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Relationships Between Depressive Symptoms, Other Psychological Symptoms, and Quality of Life

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Abstract

Depressive disorders are common, heterogeneous conditions involving physical and psychological symptoms, and substantial impairment in quality of life (QoL). However, relationships between depressive symptoms and QoL are poorly understood, and little research has directly compared relationships between subtypes of depressive symptoms, other psychological symptoms and QoL. This research aimed to examine how symptoms of depression and other mental health conditions are related to QoL. Participants (N=559) completed the World Health Organization Quality of Life - BREF questionnaire, demographic information, the Brief Symptom Inventory, the Beck Depression Inventory II, and the Depression, Anxiety and Stress Scales. Relationships between psychological symptoms and QoL were assessed using correlations and linear multiple regressions. QoL was inversely related to all types of psychopathology. Depressive symptoms were the strongest predictors of lower overall QoL. Both somatic and psychological depressive symptoms negatively predicted QoL, with somatic symptoms being stronger predictors. Conclusions: While many types of psychological symptoms were negatively correlated with QoL, depressive symptoms, particularly somatic symptoms, were the strongest predictors of impaired QoL. These findings provide new information about specific relationships between symptom profiles and QoL which may lead to greater understanding of the underlying mechanisms and to improved interventions.

Keywords

between, life, depressive, symptoms, other, psychological, relationships, quality

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Abstract

Aims: Depressive disorders are common, heterogeneous conditions involving physical and psychological symptoms, and substantial impairment in quality of life (QoL). However, relationships between depressive symptoms and QoL are poorly understood, and little research has directly compared relationships between subtypes of depressive symptoms, other psychological symptoms and QoL. This research aimed to examine how symptoms of depression and other mental health conditions are related to QoL.

Method: Participants (N=559) completed the World Health Organization Quality of Life - BREF questionnaire, demographic information, the Brief Symptom Inventory, the Beck Depression Inventory II, and the Depression, Anxiety and Stress Scales. Relationships between psychological symptoms and QoL were assessed using correlations and linear multiple regressions.

Results: QoL was inversely related to all types of psychopathology. Depressive symptoms were the strongest predictors of lower overall QoL. Both somatic and psychological depressive symptoms negatively predicted QoL, with somatic symptoms being stronger predictors.

Conclusions: While many types of psychological symptoms were negatively correlated with QoL, depressive symptoms, particularly somatic symptoms, were the strongest predictors of impaired QoL. These findings provide new information about specific relationships between symptom profiles and QoL which may lead to greater understanding of the underlying mechanisms and to improved interventions.

Key words: Symptom Profiles, Quality of Life, Depression

Impairments in QoL contribute to the suffering associated with mental health problems [1], often persist after symptoms improve, and are important to prognosis [2]. It therefore is important to understand relationships between psychopathology and QoL, to identify targets for interventions. There are few systematic studies investigating which depressive symptom subtypes and other psychopathology are associated with greatest impairment in QoL.

Measures of subjective quality of life (QoL) are increasingly recognised as important in mental health research, as these provide more comprehensive information about the impact of mental health symptoms and treatment outcomes than symptom severity measures alone [3].

Major depressive disorder (MDD) has an estimated lifetime prevalence of 10%, and is a leading cause of disability worldwide [4]. It is a chronic and debilitating condition associated with substantial functional impairment [5] and poor QoL [6, 7]. Additionally, depressive symptoms are commonly experienced by people who may not have received diagnoses or treatment. Depressive symptoms affect many aspects of functioning including somatic, psychological, cognitive, and social performance [8]. Depressive symptoms lie on a continuum, occur commonly across the world in community samples [9, 10], and produce significant health decrements [9].

The World Health Organization [3] defines QoL as individuals' subjective perception of their psychological and physical health, social relationships, and environment. QoL can be measured using psychometric tools such as the World Health Organization Quality of Life (WHOQOL) – BREF, which assesses QoL in terms of *Physical-Health*, *Psychological-Health*, *Social-Relationships*, and *Environmental* domains.

Improvements in functioning and QoL may be as important as symptom amelioration for long term recovery from depression [11-13] and are not merely by-products of symptom improvement [14]. QoL is known to be significantly lower in individuals with major depressive disorder (MDD) compared to controls [15]. Additionally, recent literature has

highlighted close links between QoL and depressive symptoms in community continuum samples. For instance, Chang, Yao [16] found that depression scores affected all domains of the WHOQOL-BREF in the elderly. Another study found that depression predicted all domains in the WHOQOL-BREF in healthy workers [17]. However, research on the factors contributing to these links remains scarce [18].

Depressive symptoms are a strong predictor of overall and domain-level QoL relative to other psychopathology [19, 20]. QoL decrements have also been individually reported in association with several mental disorders including obsessive-compulsive [21], psychotic [22] and anxiety disorders [23]. However, few studies have simultaneously compared the impact of different psychological symptoms on QoL. Because depression is a leading cause of disability worldwide, depressive symptoms may have a greater impact on QoL than symptoms of other mental disorders. In one study, depression was found to be a stronger predictor than anxiety in predicting QoL in depressed inpatients [24], however further studies are needed to understand whether different types of psychopathology are related to particular decrements in domain-specific QoL.

Although QoL is consistently inversely predicted by depressive symptoms, depressive symptoms are highly heterogeneous, and can be categorised into subtypes such as somatic symptoms including changes in energy levels, appetite and weight or psychological symptoms such as negative thinking. Previous research indicates that depressive symptom subtypes show distinct relationships to physiological and health indices [25-28]. It is therefore likely that different types of depressive symptoms vary in their relationships to QoL impairment, however there is a lack of research directly comparing the strength of correlations between depressive symptom subtypes and domain-specific QoL. One study that examined the predictive factors of QoL (using the WHOQOL-BREF) for inpatients with depression found that the Beck Depression Inventory II (BDI-II) was a significant predictor

of QoL *Physical-Health* and *Social-Relationships* domains; while age and BDI-II both predicted QoL *Psychological-Health* and *Environmental* domains [24]. However, depressive symptom subtypes and how they relate to the QoL domains were not considered, thus it remains unclear how different profiles of depressive symptoms are related to QoL.

To our knowledge, only one study has examined relationships between depressive symptom subtypes and specific QoL domains. This study [29] investigated the influence of specific groups of depressive symptoms on various QoL domains in 146 patients with first-episode psychosis. They found that all QoL domains were consistently inversely predicted by psychological depressive symptoms (*Depression, Hopelessness, Pathological Guilt, and Self-Depreciation*); while one physiological depressive symptom (*Early Morning Wakening*) predicted *Physical-Health QoL*. Additionally, *Psychological and Social QoL* were negatively related to psychological depressive symptoms [29]. However, there is a need for research examining relationships between specific types of depressive symptoms, symptoms of other disorders, and domain-specific QoL in a broader community context.

Aims and Hypotheses

Although previous research has indicated relationships between psychopathology and QoL, little research has directly compared relationships between types of depressive symptoms, other psychopathology and QoL. This research aimed to examine how symptoms of depression and other mental health conditions are related to QoL. Although few studies have compared which specific psychopathological symptom has the greatest impact on QoL, depressive symptoms are a leading cause of disability and past studies have frequently demonstrated depressive symptomology to be a strong predictor of QoL in many psychological disorders. It was thus predicted that symptoms of different types of psychopathology would be inversely related to QoL scores and that depressive symptoms would be a stronger predictor of QoL relative to other psychopathology.

Additionally, although past research has established a strong relationship between depressive symptoms and QoL, depressive symptoms are heterogeneous and little is known of whether specific types of depressive symptoms account for greater impairment in QoL. This study therefore also aimed to investigate relationships between types of depressive symptoms (somatic versus cognitive) and domain-specific QoL to better understand which symptoms are related to greatest impairment in QoL. It was predicted that somatic and psychological depressive symptoms would differentially predict domain-specific aspects of QoL. Because psychopathological symptoms occur on a continuum and are widely found in community samples, we sought to recruit individuals with differing levels of depressive and other symptoms, ranging from healthy individuals to those whose symptoms may be at clinical levels, to assess QoL, depressive symptoms, other types of psychopathology and distress.

Method

Participants

A total of 723 participants (543 females, 148 males, 32 unspecified gender) between 18 and 65 years of age ($M = 29.45$, $SD = 4.37$) participated in an online study. Participants were recruited from the university's psychology student research participation scheme and community members were invited to participate through online advertisements in social media to increase the diversity of the sample. Participants received no monetary rewards. Psychology students received course credit for participation.

Respondents with more than 20% missing data were excluded from analyses. The final sample included 559 participants (438 females, 116 males, and 5 who did not answer the gender question. Those with unspecified gender were included in the study but excluded from analyses involving gender as a variable). The mean age was 29.12 years ($SD = 4.32$; range = 18 – 65). Of the final sample, 230 (41%) endorsed having a past or present diagnosis of a

mental health problem and 348 (62%) were students. Most respondents (384, 69%) were born in Australia and 175 (31%) were born elsewhere, across 45 different countries.

Measures

The WHOQOL-BREF was chosen as a valid and brief measure of QoL, suitable for use in healthy and clinical populations. It is a 26-item self-report scale that measures perceived QoL across four domains: *Physical-Health*, *Psychological-Health*, *Social-Relationships*, and *Environment* [3], with higher scores connoting higher QoL. The *Physical-Health* domain comprises facets such as energy and fatigue. The *Psychological-Health* domain comprises facets such as feelings and thoughts. The *Social-Relationships* domain comprises facets such as personal relationships and social support. The *Environmental* domain comprises facets such as physical safety and security. Domain scores are then transformed to be out of 100 to be comparable to those in the WHOQOL-100. Additionally, an individual's *Overall* QoL life is assessed through the first question of the WHOQOL-BREF, which asks them to rate their global QOL, with a possible range of scores from 1-5. The four domain scores yielded by the WHOQOL-BREF correlated highly from .89 (*Social-Relationships*) to .95 (*Physical-Health*) with that of its longer form, WHOQOL-100, demonstrating good validity, consistency, and test-retest reliability [30].

The Brief Symptom Inventory (BSI) is a 53-item self-report inventory that measures psychological distress and psychopathology in nine symptom dimensions including Somatisation (e.g., faintness or dizziness), Obsessive-Compulsive (e.g., having to check and double-check what you do), Interpersonal Sensitivity (e.g., feeling inferior to others), Depression (e.g., feeling no interest in things), Anxiety (e.g., feeling tense or keyed up), Hostility (e.g., having urges to break or smash things), Phobic anxiety (e.g., feeling uneasy in crowds, such as shopping), Paranoid ideation (e.g., others not giving you proper credit for your achievements), and Psychoticism (e.g., the idea that something is wrong with your

mind) [31]. Respondents indicate the degree to which they were bothered by each symptom over the past week, with responses ranging from 0 (not at all) to 4 (extremely). The BSI profile produces three global indices of distress [31], including the *Global Severity Index* (GSI), a composite score of psychopathology severity; *Positive Symptoms Total Index* (PSTI), the number of symptoms experienced; and *Positive Symptoms Distress Index* (PSDI), the average intensity of psychopathology symptoms. [32].

The Beck Depression Inventory (BDI) – II [33] is a 21-item self-report tool designed to assess depressive symptoms and to detect possible depression in the general population. The items are further divided into somatic-affective and cognitive-psychological depressive symptoms [34, 35]. The somatic component includes *Sadness, Loss of Pleasure, Crying, Agitation, Loss of Interest, Indecisiveness, Loss of Energy, Changes in Sleeping Pattern, Irritability, Changes in Appetite, Concentration Difficulty, Tiredness or Fatigue, and Loss of Interest in Sex*. The psychological component includes *Pessimism, Past Failure, Guilty Feelings, Punishment Feelings, Self-Dislike, Self-Criticalness, Suicidal Thoughts or Wishes, and Worthlessness*. The following interpretive guidelines have been suggested for BDI-II scores: minimal range = 0–13, mild depression = 14–19, moderate depression = 20–28, and severe depression = 29–63 [33].

The Depression, Anxiety, and Stress Scale [36] is a 21-item self-report tool designed to assess psychological distress in the past week. It has three subscales, measuring *Depression, Anxiety, and Stress*, with greater scores indicating more severe problems. The interpretive guidelines for the DASS-21 subscales are: Depression 0-9 Normal, 10-13 Mild, 14-20 Moderate, 21-27 Severe, 28+ Extremely severe; Anxiety 0-7 Normal, 8-9 Mild, 10-14 Moderate, 15-19 Severe, 20+ Extremely severe; Stress 0-14 Normal, 15-18 Mild, 19-25 Moderate, 26-33 Severe and 34+ Extremely severe.

Procedure

Research ethics. The research was approved by the university ethics committee.

Participants were provided with written information and provided informed consent prior to providing demographic information and completing the questionnaires.

Statistical analyses. Data were analysed using the Statistical Package for Social Sciences (SPSS), Version 21, with an alpha level of $p < .05$. Prior to interpretation of results, all variables were evaluated for accuracy of input, missing data, and violation of assumptions including collinearity, normality, linearity and homoscedasticity of residuals.

To examine the hypothesised relationships between psychopathology (measured by BDI-II, BSI, and DASS-21) and QoL in each domain (*Physical-Health*, *Psychological-Health*, *Social-Relationships*, and *Environment*, measured by WHOQOL-BREF), two-tailed Spearman's rho bivariate correlations were conducted. To control for type 1 errors due to multiple comparisons, the False Discovery Rate procedure [37] was used to adjust the p -values to take account of the number of tests performed. Additionally, hierarchical multiple regression analyses (HMRAs) were conducted to examine the relative strength of particular symptom types as predictors of QoL. The first HMRAs investigated the relative strength with which nine different types of psychopathology uniquely accounted for variance in each type of QoL. The second HMRA focussed in on depressive symptom subtypes as predictors of QoL, examining the extent to which somatic and psychological depressive symptoms accounted for unique variance in QoL.

Power analyses using G*Power 3.1.9.3 [38] indicated that in order to detect a medium effect size using multiple regression ($f^2 = 0.15$), with an alpha of 0.05, a power of 0.8 and 11 predictors, a sample size of 123 is needed. For correlations, to detect a medium effect size ($p = 0.3$), with an alpha of 0.05, and a power of 0.8, a sample size of 84 people is needed [38]. Responses with more than 20% missing data were excluded from analyses, resulting in a final sample size of 559. Thereafter, assumptions were tested, and some univariate and

multivariate outliers were identified. Log10 transformation was conducted on skewed variables (all subscales in BSI, BDI-II, and DASS-21). As the pattern of results was similar between the non-transformed and transformed data, the non-transformed data was reported. Thereafter, analyses were performed by removing the outliers in the non-transformed data. The pattern of results was consistent with that prior to removal, hence the outliers were retained and analyses with the outliers were reported.

Results

Demographic data, descriptive statistics and Cronbach's alpha values for all measures are presented in Table 1. The Cronbach's alpha values exceeded .70 for all measures and subscales, indicating acceptable internal consistency. As the assumption of univariate normality was violated, non-parametric correlations were conducted.

Correlational Analyses

Results of the correlational analyses are shown in Table 2. As predicted, negative relationships between all types of symptom severity (measured by BDI-II, BSI and DASS), and QoL (WHOQOL-BREF) at the overall and domain levels were found. Alcohol intake did not correlate with any other variables (not shown) and was not further analysed.

Hierarchical Multiple Regression Analyses

Inspection of the collinearity statistics indicated that the variance inflation factor (VIF) of all predictors were less than 10, and the tolerance were all more than .10, suggesting that multicollinearity was not a concern [39]. Thirdly, inspection of the normal probability plot of regression standardised residuals, and the scatterplot of regression standardised residuals against regression standardised predicted values, indicated that the assumptions of normality, linearity and homoscedasticity of residuals were met.

However, inspection of the tests of normality table indicated that the Shapiro-Wilk and Kolmogorov-Smirnov statistics (all $p < .001$) were all statistically significant for all

variables included in the HMRA, and hence the assumption of univariate normality for continuous variables was violated. Additionally, inspection of the boxplots indicated that there were several univariate outliers. Further, the maximum Mahalanobis distance of 44.55 exceeded the critical χ^2 for $df = 11$ (at $\alpha = .001$) of 31.26 for the HMRA with 11 predictors (*Age, Gender, BSI subscales*); and the maximum Mahalanobis distance of 26.20 exceeded the critical χ^2 for $df = 4$ (at $\alpha = .001$) of 18.47 for the HMRA with four predictors (*Age, Gender, Somatic Symptoms, Psychological Symptoms*); suggesting that multivariate outliers were potentially of concern. Nevertheless, linear regressions are reasonably robust to departures from univariate and multivariate normality, particularly when the sample size is large [40, 41].

Broad Symptoms of Psychopathology on QoL

Initially we evaluated which broad types of psychopathology best predicted QoL variance. To investigate which types of symptoms of mental disorders best explained unique variance in QoL (measured by WHOQOL-BREF), beyond that accounted for by Age and Gender, HMRAs were performed (Table 3). The predictors were Age, Gender, and the nine BSI symptom subscales (*Somatisation, Obsessive-Compulsive, Interpersonal Sensitivity, Depression, Anxiety, Hostility, Phobic Anxiety, Paranoid Ideation, and Psychoticism*).

Overall QoL. At step 1, Age and Gender were entered, accounting for a statistically significant 2% of the variance in *Overall-QoL*, $p = .007$. At step 2, the BSI subscales explained an additional 36% of the variance in *Overall-QoL*, $p < .001$. Collectively, the predictors explained 38% of the variance in *Overall-QoL*, $p < .001$. At step 2, only Age and *Depression* were significant predictors of *Overall-QoL*, with *Depression* being the strongest predictor, $\beta = -.60$, $p < .001$.

Physical-Health QoL. At step 1, Age and Gender accounted for a statistically significant 2% of the variance in *Physical-Health QoL*, $p = .01$. At step 2, the BSI subscales

explained an additional 45% of the variance in *Physical-Health QoL*, $p < .001$. Collectively, the predictors explained 47% of the variance in *Physical-Health QoL*, $p < .001$. At step 2, Age, Gender, *Somatisation*, *Obsessive-Compulsive*, *Depression*, and *Phobic Anxiety* were significant predictors of *Physical-Health QoL*, with *Somatisation* as the strongest predictor, $\beta = -.32$, $p < .001$.

Psychological-Health QoL. At step 1, Age and Gender accounted for a non-significant 1% of the variance in *Psychological-Health QoL*, $p = .197$. At step 2, the nine BSI subscales explained an additional 63% of the variance in *Psychological-Health QoL*, $p < .001$. Collectively, the predictors explained 64% of the variance in *Psychological-Health QoL*, $p < .001$. At step 2, only *Obsessive-Compulsive*, *Interpersonal-Sensitivity*, and *Depression* were significant predictors of *Psychological-Health QoL*, with *Depression* being the strongest predictor, $\beta = -.61$, $p < .001$.

Social-Relationships QoL. At step 1, Age and Gender accounted for a statistically significant 2% of the variance in *Social-Relationships QoL*, $p = .009$. At step 2, the nine BSI subscales explained an additional 32% of the variance in *Social-Relationships QoL*, $p < .001$. Collectively, the predictors explained 34% of the variance in *Social-Relationships QoL*, $p < .001$. At step 2, only Age, Gender, *Depression*, and *Psychoticism* were significant predictors of *Social-Relationships QoL*, with *Depression* as the strongest predictor, $\beta = -.32$, $p < .001$.

Environmental QoL. At step 1, Age and Gender were entered, accounting for a non-significant 1% of variance in *Environmental-QoL*, $p = .238$. At step 2, the BSI subscales explained an additional 35% of the variance in *Environmental-QoL*, $p < .001$. Collectively, the predictors explained 35% of the variance in *Environmental-QoL*, $p < .001$. At step 2, only Age and *Paranoid Ideation* were significant predictors of *Environmental-QoL*, with Age as the strongest predictor, $\beta = -.14$, $p < .001$.

Somatic Versus Psychological Depressive Symptoms on QoL

Next, we conducted a more focussed analysis to evaluate the strength with which specific types of depressive symptoms (somatic or psychological) predicted QoL. As the previous HMRA indicated that *Depression* was the strongest predictor of *overall-QoL*, specifically within the domains of *Psychological-Health QoL*, *Social-Relationships QoL*, and the second strongest within *Physical-Health QoL*, subsequent HMRAs were performed within these domains to further investigate which symptoms of depression (measured by BDI-II *Somatic* and *Psychological* subscales) contributed to the unique variance in QoL, controlling for Age and Gender (Table 4).

Overall QoL. At step 1, Age and Gender explained a statistically significant 2% of the variance in *Overall-QoL*, $p = .013$. At step 2, BDI II *Somatic* and *Psychological Symptoms* were added, and explained an additional 41% of the variance in *Overall-QoL*, $p < .001$. Collectively, the four predictors explained 43% of the variance in *Overall-QoL*, $p < .001$. At Step 2, Age, BDI-II *Somatic* and *Psychological Symptoms* were all significant predictors of *Overall-QoL*, with BDI-II *Somatic Symptoms* as the strongest predictor, $\beta = -.40$, $p < .001$.

Physical-Health QoL. At step 1, Age and Gender explained a statistically significant 2% of the variance in *Physical-Health QoL*, $p = .006$. At step 2, BDI II *Somatic* and *Psychological Symptoms* explained an additional 49% of the variance in *Physical-Health QoL*, $p < .001$. Collectively, the four predictors explained 51% of the variance in *Physical-Health QoL*, $p < .001$. At Step 2, Age, Gender, and BDI-II *Somatic Symptoms* were significant predictors of *Physical-Health QoL*, with BDI-II *Somatic Symptoms* as the strongest predictor, $\beta = -.64$, $p < .001$.

Psychological-Health QoL. At step 1, Age and Gender explained a non-significant variance in *Psychological-Health QoL*, $p = .367$. At step 2, BDI II *Somatic* and *Psychological Symptoms* explained an additional 71% of the variance in *Psychological-Health QoL*, $p < .001$. Collectively, the four predictors explained 71% of the variance in *Psychological-Health QoL*, $p < .001$. At Step 2, only BDI-II *Somatic* and *Psychological Symptoms* were significant predictors of *Psychological-Health QoL*, with BDI-II *Psychological Symptoms* as the strongest predictor, $\beta = -.46$, $p < .001$.

Social-Relationships QoL. At step 1, Age and Gender explained a statistically significant 2% of the variance in *Social-Relationships QoL*, $p = .003$. At step 2, BDI II *Somatic* and *Psychological Symptoms* explained an additional 28% of the variance in *Social-Relationships QoL*, $p < .001$. Collectively, the four predictors explained 30% of the variance in *Social-Relationships QoL*, $p < .001$. At Step 2, Age, Gender, BDI-II *Somatic* and *Psychological Symptoms* were all significant predictors of *Social-Relationships QoL*, with BDI-II *Psychological Symptoms* as the strongest predictor, $\beta = -.29$, $p < .001$.

Discussion

We conducted a more detailed analysis of relationships between symptoms of psychological disorders and domains of QoL than previously reported. Our results indicated that QoL was inversely related to symptoms of all major mental disorders and distress. We then ascertained the relative strength with which nine core types of psychopathology predicted variance in QoL. Depressive symptoms were the strongest predictor of lower overall QoL. Several other types of psychopathology also negatively predicted QoL overall and at the domain level. Finally, we considered the extent to which somatic versus psychological depressive symptom types predicted QoL.

The current study used online recruitment of community members and psychology students. The overall QoL scores were somewhat lower in the current study than a previous Australian

community study. In the current sample, 41% of participants reported having at some time being diagnosed with a mental health problem such as depression or anxiety, and the symptom levels span a continuum from no symptoms to probable clinical levels, therefore the sample should be considered a continuum rather than healthy one. This was a suitable sample to examine relationships between QoL and psychological symptoms.

Symptoms of Mental Disorders as Predictors of QoL

The finding that depressive symptomology was inversely related to QoL, overall and across most domains is consistent with previous studies that have demonstrated negative associations between depressive symptomology and many aspects of QoL in older adults [16], individuals with severe mental illness [42], and healthy adults [17].

Little research has directly compared relationships between multiple types of psychological symptoms and QoL. Depressive symptoms were a stronger predictor than those of other mental disorders of overall, psychological and social QoL. This finding is consistent with and extends previous findings that QoL is negatively influenced by general psychopathology; and, in particular, depressive symptoms [43-50]. More specifically, in the current study, depressive symptoms were the strongest predictor of overall QoL, followed by age. For physical-health QoL, somatisation symptoms were the strongest predictor, followed by depressive then obsessive-compulsive symptoms, age, phobic anxiety symptoms, and gender. For psychological QoL, depressive symptoms were the strongest predictor, followed by obsessive-compulsive and interpersonal sensitivity symptoms. Depressive symptoms were also the strongest predictors of social QoL, followed by psychotic symptoms, age, and gender. Within the environmental QoL domain, only age and phobic anxiety emerged as significant predictors.

The finding that greater interpersonal-sensitivity predicted poorer QoL is novel and warrants further investigation. BSI *Interpersonal-Sensitivity* involves feelings of personal

inadequacy and inferiority, including self-deprecation, feelings of uneasiness, and marked discomfort during interpersonal interactions. While some of the aspects of interpersonal sensitivity overlap with depressive symptoms, our analysis suggests that interpersonal sensitivity may account for unique decrements in QoL, which could potentially be targeted in interventions.

Additionally, obsessive-compulsive symptoms were associated with poorer QoL. This finding is consistent with several previous studies which have shown a high impact of OCD symptoms on QoL [51]. Furthermore, the finding that somatisation symptoms accounted for the greatest variance in physical QoL, may be understandable in terms of links between the two subscales [52-54], which both assess variables such as energy, fatigue, sleep and rest.

Lastly, symptoms of psychoticism and paranoid ideation were inversely related to social and environmental QoL respectively. As social QoL encompasses facets such as social support and personal relationships, and psychoticism reflects irrational cognitions such as “the idea that someone else can control your thoughts” [31], it is plausible that the degree and intensity of irrational thoughts can contribute to an individual’s relationships with others. Likewise, as environmental QoL comprises facets such as physical safety and security, while paranoid ideation relates to “feelings that most people cannot be trusted” [31], it is probable that the level of paranoid ideation influences individuals’ perceptions of environments as safe or dangerous [35].

Somatic versus Psychological Depressive Symptoms as Predictors of QoL

This study revealed that, generally, somatic versus psychological depressive symptoms differentially predicted different domains of QoL. For overall QoL there were three significant negative predictors, with somatic symptoms emerging as the strongest predictor, followed by psychological depressive symptoms, and age. For physical QoL, somatic depressive symptoms had the strongest influence on QoL, followed by age and

female gender, while psychological depressive symptoms were not significant predictors. Psychological depressive symptoms were the strongest predictors of both psychological health and social QoL. Additionally, somatic depressive symptoms, age, and female gender also predicted social QoL. Therefore, somatic depressive symptoms emerged as significant predictors of overall, physical, psychological and social QoL domains; while psychological depressive symptoms had significant influences on overall, psychological and social QoL.

The finding that both depressive symptom subtypes uniquely explained additional variance in QoL beyond that explained by demographic variables, could be ascribed to the fact that depressive symptoms involve dynamic inter-relations spanning biological, psychological, and social spheres [55]. There is generally agreement that both somatic and psychological depressive symptoms are linked to the onset, persistence and recurrence of depression, which in turn, negatively affect QoL [56, 57]. The results demonstrate the importance of targeting both physical and psychological depressive symptoms in interventions, to improve QoL. As this is one of the first studies to differentiate the associations between symptom subtypes and QoL, further research is warranted to better understand the nuances between different symptom profiles as predictors of QoL in depression.

Female gender was also a significant negative predictor of physical and social QoL in this study. Poorer QoL scores have previously been reported for females than males in community settings [58]. Further research is warranted to understand contributors to lower QoL in females.

Limitations and Future Directions

The cross-sectional nature of this research limits the interpretation of the causal relationships between QoL and symptom profiles. Longitudinal research is needed to

understand whether psychopathology precedes poor QoL or poor QoL leads to mental health symptoms [57].

Secondly, this was a continuum study of community members who were not recruited on the basis of having a mental disorder or impaired functioning. Symptoms and distress were measured using psychometric tools and gave an indication of psychopathology but were not able to diagnose mental disorders. A strength of this approach is that we were able to examine relationships between QoL and several types of mental health symptoms on continuums in a relatively large sample. However, the results need to be considered alongside clinical studies, to better understand avenues for interventions.

Thirdly, mental health symptoms and QoL outcomes show complex and overlapping relationships [44-46]. Our psychometric and statistical approach assessed relationships between the variables and their unique contributions to QoL. Additionally, our study found only weak-moderate correlations between mental health symptoms and QoL, consistent with previous research which has concluded that they are not highly correlated and are distinct concepts [7]. Nonetheless, further research is needed to fully understand the complex interplay between QoL and mental health symptoms.

Fourthly, as the participants were mainly recruited from the psychology student pool and social media, there may be a self-selection-bias whereby individuals who agreed to be involved in the research are not representative of all individuals in the community. Therefore, the findings from this research should be considered in light of this limitation. Nonetheless, this is a common limitation in similar research [59]. Further, a higher number of females than males responded to the survey. This is consistent with previous research, as survey respondents are more likely to be female [60], and there is a higher proportion of females in undergraduate psychology students, who were also invited to participate.

Additionally, various psychosocial factors (e.g., personality, education, and employment status) that may affect QoL [61] in depression were not included in this study. For instance, examples of variables derived from literature such as the coping style or personality of the participants [62], which could either act as a perpetuating or protective factor, has been shown to play important roles in regulating QoL in depression, but were not assessed in this paper. Additionally, occupation and educational levels show complex relationships with QoL and health conditions. Unemployment, low socioeconomic status, demanding educational training and stressful occupations can all be associated with lower QoL and interact with mental and physical health [63, 64]. Thus, in order to ascertain the possible influence of mediating factors on depressive symptoms and QoL outcomes, future research should investigate these factors.

Implications of Findings While much previous research has examined relationships between QoL and mental health symptoms, the current research employed a novel study design which directly compared the strength of correlation between different types of psychopathology to QoL. Additionally the strength of relationships between depressive symptom subtypes and domain-specific QoL was assessed, which has received little previous examination. The findings suggest that while psychopathology is broadly, inversely related to QoL, there are significant differences between symptom profiles and the extent to which they impact on QoL. Depressive symptoms, and more specifically somatic depressive symptoms, account for the highest amount of variance in QoL relative to other symptoms.

The results demonstrate important relationships between mental health symptoms, particularly depressive symptoms, and QoL. This in turn suggests that assessing QoL across multiple domains, in addition to mental health symptoms, may provide further important information about holistic health and functioning in clinical and community settings. QoL is increasingly recognised as a meaningful construct that can be used to assess prognosis and

patient well-being [65]. Additionally, improving QoL is increasingly considered as the gold standard treatment goal in depression [57], and in other areas of medicine [66].

Understanding factors that are associated with QoL in depression is imperative to the development of health policies that can improve overall health outcomes. Depressive symptoms were negatively predictive of QoL overall and in the physical health, psychological, and social domains. Interventions that specifically target these domains could be beneficial in the context of depressive symptoms. Additionally, the study further supports the importance of the encouragement of early treatment uptake for mental health symptoms, due to their relationship with overall QoL. Knowledge of the impact of depressive symptoms and other types of psychopathology on QoL in community samples could be used to improve targeted health interventions.

Conclusions

The current study shows that mental health symptoms are broadly and inversely related to QoL, and provides new evidence that some types of symptoms, particularly somatic depressive symptoms, are stronger predictors of QoL decrements. Depressive symptoms were significant predictors of overall, physical, psychological, and social functioning. Overall, the results provide more evidence of the connectedness between mental and physical health. In conjunction with previous research, the results support a need for encouraging early intervention for depressive symptoms, and consideration of community preventative strategies for mental health symptoms. Assessment of both QoL and symptoms may allow for tailored interventions to improve outcomes.

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Table 1

Demographic and psychometric characteristics of the participants (n=559) and Cronbach α of the study measures.

Variable	<i>M</i>	<i>M</i> \pm (%)
Age		29.12 years \pm 4.32
Gender	Female	438 (78.4)
	Male	116 (20.8)
	Unspecified	5 (0.9)
Living arrangements	Alone	58 (10.4)
	With family	347 (62.1)
	With friends	71 (12.7)
	With intimate partner	83 (14.8)
Previous mental health diagnosis	Yes	230 (41.1)
	No	329 (58.9)
Average units of alcohol per week	0 units	249 (44.5)
	< 7 units	217 (38.8)
	8 - 14 units	62 (11.1)
	15 - 21 units	18 (3.2)
	22 - 28 units	8 (1.4)
	> 28 units	5 (.9)
Current student	Yes	348 (62)
Country of birth	Australia	384 (68.7)
	Other	175 (31.3)
	<i>M</i> (<i>SD</i>)	Cronbach α
BSI		
Somatisation	.72 (.75)	.86
Obsessive-Compulsive	1.37 (.96)	.89
Interpersonal Sensitivity	1.31 (1.15)	.88
Depression	1.15 (1.10)	.93
Anxiety	.94 (.91)	.89
Hostility	.81 (.81)	.86
Phobic Anxiety	.65 (.83)	.85
Paranoid Ideation	.87 (.89)	.83
Psychoticism	.88 (.88)	.79
Global Severity Index	.97 (.78)	.98
DASS-21		
Depression	11.18 (11.31)	.94
Anxiety	7.94 (8.23)	.85
Stress	12.46 (9.58)	.89
Overall DASS-21	31.57 (26.21)	.95
BDI-II		
Somatic Symptoms	13.55 (10.14)	.91
Psychological Symptoms	6.57 (5.92)	.91
Overall BDI-II	16.84 (13.16)	.94
WHOQOL-BREF		
Physical Health	59.28 (11.44)	.82
Psychological Health	49.96 (13.96)	.88
Social Relationships	52.02 (15.44)	.74
Environment	59.56 (10.92)	.84
Total QoL	3.83 (.95)	-

Note. BSI = Brief Symptom Inventory; DASS = Depression, Anxiety, and Stress Scales; BDI-II = Beck Depression Inventory; WHOQOL-BREF = World Health Organisation Quality of Life Brief measure.

Table 2 Spearman's Rho Correlations for Study Variables (*n* = 559)

Variables	WHOQOL-BREF									
	Overall QoL		Physical Health		Psychological Health		Social Relationships		Environment	
	r_s	FDR p	r_s	FDR p	r_s	FDR p	r_s	FDR p	r_s	FDR p
BSI										
Somatisation	-.42	0.04	-.59	0.01	-.53	0.03	-.32	0.04	-.46	0.03
Obsessive-Compulsive	-.47	0.04	-.59	0.01	-.66	0.01	-.37	0.04	-.49	0.03
Interpersonal Sensitivity	-.49	0.03	-.52	0.03	-.71	0.00	-.47	0.03	-.52	0.03
Depression	-.58	0.01	-.56	0.02	-.79	0.00	-.53	0.02	-.52	0.02
Anxiety	-.47	0.03	-.56	0.02	-.64	0.01	-.39	0.04	-.51	0.02
Hostility	-.38	0.03	-.48	0.03	-.52	0.03	-.38	0.04	-.46	0.03
Phobic Anxiety	-.40	0.04	-.54	0.03	-.62	0.01	-.37	0.04	-.46	0.04
Paranoid Ideation	-.41	0.04	-.49	0.03	-.55	0.02	-.42	0.04	-.50	0.03
Psychoticism	-.49	0.03	-.53	0.02	-.70	0.01	-.53	0.02	-.52	0.02
Global Severity Index	-.54	0.02	-.64	0.01	-.76	0.00	-.50	0.03	-.57	0.01
DASS-21										
Depression	-.58	0.01	-.59	0.01	-.82	0.00	-.52	0.02	-.53	0.02
Anxiety	-.43	0.04	-.59	0.02	-.61	0.01	-.37	0.04	-.52	0.03
Stress	-.45	0.04	-.55	0.02	-.65	0.01	-.38	0.04	-.49	0.03
Overall DASS-21	-.54	0.02	-.64	0.01	-.78	0.00	-.48	0.03	-.56	0.02
BDI-II										
Somatic Symptoms	-.58	0.02	-.65	0.01	-.80	0.00	-.48	0.03	-.54	0.02
Psychological Symptoms	-.55	0.02	-.57	0.02	-.81	0.00	-.52	0.02	-.53	0.02

Note. BSI = Brief Symptom Inventory; DASS = Depression, Anxiety, and Stress Scales; BDI = Beck Depression Inventory; WHOQOL = World Health Organisation Quality of Life. FDR p = Benjamini and Hochberg False Discovery Rate-adjusted probability values.

Table 3

Summary of Hierarchical Multiple Regression Analyses Predicting Quality of Life as Measured by WHOQOL-BREF from the BSI (n = 559)

Predictor	WHOQOL-BREF											
	Overall QoL				Physical Health				Psychological Health			
	<i>B</i>	β	<i>sr</i> ²	<i>p</i>	<i>B</i>	β	<i>sr</i> ²	<i>p</i>	<i>B</i>	β	<i>sr</i> ²	<i>p</i>
Step 1	$R^2 = .02, F(2, 556) = 5.07, p = .007$				$R^2 = .02, F(2, 556) = 4.64, p = .01$				$R^2 = .01, F(2, 556) = 1.63, p = .197$			
Age	-.15	-.13*	.02	.002*	-.43	-.13*	.02	.003*	.18	.04	.00	.294
Gender	.04	.02	.00	.663	.10	.02	.00	.722	-.48	-.06	.00	.159
Step 2	$\Delta R^2 = .36, \Delta F(9, 547) = 35.80, p < .001$				$\Delta R^2 = .45, \Delta F(9, 547) = 51.10, p < .001$				$\Delta R^2 = .63, \Delta F(9, 547) = 104.77, p < .001$			
Age	-.21	-.19**	.03	.000**	-.64	-.19**	.03	.000**	-.18	-.04	.00	.097
Gender	.08	.04	.00	.291	.50	.07*	.01	.020*	-.16	-.02	.00	.458
BSI Somatisation	-.07	-.06	.00	.326	-1.19	-.32**	.03	.000**	.15	.03	.00	.459
BSI Obsessive-Compulsive	-.05	-.06	.00	.369	-.65	-.22**	.01	.000**	-.69	-.20**	.01	.000**
BSI Interpersonal Sensitivity	-.02	-.02	.00	.722	-.02	-.01	.00	.917	-.53	-.18*	.01	.001*
BSI Depression	-.51	-.60**	.07	.000**	-.65	-.25**	.01	.000**	-1.89	-.61**	.07	.000**
BSI Anxiety	-.04	-.04	.00	.575	.21	.07	.00	.326	.31	.08	.00	.156
BSI Hostility	.05	.05	.00	.377	-.05	-.02	.00	.744	.15	.04	.00	.378
BSI Phobic Anxiety	.08	.08	.00	.157	-.36	-.11*	.00	.031*	-.32	-.08	.00	.055
BSI Paranoid Ideation	-.06	-.06	.00	.333	-.06	-.02	.00	.742	.30	.08	.00	.086
BSI Psychoticism	.10	.10	.00	.223	.35	.11	.00	.135	.04	.01	.00	.864
Total	$R^2 = .38, \text{adjusted } R^2 = .37, F(11, 547) = 30.73, p < .001$				$R^2 = .47, \text{adjusted } R^2 = .46, F(11, 547) = 43.33, p < .001$				$R^2 = .64, \text{adjusted } R^2 = .63, F(11, 547) = 86.51, p < .001$			

Note. BSI = Brief Symptom Inventory.

* $p < .05$, ** $p < .001$.

Table 4 (continued)

Summary of Hierarchical Multiple Regression Analyses of Different Types of Psychological Symptoms as Predictors of Quality of Life (n = 559)

	WHOQOL-BREF							
Predictor	Social Relationships				Environment			
	<i>B</i>	β	<i>sr</i> ²	<i>p</i>	<i>B</i>	β	<i>sr</i> ²	<i>p</i>
Step 1	$R^2 = .02, F(2, 556) = 4.79, p = .009$				$R^2 = .01, F(2, 556) = 1.44, p = .238$			
Age	-.50	-.11*	.01	.009*	-.24	-.07	.00	.093
Gender	.56	.06	.00	.141	-.09	-.01	.00	.760
Step 2	$\Delta R^2 = .32, \Delta F(9, 547) = 29.08, p < .001$				$\Delta R^2 = .35, \Delta F(9, 547) = 32.65, p < .001$			
Age	-.76	-.17**	.03	.000**	-.45	-.14**	.02	.000**
Gender	.64	.07*	.01	.044*	.14	.02	.00	.538
BSI Somatisation	.14	.03	.00	.647	-.28	-.08	.00	.200
BSI Obsessive-Compulsive	.30	.08	.00	.223	-.11	-.04	.00	.541
BSI Interpersonal Sensitivity	-.32	-.10	.00	.178	-.25	-.11	.00	.137
BSI Depression	-1.11	-.32**	.02	.000**	-.27	-.11	.00	.179
BSI Anxiety	.57	.14	.00	.078	-.29	-.10	.00	.209
BSI Hostility	-.15	-.03	.00	.546	-.28	-.08	.00	.124
BSI Phobic Anxiety	-.28	-.06	.00	.266	-.07	-.02	.00	.682
BSI Paranoid Ideation	-.38	-.09	.00	.143	-.41	-.13*	.01	.029*
BSI Psychoticism	-.96	-.22*	.01	.007*	-.09	-.03	.00	.716
Total	$R^2 = .34, \text{adjusted } R^2 = .32, F(11, 547) = 25.06, p < .001$				$R^2 = .35, \text{adjusted } R^2 = .34, F(11, 547) = 27.11, p < .001$			

Note. BSI = Brief Symptom Inventory.
 * $p < .05$. ** $p < .001$.

Table 5

Summary of Hierarchical Multiple Regression Analyses of Types of Depressive Symptoms (BDI-II Somatic and Psychological) as Predictors of Quality of Life (n = 559)

	WHOQOL-BREF							
	Overall QoL				Physical Health			
	<i>B</i>	β	<i>sr</i> ²	<i>p</i>	<i>B</i>	β	<i>sr</i> ²	<i>p</i>
Step 1	$R^2 = .02, F(2, 471) = 4.38, p = .013$				$R^2 = .02, F(2, 471) = 5.23, p = .006$			
Age	-.14	-.13*	.02	.005*	-.44	-.14*	.02	.003*
Gender	.07	.03	.00	.457	.29	.05	.00	.314
Step 2	$\Delta R^2 = .41, \Delta F(2, 469) = 168.61, p < .001$				$\Delta R^2 = .49, \Delta F(2, 469) = 236.62, p < .001$			
Age	-.18	-.17**	.03	.000**	-.53	-.17**	.03	.000**
Gender	.15	.07	.00	.051	.67	.11*	.01	.001*
BDI-II Somatic Depressive Symptoms	-.05	-.40**	.05	.000**	-.24	-.64**	.13	.000**
BDI-II Psychological Depressive Symptoms	-.05	-.27**	.02	.000**	-.04	-.07	.00	.189
Total	$R^2 = .43, \text{adjusted } R^2 = .42, F(4, 469) = 88.05, p < .001$				$R^2 = .51, \text{adjusted } R^2 = .51, F(4, 469) = 123.54, p < .001$			
	Psychological Health				Social Relationships			
	<i>B</i>	β	<i>sr</i> ²	<i>p</i>	<i>B</i>	β	<i>sr</i> ²	<i>p</i>
Step 1	$R^2 = .00, F(2, 471) = 1.00, p = .367$				$R^2 = .02, F(2, 471) = 5.84, p = .003$			
Age	.15	.04	.00	.391	-.51	-.12*	.01	.010*
Gender	-.39	-.05	.00	.281	.82	.10*	.01	.037*
Step 2	$\Delta R^2 = .71, \Delta F(2, 469) = 568.57, p < .001$				$\Delta R^2 = .28, \Delta F(2, 469) = 93.12, p < .001$			
Age	-.07	-.02	.00	.494	-.66	-.15**	.02	.000**
Gender	-.11	-.01	.00	.591	1.02	.12*	.01	.003*
BDI-II Somatic Depressive Symptoms	-.19	-.42**	.06	.000**	-.14	-.27**	.02	.000**
BDI-II Psychological Depressive Symptoms	-.29	-.46**	.07	.000**	-.20	-.29**	.03	.000**
Total	$R^2 = .71, \text{adjusted } R^2 = .71, F(4, 469) = 286.00, p < .001$				$R^2 = .30, \text{adjusted } R^2 = .30, F(4, 469) = 50.62, p < .001$			

Note. BDI = Beck Depression Inventory.

* $p < .01$, ** $p < .001$.