

Introducing the Heartfulness Project

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Abstract

The Heartfulness Project was developed as an integrative program for people suffering from heart disorders. The program has been trialed twice and the results are positive: people with cardiovascular diseases feel more optimistic and less stressed when they incorporate the new skills as taught in the program into their lives.

Context

Heart disease is the number one cause of death worldwide and along with depression is a leading burden and cost to health services. An estimated 17.9 million people died from cardiovascular diseases (CVD) in 2016, representing 31% of all global deaths with more people die annually from cardiovascular diseases than from any other cause. Of these deaths, 85% were due to heart attack and stroke with an increasing proportion occurring in developing worlds in people of middle age. (Cardiovascular diseases include coronary heart disease (CHD), myocardial infarction (heart attack), heart failure, stroke, hypertension (high blood pressure), diseases of the circulatory system and diabetes) (WHO, 2016).

In the UK, cardiovascular disease causes more than 1 in 4 of deaths with coronary heart disease being the biggest single cause of death (BHF, 2015). In 2014, one quarter of premature deaths in men and around 17% of premature deaths in women were from cardiovascular diseases (premature in the UK being defined as below 75). This statistic shows an improvement in survival rates from cardiovascular diseases over the period 1969 – 2013 with the death rate for under 75s having fallen by 80%. However, this masks the fact that some heart diseases have not shown any improvement in survival rate. (Taylor, 2017; NIHR, 2017). Between 1998 and 2012, survival rates for people over 45 with heart failure have shown no improvement compared with survival rates for cancer doubling over the last 40 year. Currently there are approximately 600,000 people in the UK living with heart failure with this increase being described as epidemic (Cowie, 2017). The result of medical advances means that more people are surviving acute heart episodes (e.g. heart attacks) in middle age and progressing into old age with an increasing number of heart related disorders such as heart failure. The progression of heart diseases such as ischemic heart disease (result of a heart attack), high blood pressure and atrial fibrillation often results in heart failure (Al-Mohammad & Mant, 2011). In the UK the increasing

incidence of atrial fibrillation have been described as an emerging epidemic (Stewart et al, 2004) with 7 million people now living with a heart and circulatory condition (BHF, 2018). In 2013-2014 the NHS expenditure on cardiovascular disease was £4,292 million for England alone with the estimated total cost of cardiovascular disease in the UK (including lost work days due to mortality and morbidity) being £15.2 billion, rising to £18.7 billion in 2020 (BHF, 2015).

Both the World Health Organization (WHO) and UK health authorities highlight risk factors such as blood pressure, cholesterol, tobacco and alcohol usage, physical inactivity, obesity, unhealthy diets and diabetes for cardiovascular diseases. The WHO recognizes the role that a person's mental health and psychological stress plays in the development and progression of heart diseases. Depression is associated with an increased risk of coronary heart disease; and chronic life stress, social isolation and anxiety increases the risk of heart disease and stroke (WHO, 2016; Abramson, Berger, Krumholz & Vaccarino, 2001; Brown, Barton & Lambert 2009; Barton et al., 2007, Joynt, Whellan & O'connor 2003). Conversely, when a person develops a heart disorder there is an increased risk of developing anxiety and depression disorders (Dhar & Barton 2016; Emani & Binkley, 2010; Ferketich & Binkley 2005). There is a direct link between depression and anxiety in those individuals with cardiovascular diseases and mortality rates (Carney & Freedland, 2003; Carney, Freedland & Veith 2005; Grossman et al, 1996; Jünger, 2005; Watkins et al, 1998). This bidirectional association between psychological states and cardiovascular disease (Grippe & Johnson, 2009) is under current research in a number of institutions and has been shown to be independent from the other traditional risk factors as blood pressure, exercise, diet, and lifestyle factors (Glassman, 2007). In the USA there is a call to screen cardiac patients for depression (Lichtman, 2008; Lespérance, Frasure-Smith, Talajic, Bourassa, 2002) and in 2001 the National Institute of Mental Health presented data linking depression with cardiovascular disease. The usefulness of pharmaceutical interventions in a cardiac population has been called into question with one study finding a 49% increased mortality risk for people using antidepressants (Veien et al, 2011).

In the UK there has been less awareness of the role of a person's emotions and psychologies upon the acquisition and progression of heart diseases with the emphasis been largely upon behavioral lifestyle change and increased physical activity. Whilst this is undoubtedly an essential component in both prevention and management of cardiovascular diseases it does not address the emotions of the person and the possible benefits through psychological interventions. In fact, it has been suggested that obesity is not correlated with the incidence of heart failure and that other mechanisms need to be investigated (Movahed & Saito 2009).

There is growing awareness of interactions between psychological and physical health with many mind-body techniques now being routinely utilized (Emani & Binkley, 2010; Kemp & Quintana, 2013; McClafferty, 2018). It is this reciprocal interaction between a person's psychological health and physical heart health which

provides the basis of the training delivered in the Heartfulness Project and will be expanded upon throughout the rest of this paper.

Personal Experience

In 2009 I (MC) had a heart attack which resulted within minutes in cardiac arrest (Campbell & Bendijk, 2016). The extreme damage that this event caused to my heart only became clear after a number of years of ever-increasing chronic health issues. I was finally diagnosed with a left ventricular aneurysm and heart failure in 2012 and I had to stop working in the NHS. I had been through the cardiac rehabilitation program (BHF, 2017b; BHF, 2018b) which had been very helpful in helping me start exercising and gave me confidence to eventually return to work. I had decided to retrain in psychology since my interests had shifted after having gone through the trauma of a cardiac arrest. My background was as a research scientist in chemistry and physics and after my illness I was much more drawn to people and to helping others. Initially I had not been told that I had heart failure. When I asked 'why not?'; the cardiologist responded that it might have frightened me. In later years I realised that others with heart conditions reported similar experiences. I made choices with regards to my health based without any knowledge or real understanding about how stress and my emotions could affect my heart and physical wellbeing. At the time I worked in a very stressful NHS environment and was experiencing firsthand how stress was somehow influencing my health as my heart began to deteriorate.

It was after I stopped working in the NHS that I began to research my own condition and look at ways that could support my heart. I had been told the aneurysm was inoperable and it continued to grow until 2017 when it stabilized. Similarly, my heart function continued to decrease to a low of about 30% in 2015 when I began to really practice the mind-body techniques I had been researching. I began practicing Mindfulness soon after I had come out of hospital after the cardiac arrest and it had proved invaluable in enabling me to manage both my emotions and physical health conditions. The part of Mindfulness that encompassed compassion-based practices I found particularly useful and I have since trained as a Mindfulness teacher and a Mindful Self-Compassion teacher. I took up exercises such as Tai Chi, Qi Gong and Nordic Walking and worked on implementing into my life the learnings that I had discovered that could support my heart health. In 2018 my heart function was up to 40 – 45% and the aneurysm staying stable. On my journey of discovery into what would benefit my own condition I very quickly came across the statistics and life expectancies for those with heart conditions like myself. Depending upon the source and age they vary from 2 – 7 years.

Upon writing this paper I am in my 10th year of living with heart failure. I am extremely grateful and happy to be able to do so and very grateful to have lived the majority of those 10 years without depression or fear. In 2016 I gave evidence at the All Party Parliamentary Group on Heart Failure in the UK and was quoted in their report calling for more psychological support for those with heart conditions (APPG, 2016). Through my own experience and research, I had an understanding of the reciprocal nature of heart disease and psychological health and knew that it could help others. In 2017 myself and TR ran in London the first pilot study of the Heartfulness Project which took an integrative approach to heart health by understanding the reciprocal nature of a person's emotions and heart health. The outcomes and learnings from this and the further two courses are presented in this paper along with the theoretical underpinnings of the model used.

The Physical and Emotional Heart

It is only with the heart that one can see rightly; what is essential is invisible to the eye.

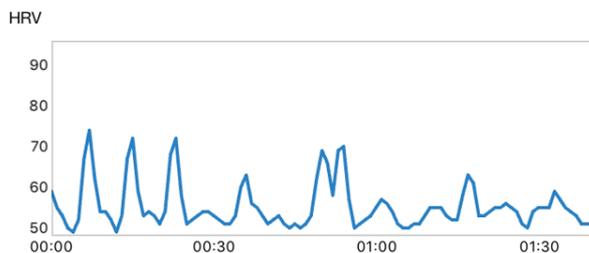
Antoine de Saint-Exupery

Our language is filled with references to our hearts and the emotions felt in this area. Heartfelt, heartfelt, hearty, heartbroken, heartache, heart bleeding, from the bottom of my heart.....the list is long. The fact that our hearts play an important role in the subjective experience of emotions has long been known throughout history and emotions play a crucial role in our everyday decision making (Lerner, Li, Valdesolo & Kassam, 2015). The world's literature is filled with references to the heart for love, compassion, kindness and the pain that a person feels upon separation from a loved one. Modern day scientific disciplines such as neurocardiology have discovered that our nervous system extends from the brain down into the heart with the heart having around 400,000 neurons (Learning Mind, 2019; Pereira, Cerqueira, Palha & Sousa, 2013) and 80% of the nerve fibres between the heart and brain carry sensory information from the heart back to the brain (Thayer, 2007). We can sense things through our heart and our nervous system in a term called neuroception coined by Stephan Porges in his Polyvagal Theory (Porges, 1995; Porges, 2011). Our empathic abilities rely in part on being able to feel what the other person is feeling, to resonate on a neuronal heart level. The wide range of emotions that we experience are reflected in the heart's rhythm, termed heart rate variability (HRV), where there are continuous changes in the heart rate depending upon the situation and emotional response. High heart rate variability has been consistently correlated with both mental and physical wellbeing (Mather & Thayer, 2018; McCraty & Shaffer 2015).

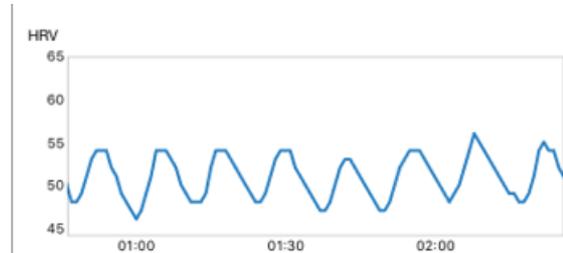
Input to the heart from the brain occurs via both the sympathetic and parasympathetic (via the vagus nerve) branches of the autonomic nervous system and provides opposing energies. Broadly speaking sympathetic activation to the heart increases heart rate (HR) and blood pressure (BP) and parasympathetic input provides an inhibitory energy opposing this sympathetic activation. This allows flexibility to the system whereby withdrawal of the inhibitory energy of the parasympathetic input allows rapid increases in HR and BP in preparation to respond to environmental challenges and threats. This inhibitory parasympathetic energy is supplied through the ventral vagal complex and referred to as the vagal brake. This system is in continuous dynamic flux with constant adjustments in HRV signifying the person's situation and emotions (Porges, 1995; Porges, 2011).

In homeostasis, there is a balance in the interplay between these inputs to the heart. In times of safety the sympathetic activation to the heart is inhibited by the vagal brake resulting in a normal heart rate of between 60 – 100 bpm in an adult. In this state it is possible to rest, restore energy, heal and engage in social interactions. Corresponding neurotransmitters are those of oxytocin and vasopressin and associated healing emotions of contentment, gratitude, love and compassion are available. The HRV pattern in this state is very regular and coherent, indicating that the person is in a state where everything is working together in harmony, in mind and body. In contrast when a person is under threat or stressed the vagal brake is withdrawn readying the body to engage with whatever the situation requires. Heart rate increases, blood pressure goes up and stress hormones such as cortisol and adrenaline are pumped through the body. The HRV pattern in this threat state is very incoherent, rapidly changing in response to threats to fuel the body with the needed energy to engage. Associated emotions in this state are fear, anger, stress, anxiety and depression. This is a high energy state that does not allow rest or healing and ultimately will lead to exhaustion if the vagal brake is not reinstated (Porges, 1995; Gilbert, 2009).

Heart Rate Variability Traces



Incoherent stressed state



Coherent contented state

There are a number of physical diseases that are characterized by an imbalance in this regulatory system. In heart diseases parasympathetic inhibitory energy (vagal brake) to the heart is reduced, accompanied by an increase in sympathetic activation.

“Unfortunately, there are disease states that compromise the regulatory function. Some disease states (e.g., hypertension) are characterized by a depression of PNS tone with a compensatory SNS excitation. Other disease states (e.g., diabetes) are characterized by a depression of the PNS tone without eliciting a reciprocal SNS excitation, while other disease states may be characterized by dual inhibition.” (Porges, 1995)

Heart failure occurs when the chambers of the heart are not pumping efficiently and there is a reduction in this capacity to pump blood around the body. It is characterized by parasympathetic withdrawal from the heart and increased sympathetic activation (Emani & Binkley, 2010; Floras, 1993; Floras & Ponikowski, 2015; Kemp & Quintana, 2013). The loss of parasympathetic input to the heart exposes it to unopposed sympathetic energy producing direct damage to the muscles of the heart resulting in adverse events such as heart failure and sudden cardiac arrest (Gorman & Sloan, 2000; Grossman, 1996; Kemp & Quintana, 2013; Krantz & McCeney, 2002).

Parasympathetic withdrawal and sympathetic activation of the heart equates with a state of threat and with emotions of fear, anxiety and depression (Porges, 1995; Gilbert, 2009; Rothschild, 2000). Depression is associated with sympathetic and parasympathetic imbalances that can produce an environment that can promote coronary heart disease, heart failure and sudden death (Brown, Barton & Lambert, 2009; Emani & Binkley, 2010).

The evidence thus points to a reciprocal dysfunction in the autonomic nervous system linking heart disease with emotions such as depression. This imbalance between the parasympathetic and sympathetic inputs to the heart, whether initially through a physical heart condition or through a mood disorder such as depression, greatly increases the risk of developing the other condition. Treatment of heart conditions without treatment of the comorbid anxiety and depression may mean that the heart continues to deteriorate due to continued imbalance between the sympathetic and parasympathetic inputs to the heart from depression or anxiety. Conversely those suffering from mood disorders such as depression are at increased risk of developing cardiovascular diseases. Coupled with this is the psychology of a person who suffers from cardiovascular disease. Heart failure is currently incurable and often consists of a steady decline into debilitating comorbid illness such as kidney failure. The afflicted person becomes very aware of the threat of illness and death and as Porges goes on to say: -

“Perceptions and assumed threats to survival, independent of the actual physical characteristics of the stimulation, may promote a massive withdrawal of PNS tone and a reciprocal excitation of SNS tone” (Porges, 1995)

Thus, providing a further parasympathetic withdrawal and sympathetic activation of the heart resulting in further damage to the heart resulting in increased risk of anxiety and depression and so the cycle goes on. These two factors, the parasympathetic withdrawal due to the physical damage to the heart and the parasympathetic withdrawal due to the cognitive evaluation of being under threat results in a massive imbalance in the autonomic nervous systems inputs into the heart leading to further physical damage until death occurs.

Section Summary

Heart disease is characterized parasympathetic withdrawal and unopposed sympathetic activation. This biological consequence of the physical heart being damaged results in HRV patterns that corresponds to the emotions of anxiety, stress, fear and anxiety. When an individual has a heart disorder, they experience these negative emotions which puts them into a threat state. Since our mind and bodies are so intricately connected, the corresponding cognitions arising are of negative origin with much anxiety and fear around illness and dying. As pointed out in the Polyvagal Theory Therapy; state precedes story and the physiological state that the individual is experiencing drives the stories of the individual around their personal experience of illness. Consequently, a large number of individuals with heart disease experience fear and anxiety with thoughts of death which can result in complete shutdown into depression and a freeze response. The individual feels hopelessness and despair with no motivation or the will to do anything; even the will to live disappears.

The Heartfulness Project

The Heartfulness Project has been designed with this above knowledge and uses a mind-body paradigm that address both sides of this equation. When a person experiences a threat that is internal such as cardiovascular diseases and cancer, our evolutionary adaptive behaviors in response to threat can become maladaptive. Flooding the body with hormones and energy in readiness to fight or run away from the threat simply results in physiological stress to the body with no outlet. Since the threat is continuous with no way to escape this anxious/stressed state leads to depression, with all these negative emotions compromising further physical health.

Consequently, the Heartfulness Project was designed to promote parasympathetic activity to the heart; reduce sympathetic activity to the heart; provide skills and techniques to help with the comorbid depression and anxiety; address the cognitions arising within the person around illness, heart failing and death.

Traditionally the autonomic nervous system, consisting of the sympathetic and parasympathetic branches, was seen to be involuntary and not under conscious control. However, there is increasing awareness that mind-body techniques do have the ability to affect this system and with this in mind we designed a training which would affect the autonomic nervous system in such a way to alter cardiovascular functioning through using conscious effort i.e. mind-body techniques. This was done using a range of innovative and creative mindfulness-based techniques such as

- Sitting Mindfulness meditations and exercises
 - Present moment awareness promoting emotional non-reactivity and resilience reducing sympathetic activation to the heart and increasing heart rate variability.
(Sullivan, 2009; Peressutti, Martín-González & García-Manso, 2012; Krygier et al. 2013)
 - Compassion and particularly self-compassion training promoting parasympathetic activation to the heart and reducing sympathetic activation and promotion of cardioprotective peptides such as oxytocin.
(Luo, Qiao & Che, 2018; Houshmand, Faghihi & Zahediasl, 2015; Svendsen, 2016)
 - Training of an inner compassionate voice and inner 'care giver' as opposed to having an 'inner critic'; promoting parasympathetic activation to the heart and reduction to threat and sympathetic activation of the heart.
(Bourassa, Ruiz & Sbarra, 2019; Breines & Chen, 2013; Gilbert, 2009; Neff & Germer, 2013).
 - Reduction in anxiety and depression allowing reduction in sympathetic activation to the heart.
(Segal, Williams & Teasdale, 2018; Kabat-Zinn, 1982; Sullivan, 2009; Parswani, Sharma & Iyengar, 2013;
- Mindful movement (Tai Chi)
 - Present moment awareness in movement reducing excess sympathetic activation to the heart in cardiac population (Taylor-Piliae, 2003).
 - Increased parasympathetic activation and self-compassion training (Chang et al, 2008; Yeh et al, 2004;

- Creative activities
 - Promoting the social engagement system (Gilbert, 2009) increasing parasympathetic activity to the heart and reducing threat. Individuals with cardiovascular diseases have a reduction in heart rate variability which has been shown to correlate with a reduction in motivation to partake in social engagement activities and social approach behaviours (Kemp, 2013)

- Music
 - Promoting parasympathetic activation using soothing and prosodic music (Vickhoff et al, 2013)

- Biofeedback
 - Using visual cues to use biofeedback to regulate heart rate variability and thereby promote parasympathetic activation and sympathetic reduction.
 - Promoting awareness of breath and heart resonance (Moravec & McKee, 2011; Del Pozo, Gevirtz, Scher & Guarneri, 2004;

- Psychoeducation
 - Use of Gilbert's three circle model of threat, drive and care systems (Gilbert, 2009)

The Heartfulness Course

The course consists of a 10-week program of the participants learning the skills of mindfulness, compassion and mindful movements based on tai chi. For the initial pilot study, six participants were recruited from the general public with the aid of the British Heart Foundation and heart support groups in London. It was a mixed group with participants with a variety of cardiac conditions. The exercises and activities were developed to support the parasympathetic nervous system of the individuals (see sections above) and reduce the anxiety and fear typically found in this population. With themes of compassion, curiosity and creativity, participants were invited to explore their lives. They determined how best to use the skills learnt on the course to continue to develop increased self-compassion and intentions to self-care (as best as one can).

Outcomes

The program was evaluated using quantitative and qualitative methods by two master's students from King's College London. The intervention showed a significant decrease in depression and a significant decrease in the emotional impact of the disease on quality of life. Additionally, there was a significant increase in mindfulness non-reactivity indicating a greater emotional resilience (Flynn, 2017; McCorry, 2017). The qualitative data showed good acceptability of the course by the participants, with themes of developing greater self-awareness, increased ability to manage distressing emotions, increased self-care with a healthier more active lifestyle. Changes in internal narrative were noted, with all participants experiencing a more healthy and supportive inner voice ((Flynn, 2017; McCorry, 2017)).

On a two month follow up meeting:

- One participant who had been scheduled for a second major heart valve operation in the new year was told that it was no longer needed.
- One participant, who had had a major myocardial infarction and who had been at risk of heart failure, improved enough to be discharged from cardiology.
- A 76-year-old woman who had often been bed bound by depression after developing angina was back doing her preferred activity of walking and taking part in marathons.
- As one participant with cardiomyopathy noted that she was getting 'my old life back again'

Subsequently the Heartfulness Course has been run two more times, once again in London and once in Colchester. The course continues to be accepted well and has good outcomes with participants learning a mix of self-care and emotional resilience tools. The participants of these latter two courses have been of a mixed cardiac and general population with the material of the course being as relevant and acceptable to those from the general population suffering from anxiety and depression as those with cardiac histories.

Discussion

The recruitment of participants onto the course has proved challenging with a low level of uptake. This is in line with other mindfulness courses and psychological interventions with an especially low intake from men. A recent study of using an adapted MBCT course for a cardiac population run by the Oxford Mindfulness Centre, approached 3400 potential participants sourced from cardiac outpatient units or by letter after searching GP records for suitable candidates. Of these 7.1% were interested in taking part, with 33 (<1%) eventually partaking in the research study (Alsubaie et al, 2018). It was noted in this study that the sample had been heterogeneous meaning that the adapted intervention was unlikely to meet all the

needs of the participants. Further suggestion was that for a further research trial to recruit only those that optimally matched their adapted intervention.

The Heartfulness Project has successfully tried to develop a psychological intervention for those suffering from cardiovascular disease. The course is informed from a first-person perspective and is supported by current evidenced based research. When a person is under life threat very basic evolutionarily old survival patterns are activated involving the withdrawal of the vagal brake to the heart resulting in behaviors such as fight, flight or freeze (Gilbert, 2009; Porges, 1995). It is not possible to fight or run away from one's own heart, and although various blocking and distraction techniques might provide some relief, ultimately the person has a high risk of moving into a freeze state characterized by an anxious depression and withdrawal. A large number of individuals who undergo heart related operations may end up with post-traumatic stress disorder with one study finding 44% of those treated for an emergency heart procedure tested positive for PTSD. Heart attack survivors who suffer from PTSD are at double the risk of having another heart attack or dying within the first year that a survivor who is not under the same distress (Medical Express, 2019). Motivating individuals who are experiencing these conditions is difficult with a need for high levels of support to enable them to feel safe enough to engage with the intervention. The Heartfulness project equips individuals with the necessary skills and techniques to create an inner voice that can provide a sense of psychological safety that can soothe the threat system allowing the individual to reengage with life in a meaningful way.

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