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Depression and anxiety disorders and the link to physician diagnosed cardiac disease and metabolic risk factors

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ABSTRACT

Objective: There has been increasing interest in the relationship between cardiac and metabolic conditions with mental illness. Many studies have found associations between these conditions and depression but results with anxiety disorders have been mixed. We explore these relationships in a nationally representative survey using physician diagnoses of physical conditions and DSM-IV psychiatric disorders.
Methods: Data came from the nationally representative German Health Survey (N=4181, age 18–65). Physician diagnoses of angina, myocardial infarction, congestive heart, hypertension, dyslipidemia, diabetes, and obesity were examined in relation to depression and anxiety disorders, which were assessed through a modified version of the Composite International Diagnostic Interview. Multiple logistic regression analyses were used to examine the associations between these conditions.
Results: After adjusting for sociodemographics, psychiatric comorbidity, and substance use, having an anxiety disorder was associated with increased odds of cardiac conditions and metabolic risk factors with odds ratios ranging from 1.3 to 3.3. Depression was not associated with any of the conditions but was associated with poor medical compliance for health conditions on two outcomes measured. Anxiety was also associated with reduced medical compliance for one health behaviour measured.
Conclusion: Anxiety disorders, but not depression, were associated with metabolic and cardiac conditions in our sample. Both conditions were related to some aspects of poor self-care for health conditions and therefore may be linked to negative outcomes.

In recent years, there has been an increased interest on the relationship between physical and mental health. Specifically, depression and anxiety disorders can have both physiological and behavioral effects that may be linked to cardiac disease or more broadly, metabolic conditions. Both depression and anxiety disorders are potentially modifiable, which make the association with physical health clinically relevant. However, the literature on these associations has been inconsistent and questions remaining regarding the independent associations for anxiety and depression with metabolic and cardiac conditions, as well as the associations with health behaviour.

Depression has been linked to cardiac diseases and poor outcomes among those with previous heart conditions [1–3]. More broadly, studies have found associations between depression and metabolic syndrome, which is a constellation of risk factors including obesity, insulin resistance, high blood pressure, and high cholesterol that increase cardiovascular risk [4–6]. However, these studies often use clinical samples with self-report measures of depression and do not adjust for comorbid anxiety. Further, treatment of depression does not appear to improve outcomes among those with coronary events [7]. Depression and anxiety are highly comorbid conditions; thoroughly examining independent effects of depression requires control or adjustment for anxiety. Associations in clinical samples may also not generalize to a wider population. Therefore, these previous findings may not accurately reflect the independent relationship between depression and cardiac or metabolic conditions in the general population.

The association between anxiety disorders and cardiac conditions is even more mixed in the literature [8]. There are more studies that have found associations between anxiety and cardiac disease [9–12], than have found no association [13]. There are studies finding evidence for negative outcomes among those with anxiety and a current cardiac condition [14–16], although not mortality [15,17]. The behavioural effects of anxiety are also mixed, with evidence of anxiety leading to

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avoidance of certain health care behaviours, which could be detrimental for health [10,18], as well as some support for protective effects of anxiety for cardiac outcomes [19,20]. It is possible that in moderation, anxiety can lead to improved medical compliance and in extreme levels can lead to avoidance of health care behaviors such as medical appointments. There have been similar conflicting results for the association between anxiety and metabolic syndrome, which vary depending on population characteristics, and the specific psychiatric conditions examined, and methods of assessment [4–6,21–24].

Some of the inconsistencies in this body of literature may be explained by the difficulty with differentiating symptoms of anxiety from symptoms of the cardiac condition or an appropriate fear response to being hospitalized. The use of self-report scales may also be an important factor. These scales tend to give higher estimates of distress [16], which could be particularly important with respect to anxiety. Anxiety can be adaptive in moderate levels, providing motivation to avoid risks and engage in behaviours to prevent negative health outcomes in the future, such as checking for early symptoms and increased treatment seeking. Finally, there are high rates of comorbidity between depression and anxiety, which make it difficult to separate effects. Without adjusting for comorbidity, results reflect a combined effect of both conditions, which could either inflate or reduce effect size estimates. These conditions may have different associations with metabolic and cardiac conditions in terms of physiological effects and health behaviours. By examining the independent effects for each condition, the specific pathways that require further investigations may become clearer.

This study extends previous research by examining the cross-sectional associations between lifetime depression and anxiety disorders with cardiac conditions and metabolic risk factors, in a large, nationally representative community sample. This sample allows for improved generalizability, the structured interviews for mental health diagnoses improve the estimates of anxiety and depression, and the physician diagnoses of physical conditions enhance estimates compared to self-report diagnoses. Importantly, we are examining the associations among these variables after adjusting for mental health comorbidity, which improves the ability to interpret the associations. For comorbid physical and mental conditions, the onset of each condition was compared to provide some information about temporality. We also explore the relationship between psychiatric disorders and self reported health behaviors associated with specific conditions.

1. Method

1.1. Sample

The German Health Survey (GHS) is a cross-sectional, nationally representative epidemiological survey of physical and mental health. Data were collected between 1997 and 1999 using a stratified, multistage, random design to ensure a representative sample of the non-institutionalized, German population, aged 18–79. The first stage was the core survey ($N=7124$, 61.4% response rate), which included self-reported questionnaires, a standardized computer assisted clinical medical interview, laboratory assessments, body measures, and screening for mental health disorders (Munich-Composite Diagnostic-Screener, CID-S). The second stage consisted of a structured psychopathological computer assisted interview that was administered to anyone who had a single positive score on the mental health screener and a random sample of 50% who did not endorse any of the screener questions ($N=4181$, 87.6% response rate, age range 18–65) [25]. No significant differences were found between non-responders and responders with respect to age, sex, smoking status, and perceived health status [25]. The survey was completed in German and translated to English for our study by a German English dictionary and reviewed by the principal investigator of the GHS (FJ, one of the authors of this study). More detailed descriptions of the study are available elsewhere [25,26].

1.2. Measures

1.2.1. Sociodemographic variables

Sex, education, age, and marital status were examined descriptively and included in regression models as covariates. The specific categories used are shown in Table 1.

1.3. Psychiatric disorders

The DIA-X/M-CIDI [27], a modified version of the CIDI, was used to assess lifetime and 12-month DSM-IV diagnoses of anxiety disorders (panic disorder, social phobia, specific phobia, generalized anxiety disorder, and obsessive compulsive disorder), major depressive disorder, and substance use disorders (abuse or dependence of any substance, including nicotine). Reliability estimates for the diagnoses range from good to excellent [28]. To increase the power of our study, we collapsed the anxiety disorders and examined only lifetime anxiety and depressive disorders. However, the same pattern of results was found with 12-month analyses and when removing individuals with only specific phobia, who may have less impairment compared to other anxiety disorders. Supplementary analyses are available upon request.

1.4. Cardiac conditions and metabolic risk factor assessment

Physical conditions were initially assessed by a self-report questionnaire that included current and past somatic complaints, health care utilization, impairment, and disability. A general practice physician administered a standardized computer-assisted medical interview for all participants, using the information from the questionnaires to re-examine and refine diagnoses. A physical exam (e.g., blood pressure, weight, and height) and over 50 laboratory measurements (e.g., enzymes, metabolites, hormones, antibodies) were completed for each participant. The cardiac conditions assessed in this study

Table 1
Profile of the sample.

	n 4181	%
Lifetime psychiatric disorders		
Any anxiety disorder	788	15.7
Major depression	699	14.8
Any substance abuse	920	21.6
Lifetime physical conditions		
Angina	133	3.0
Myocardial infarction	52	1.3
Congestive heart failure	75	1.6
Any cardiac condition	183	4.2
Hypertension	768	17.3
Dyslipidemia	715	17.1
Obesity	797	18.1
Diabetes	143	3.3
Any metabolic condition	1669	38.8
Sociodemographic variables		
Gender		
Male	1913	50.3
Female	2268	49.7
Age		
18–25	517	12.4
26–35	949	24.9
36–45	992	23.5
46–55	863	18.8
56–65	856	20.8
Marital status		
Married	2617	64.1
Single	493	11.0
Previously married	991	24.9
Education		
Grade 10 or high school	2314	61.0
More than high school	1790	39.0

Notes. N's are unweighted, %'s are weighted.