is a disruption in everyday life that changes the future expectations one can have. The participants described how the MI experience altered their ideas about themselves, their relationship with others, and the future. To some extent this can be understood in the terminology of Beck's cognitive theory of depression (1979), where the new experience may trigger assumptions (or schemas) developed from previous experiences (e.g. I have to be strong to be good). The questioning of one's own identity, worth, relationship to others, and the future might result in a sense of confusion and loss. Also, the disease (the MI) itself is interpreted, often as a threat eliciting fear and avoidance, but sometimes patients also described how they actively tried to give meaning to the event, accept it and question their own less rational fear-influenced thoughts. The importance of illness perception has been stressed in other studies, and to intervene on illness perception has been found favourable for recovery after MI (Petrie et al., 2002). Finally, some participants also reported some positive or mixed emotions regarding their MI. A higher appreciation of life and a motivation for lifestyle changes were mentioned. This can possibly be understood in line with the theory of post-traumatic growth but is beyond the scope of this article (Tedeschi & Calhoun, 2004).

Patients try to manage their emotional distress in various ways. As anticipated, social withdrawal was one of the most frequently mentioned strategies utilised. Social interaction is generally believed to be one of our basic needs (Maslow, 1943) and its importance for reward and reinforcement has been confirmed even on a neurological level (Rilling & Sanfey, 2011).). In addition to social withdrawal, participants also mentioned that they

stopped participating in previously reinforcing recreational and leisure time activities. This may limit the availability of positive reinforcement further. Low energy levels and fatigue were the reasons for withdrawal most often mentioned in the present study. When it comes to heart-relevant stimuli, both activities that trigger anxiety and the feeling of anxiety in itself are reported being avoided. This omits the opportunity of exposure to the conditioned stimuli, and thus habituation and extinction, which, according to learning theory, is needed to break the vicious maintenance circle of anxiety (Mowrer, 1956). However, it can sometimes be difficult to differentiate if a behaviour serves the function of experiential avoidance from a learning perspective, or if it is a competent handling of the situation. In fact, many of the patient reports indicate that some potential avoidance may rather facilitate temporary relief, relevant support or general health outcomes. For example, distraction by engaging in pleasant activities, relaxation, physical activity and exercise, or seeking reassurance from healthcare or ones family, could contribute to increased wellbeing with few anticipated negative outcomes. Some of these activities are also standard components of cardiac rehabilitation, e.g. physical activity.

In summary, we found that participant's reports of their experiences of distress after an MI and their attempts to handle these experiences, were in line with the a-priori defined behavioural model which is based on basic learning theory. This suggests that a behavioural approach, within the CBT umbrella, focusing on the experiential avoidance, such as behavioural activation or exposure therapy, is relevant. Suggestions for themes to target in behavioural activation and exposure therapy can be found in citations and examples above. However, there is an inherent truism in that to decrease avoidance you must use non-avoidant strategies. Experiences are avoided for a reason. To reach the approaching behavioural strategies, e.g. exposure and behavioural activation, psychoeducational and motivational strategies may be needed to establish awareness and intention. U-CARE heart had a certain focus on approaching strategies. We do not know if an approach even more focused on avoidance would have been beneficial.

In addition to the above we found an array of experiences illustrating the complexity of suddenly being struck by a potentially lethal event leading to longstanding behavioural adaptations. Some of the reports also fit with established cognitive treatment approaches sometimes applied in psychological treatments for CVD patients. In fact, this study does not rule out any treatment approaches but highlights the match between patients' experiences and learning theory. Being a qualitative study, the focus is descriptive and explorative rather than comparative and conclusive.

Methodological considerations

The data analysis was an iterative process and a continuous dialogue was maintained within the research team with the aim to establish agreement on the interpretation of the data and limit the risk of bias on behalf of the analysts due to pre-existing assumptions (Elo & Kyngäs, 2008; Graneheim & Lundman, 2004). Despite the potential inherent limitations analysing worksheet data, e.g. a lack of depth in the answers provided, this method of data collection may enhance the dependability of the findings as the questions were framed in a consistent way to all participants, thus limiting the researchers'

influence during the data collection process (Graneheim & Lundman, 2004). Due to the variety within the sample and recruitment context, we believe that the findings could be transferred to relatively young (<75 years) MI patients suffering from depression and/or anxiety in similar settings. Moreover, the authors have strived to describe the study design thoroughly in order to facilitate the readers' own judgement of the transferability to other settings or patient groups (Elo & Kyngäs, 2008; Graneheim & Lundman, 2004).

The present study had some methodological limitations. The findings of any study are dependent on the quality of the data collected. At times the participant responses were short and lacking in depth, which could make the inherent meaning of the answers difficult to interpret. When conducting an analysis at a later point in time the possibility to return to the participants for verification of the findings is limited. As a measure to address these limitations, meetings within the research team were held continuously throughout the research process in order to discuss the interpretation and conclusions drawn from the data. Moreover, the design of the data collection tool may have introduced a risk of bias with regard to the findings. In the outline of the worksheet (see Appendix 1) the question regarding strategies was stated with examples which could have had a leading effect on the responses given. Furthermore, the fact that the patients had already consented to participate in a CBT self-management programme may have introduced bias, potentially skewing the findings towards certain types of answers. Also, one inclusion criterion was to have at least mild anxiety or depression according to the HADS instrument. It was thus not unexpected that they would report mainly anxiety and depression. On the other hand it was important to include only patients eligible for psychological interventions, in line with the rationale of the study, and the results were interpreted beyond just anxiety and depression. We encourage future research to continue to investigate the emotional reactions and the strategies for managing these reactions in other samples, with an even more open approach, to identify potential variations. It should also be noted that even though the questions in the work sheet explicitly asked for reactions to the MI, many participants may have experienced depression or anxiety already before the MI which may have influenced their answers.

Implications for practice

The findings suggest that the MI may constitute a stressful and disruptive event, triggering emotions, such as anxiety and depression, as well as a shift in the perception of the self and one's own identity, thus adding to the findings of previous research (Norlund et al., 2018; Petriček et al., 2017). Furthermore, the findings are in line with the proposed behavioural model stressing the importance of experiential avoidance and withdrawal in the maintenance of both anxiety and depression following an MI, thus indicating that the corresponding therapeutic interventions based on CBT principles should be applicable addressing these problems in this population.

Conclusion

The findings indicate that the MI experience may elicit a wide array of emotional reactions, with a particular emphasis on fear and anxiety, sadness and depression and

a shift in the perception of the self and one's own identity. Patients tend to handle their emotions through, for example, social withdrawal and experiential avoidance which likely maintains the distress. Hence applying a behavioural model to emotional distress following an MI appears to be a good fit.

Acknowledgments

We would like to acknowledge the participants in the U-CARE Heart clinical trial for sharing their experiences.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This study is a part of the strategic research environment U-CARE, which is funded by the Swedish Research Council (dnr: 2009-1093). The U-CARE Heart clinical trial was also funded by The Swedish Heart and Lung Association (dnr: E 148/11); the Uppsala-Örebro Regional Research Council (dnr: 22 86 61); Swedish Research Council for Health, Working Life, and Welfare (dnr: 2014-4947); and the Vårdal foundation (dnr: 2014-0114).

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