

## Behavioural Cardiology: The Dual Relationship Between the Heart and the Mind

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### Abstract

Behavioural cardiology is an emerging field that examines the behavioural determinants of cardiovascular health, with the aims of improving cardiac health through behavioural interventions. This paper examines the validity of this approach by briefly reviewing the behavioural aspects of cardiology, current research conclusions on the effectiveness of behavioural interventions, and the potential role of behavioural cardiology in clinical practice today. Behavioural cardiology requires further research to validate its effectiveness before implementation in clinical settings.

### Introduction

Who are you? Do you have a BMI of 20 kg/m<sup>2</sup>, a blood pressure of 120 mmHg/80 mmHg, a resting heart rate of 60 bpm, a blood concentration of 2.2 mmol/L HDL, 5.5 mmol/L LDL, 8.3 mmol/L triglycerides?<sup>1-4</sup> Body mass index, blood pressure, resting heart rate, and blood lipid levels: these are the parameters a cardiologist might examine to assess your risk for cardiovascular health. However, there may be a missing question in this assessment: How are you?

Cardiovascular disease is the leading cause of death worldwide.<sup>5</sup> High blood pressure, abnormal blood lipid levels, and high blood glucose are generally recognized as important contributors to cardiovascular risk.<sup>6-7</sup> Tremendous progress has been made in targeting these risk factors using drugs such as beta-blockers and diuretics, which lower blood pressure, and statins, which regulate blood lipid levels.<sup>8,9</sup> Additional risk factors include diets high in fat or sodium, and physical inactivity.<sup>7,10</sup> Although each of these risk factors may be inter-related, it is important to address the behavioural component

of cardiovascular health. In regards to risk management, a balanced diet and regular exercise are the tenets of leading a healthy lifestyle.<sup>6</sup> However, they entail behavioural changes, such as changes in motivation.<sup>18</sup> In addition, certain behavioural parameters, including personality and stress, may act as risk factors for cardiovascular diseases, or influence prognosis once diagnosed.<sup>11-12</sup> Finally, behavioural factors, such as risk perception and self-efficacy, may influence treatment adherence.<sup>13</sup> Evidently, behaviour appears to play an important role in prevention, prognosis, and treatment of cardiovascular diseases. However, behavioural interventions are infrequently used in clinical practice.

This paper will briefly review behavioural cardiology, a field that has been emerging within the last decade, and that outlines the behavioural risk factors of cardiovascular health, the effectiveness of behavioural treatments in improving cardiovascular health, and the integration of behavioural interventions into clinical practice.

### The Behavioural Component of Heart Health

Behavioural risk factors associated with the onset and prognosis of cardiovascular diseases include: (1) physical health behaviours (unbalanced diet, sedentary lifestyle, and inadequate sleep); (2) negative mental mindsets (depression, anxiety, anger); (3) chronic stress; (4) social isolation; and (5) lacking a sense of purpose in life.<sup>14-15</sup> For example, depression is estimated to be almost twice as more prevalent in patients suffering from ischemic heart disease compared to the general population.<sup>15</sup> According to the INTERHEART study, psychosocial factors have an odds-ratio comparable to that of more traditional cardiovascular health risk factors, such as smoking and hypertension.<sup>17</sup> Possible biological mechanisms through which these behavioural factors might contribute to cardiovascular disease development further substantiate the influence of behavioural risk factors in the development of cardiovascular disease. These mechanisms broadly include altered activity in the hypothalamic-pituitary-adrenal (HPA) axis, the autonomic nervous system, and the immune system.<sup>16-17</sup>

In addition to acting as risk factors, an individual's behaviour related to risk management and treatment adherence may also influence cardiac outcomes. 60% of cardiac patients are estimated to not follow medical directions, such as drug intake of aspirin or  $\beta$ -blockers.<sup>18</sup> This nonadherent behaviour has been recognized in clinical practice and attempts are be-

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ing made to identify causes of nonadherence and how to solve them. A prominent reason for nonadherence includes lack of motivation.<sup>18</sup> The health belief model, a model developed in the 1950s aimed towards improving healthy behaviours, attempts to address nonadherence by changing an individual's perception of risk of disease and self-efficacy through education, goal-setting, and positive reinforcement.<sup>13-14</sup> As of 2014, 78% of studies that have applied this model appear to show significant improvements in general treatment adherence.<sup>19</sup>

Thus, substantial evidence has accumulated supporting the idea that behavioural factors play a significant role in cardiovascular disease onset, progression, and/or treatment. This correlative evidence has stimulated research into examining the efficacy of behavioural interventions, including cognitive-behavioural therapy, counseling, psychotherapy, relaxation therapy, and education in improving cardiac health outcomes, such as blood pressure, infarction rates, and mortality rates.<sup>19</sup> This type of research, examining behaviour in relation to cardiac outcomes, has been categorized as behavioural cardiology, and is a relatively new field, having emerged within the last two decades.<sup>13-14</sup>

### The Effectiveness of Behavioural Treatment on Heart Health

Analyses of behavioural cardiology research conducted thus far reveals that behavioural conditions, such as depression and anxiety, can be improved by treatment, but that this does not appear to impact cardiovascular health.<sup>15,20,22</sup> In contrast, cardiac outcomes such as mortality or non-fatal infarctions do not appear to significantly improve with psychological interventions.<sup>22</sup> A few studies have additionally examined the effects of using pharmacological approaches, such as antidepressants, to treating behavioural conditions in cardiac patients, and there appears to be no effect on cardiac health, in terms of mortality, cardiac events, and QoL.<sup>24</sup> Combined, these studies question the validity of using behavioural treatments in cardiac healthcare. However, several meta-analyses conducted on studies published between the late 1990s and the early 2000s reveal issues regarding many of these original studies, including small sample size, heterogeneous subjects, and poor research design (ex. non-blinded trials).<sup>21-22</sup> Differences in treatment methodology, such as the timing of treatment provision relative to a cardiac event and the type of treatment provided, add further difficulty in assessing the effectiveness of behavioural treatments on cardiac outcome.<sup>23</sup> Finally, traditional cardiology, specifically drug-focused treatments, is continually advancing, and the effectiveness of behavioural treatments in conjunction with newer pharmacological approaches remain to be assessed.<sup>21</sup> These issues illustrate the need for more well-designed research.

### Behavioural Cardiology in Clinical Practice

Given that evidence of the effectiveness of behavioural treatments in improving cardiac health is limited, should such treatments still be applied in today's clinical practice? Although the efficacy of behavioural cardiology is inconclusive at the moment, certain interventions, such as stress therapy or education, may yield benefits and are unlikely to produce

harm.<sup>15</sup> Moreover, minimally time-consuming and cost-effective methods of screening for behavioural risk factors have already been proposed.<sup>17</sup> These include administering a questionnaire either by a family physician or cardiologist with open-ended questions simultaneously during screenings for background history, in order to identify sources of stress, health habits, and social resources.<sup>16</sup> Following this general initial assessment, they are able to either refer the patient to certain specialists or provide direct interventions, such as education.<sup>17</sup> Therefore, although the effectiveness of behavioural interventions on cardiac health appear limited as discussed previously, behavioural risk assessment, such as questionnaires, and interventions through referrals to professional therapists or education, can still be introduced into traditional clinical practice with relatively minimal efforts.

### Conclusion

*"The cure of the part should not be attempted without treatment of the whole"-Plato<sup>25</sup>*

The importance of behavioural cardiology is that it recognizes behaviour as a critical component to many aspects of cardiology: behaviour may act as a risk factor for cardiovascular disease and behaviour may influence how cardiovascular diseases are managed. Therefore, behavioural interventions would be predicted to improve cardiac health. Currently, there is inconclusive evidence on whether behavioural interventions are truly effective in heart care. Clinical implementation of behavioural interventions, however, appear feasible, making the need for greater research the most significant limiting factor of behavioural cardiology as of today.

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