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ABSTRACT

Background: Limited data are available examining the relationship between mental state disorders (mood, anxiety, substance use, eating disorders), their co-occurrence with personality disorder (PD), and quality of life among women. We aimed to investigate these relationships in a sample of women from the community.
Method: Women from the Geelong Osteoporosis Study ($n = 717$) were administered the Structured Clinical Interview for DSM-IV (SCID-I/NP and SCID-II) and the World Health Organisation Quality of Life scale (WHOQOL-BREF). Weight and height were measured and lifestyle and demographic factors were self-reported. Logistic regression models (odds ratios with 95% confidence intervals) were undertaken to investigate associations among groups (mental state disorders, co-occurring mental state disorders with PD, and controls) and the WHOQOL-BREF domains (physical, psychological, social, and environmental health) while testing for potential confounding.
Results: Results indicated that mental state disorders were associated with increased risk of low quality of life in physical, psychological, social, but not environmental domains, compared to controls. This risk was increased among women with co-occurring PD across all domains compared to both controls and those with mental state disorders.
Conclusion: These findings add evidence suggesting poor quality of life is experienced by those with mental state disorders, and that this is worsened by the experience of co-occurring PD.

1. Introduction

Psychiatric disorders account for one third (32.4%) of the years lived with disability burden, surpassing its other main causes (i.e., infectious, cardiovascular, and musculoskeletal diseases, cancers, and injuries) [1]. Disability burden greatly affects quality of life, particularly among patients with multimorbidity [2]. Quality of life refers to an individual's subjective wellbeing, with reference to their health, psychological state, beliefs, interpersonal relationships, and connection to relevant features of their environment [3]. Although quality of life is becoming increasingly recognised as an important outcome in contemporary

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psychiatry, research on the relative impact of the co-occurrence of mental state disorders and personality disorder (PD) is still in its infancy.

Mental state disorders usually encompass those psychiatric disorders seen as episodic perturbations of mental state, such as mood, anxiety, eating, and substance use disorders. Definitions of mental state disorders generally exclude PD, which is seen as a manifestation of enduring traits [4]. PD commonly co-occurs with mental state disorders, which is largely an artefact of the hierarchical structure of psychopathology [5], but it is often ignored.

Mental state disorders have been associated with significant disability and impairment in quality of life. In a recent large-scale sample of the general population from the United States, mood disorders were found to have the largest decrease in health-related quality of life scores out of all mental and physical conditions studied [6]. Sanderson and Andrews [7] found that individuals with mental state disorders (affective disorders, panic disorder, post-traumatic stress disorder, and generalised anxiety disorder) experienced moderate to severe disability (characterised by self-reported low mental health and impairment in role-functioning). Similarly, Druss et al. [8] demonstrated that mental state disorders (namely, anxiety, mood, and impulse-control disorders), were associated with more severe impairment in home, social, and interpersonal functioning, in comparison to chronic medical conditions (i.e., cancer, cardiovascular and musculoskeletal diseases, chronic pain disorders, diabetes, chronic headaches, asthma, and ulcer). These findings have also been echoed in clinical research, whereby participants with chronic/double major depression, major depressive disorder, and post-traumatic stress disorder were found to report low subjective quality of life [9].

The association between quality of life and PD has been less comprehensively explored. PD occurs when an individual's personality structure prevents them from achieving adaptive solutions to universal life tasks [10]. Such tasks include achieving stable and integrated representations of oneself and others; developing the capacity for intimacy, attachment, and affiliation; and developing the capacity to function adaptively in the social group through prosocial behaviour and/or cooperative relationships. These characteristics are relatively pervasive and stable across time and situations. Quality of life is particularly pertinent to those with PD, as subjective well-being, rather than an objective health, influences treatment-seeking or rejecting behaviour, adherence, and appraisal of treatment [11]. The available literature has demonstrated that patients with PD have significantly lower quality of life than the general population, with one study suggesting comparable quality of life to patients with Parkinson's disease, rheumatic disease, or lung cancer [12]. Soeteman et al. [12] suggested that although some specific PDs (borderline, narcissistic, obsessive-compulsive, negativistic, and mixed PD) are independently associated with low quality of life, the co-occurrence of multiple PDs reduces quality of life over and above specific individual PD diagnosis. Further, Jackson and Burgess [13] demonstrated that mental and physical disability was impaired for individuals with PD, even after adjusting for co-occurring mental state disorders and physical conditions.

Sex disparities between mental state disorders and PD may be pertinent to quality of life. Borderline, depressive, dependent, and avoidant PDs are more common among women, whereas antisocial, schizotypal, and schizoid PDs are more commonly experienced by men [14,15], however such results are likely to be influenced by study population and sampling issues [16]. These sex differences are echoed in utilization of healthcare services, reflecting gender disparities in prevalence and treatment-seeking factors. In a recent analysis of health encounters of Australians in primary care settings, women were reported to have had more encounters of depression, anxiety, and bipolar disorder, while men had more encounters of schizophrenia [17]. Help-seeking behaviour is typically more common among women [18]. This is potentially due to risk factors which disproportionality affect women and perceptions of reduced barriers to disclose mental health problems among women [19]. Thus, motivations to alleviate impairments in quality of life may act as an important factor in this relationship.

The over-representation of women with psychiatric disorders and how this affects quality of life warrants further investigation. While both mental state disorders and PD are associated with impacts on quality of life, what remains unanswered is the contribution mental state disorders, PD, and their combination have on quality of life. Therefore, the aim of this study was to investigate the quality of life of women with mental state disorders with and without co-occurring with PD. It was hypothesised that women with mental state disorders co-occurring with PD would have significantly poorer physical, psychological, social, and environmental quality of life compared to controls and compared to women with mental state disorders without co-occurring PD.

2. Materials and methods

2.1. Participants

This cross sectional study utilised data from women returning for follow up in the most recent phase (2011–2014; $n = 849$) of the Geelong Osteoporosis Study (GOS) [20]. Briefly, GOS is an age-stratified, population-based cohort study of women (≥20 years), originally recruited between 1993 and 1997. Participants were randomly selected from the Australian electoral roll for the Barwon Statistical Division (located in south-eastern Australia), an area encompassing semi-rural and urban communities. Since the inception of the GOS, participants have been invited to undertake physical and mental health assessments every two to five years. Detailed descriptions of the GOS cohort and study design have been published previously [20,21].

Participants were not included in the present study if they did not undertake mental health ($n = 81$) or quality of life ($n = 11$) assessments. Additionally, we were primarily interested in examining impacts of quality of life among participants with mental state disorders with and without co-occurring PD, thus participants who were identified as having PD without mental state disorder ($n = 40$) were excluded from the current study. The final sample included $n = 717$ women aged between 28 and 95 years at the time of interview.

This study was carried out in accordance with the latest version of the Declaration of Helsinki. The Barwon Health Human Research Ethics Committee (HREC) approved this study (Reference no. 92/01_E7). Written informed consent was obtained for all participants in the present study.

2.2. Outcome measures

Lifetime history of mental state disorders (defined here as mood, anxiety, substance misuse, and eating disorders) were identified using the Structured Clinical Interview for DSM (SCID) Axis I Disorders, non-patient edition (SCID-I/NP) [22] for DSM-IV. Lifetime history was classified as participants who met current or past criteria for any mental state disorder. PD was identified using the SCID Axis II Disorders (SCID-II) [23]. All interviews were conducted by trained personnel with qualifications in psychology who had completed extensive training according to the SCID protocol [22,23]. Participants were assigned to one of three categories: 1) mental state disorders, 2) mental state disorders co-occurring with PD, or 3) no history of mental state disorder or PD (i.e., controls).

Quality of life was assessed using the World Health Organisation Quality of Life scale (WHOQOL-BREF) [24]. The WHOQOL-BREF is a 26-item self-report measure, measured on a 5-point Likert scale (lower scores indicate lower quality of life). It assesses quality of life in four domains: *physical health* (i.e., pain and discomfort, energy and fatigue, sleep and rest, dependence on medication, mobility, activities of daily living, and work capacity); *psychological health* (i.e., positive feelings, negative feelings, self-esteem, thinking and concentration, body

image, and spirituality and religion); *social health* (i.e., personal relations, sex, and practical social support); and *environmental health* (i.e., financial resources, information and skills, recreation and leisure, home environment, access to health and social care, physical environment, and transport), over the past two weeks. The WHOQOL-BREF yields an overall quality of life profile, which encompasses the four domain scores.

Lifestyle and demographic factors were self-reported. Current smoking and physical activity status was dichotomised as yes/no. Marital (single or never married, defacto relationship or married, separated or divorced, or widowed) and education status (non-completion of secondary school, completed secondary school, completed university, or completed a Technical and Further Education [TAFE] or trade qualification) was grouped into four categories. Area-based socio-economic status (SES) was assessed using the Index of Relative Socioeconomic Advantage and Disadvantage (IRSAD) [25]. Lower scores on the IRSAD signifies greater disadvantage (Quintile 1), while a high score represents greater advantage (Quintile 5). Body mass index (BMI) was determined using clinical measurements [weight (kg) and height (cm); weight/height^2].

2.3. Statistical analysis

All statistical analyses were performed using Minitab 18 [26]. Demographic characteristics were compared among the groups (mental state disorders, mental state disorders co-occurring with PD, and controls) using Kruskal-Wallis tests and chi square analyses.

Scores on each domain of the WHOQOL-BREF were assessed against general norms reported by Hawthorne et al. [27]: Physical health $M = 73.5$ (SD = 18.1), psychological health $M = 70.6$ (SD = 14.0), social health $M = 71.5$ (SD = 18.2), and environmental health $M = 75.1$ (SD = 13.0). These norms are based on a comparable, random, community-based sample of residents from Victoria, Australia. We were particularly interested in examining if quality of life among our sample was poor in comparison to general norms, so each domain of the WHOQOL-BREF was dichotomised as high or low according to general norms. Scores were considered to be poor when they were below the threshold for the indicated norm.

Logistic regression (odds ratios with 95% confidence intervals) was undertaken to investigate associations among the three groups and the WHOQOL-BREF domains (physical, psychological, social and environmental health), with controls set as the reference group. Differences between mental state disorders and co-occurring mental state disorders with PD were then examined, with mental state disorders set as the reference group. Covariates including marital status, education, SES, BMI, physical activity, and smoking status were tested. Backwards stepwise regression techniques were used to determine the best model, with all interactions checked.

3. Results

Results indicated that 239 (33.3%) women had a mental state disorder, 114 (15.9%) had co-occurring PD, while 364 (50.8%) women did not meet criteria for any psychiatric disorder. Of those with mental state disorders, 289 (40.3%) had a mood disorder, 178 (24.8%) had an anxiety disorder, 15 (2.1%) had an alcohol-related disorder, 16 (2.2%) had a drug-related disorder, and 35 (4.9%) had an eating disorder. Of those with a PD, 34 (4.7%) had a Cluster A PD, 19 (2.7%) had a Cluster B PD, and 88 (12.3%) had a cluster C PD. Characteristics of the four groups can be seen in Table 1. Age, BMI, marital status, and each of the quality of life domains differed between the groups.

After adjusting for age, women with mental state disorders had increased likelihood of poor quality of life in the physical [OR 2.80 (95% CI 1.92–4.10), $p < .001$], psychological [OR 2.01 (95% CI 1.43–2.83), $p < .001$], social [OR 1.83 (95% CI 1.29–2.60), $p < .01$], but not environmental domains [OR 1.14 (95% CI 0.81–1.60), $p = .44$], compared with controls. This additive risk was also increased for women with co-occurring PD [physical OR 9.32 (5.56–15.62), $p < .001$; psychological OR 10.82 (6.03–19.42), $p < .001$; social OR 6.27 (3.89–10.10), $p < .001$; environmental OR 2.87 (1.83–4.50), $p < .001$]. When comparing to those with mental state disorders, women with co-occurring PD had greater risk of poor physical [age adjusted OR 3.32 (95% CI 2.01–5.50), $p < .001$], psychological [age adjusted OR 5.39 (95% CI 2.98–9.75), $p < .001$], social [age adjusted OR 3.43 (95% CI 2.11–5.57), $p < .001$], and environmental [age adjusted OR 2.51 (95% CI 1.58–4.00), $p < .001$] quality of life.

4. Discussion

In this population-based sample of women, quality of life among those with mental state disorders and those with mental state disorders co-occurring with PD differed but was low overall. The results demonstrated that women with a lifetime history of mental state disorder were more likely to have poor physical, psychological, and social (approximately 2.8-, 2.0-, and 1.8-fold, respectively), but not environmental quality of life, compared with women without a history of psychiatric illness. Furthermore, women with mental state disorders co-occurring with PD also had considerably poorer physical, psychological, social, and environmental quality of life (approximately 9.3-, 10.8-, 6.3-, and 2.9-fold, respectively) compared with women without a history of psychiatric illness. Interestingly, when comparing women with mental state disorders to those with mental state disorders and co-occurring PD, the additive risk for poor quality of life was considerably higher for women with the later across all domains (approximately 3.3-, 5.4-, 3.4-, and 2.5-fold, respectively).

4.1. Mental state disorders and quality of life

Among individuals with mental state disorders, quality of life was low in the physical, psychological, and social domains, and this is in line with the broader literature [e.g., 6, 7, 8]. The finding that mental state disorders were not associated with low environmental quality of life might be explained by the fact that mental state disorders were measured across the lifetime, which incorporated both current and past history of mental state disorders, and might not have allowed for a nuanced interpretation of different illness stages in association to current quality of life. The episodic nature of mental state disorders [31] might allow individuals to engage in, and be satisfied with, occupational activities during periods of remission [29], and thus acquire positive environmental resources including, finance, transport, information and skills, and access to health and social care. It might be that additional compromises have been made to assist participants with mental state disorders to participate in occupational activities. For example, de Vries et al. [30] found that after 18-months of depression intervention, participants who were in remission were able to engage in 92% of their original work hours, but still experienced impaired work functioning. In particular, it was found that participants had increased work limitations and needed more time to recover after work, suggesting that although extra work-related effort was put in place by participants, environmental resources might still have been obtained, reflecting a positive perception of quality of life.

4.2. Mental state disorders co-occurring with personality disorders and quality of life

In line with our hypothesis, individuals with mental state disorders with co-occurring PD had significantly poorer quality of life in all domains, compared to control participants and compared to those with just mental state disorders. The increased psychopathology amongst this group, possibly leads to amplified complexity in presentation,

Table 1
Characteristics of Whole Group and Women with Mental State Disorders, (±) PD, and Controls. Values are reported as Median (Interquartile Range) and or *n* (%).

Characteristic	All	Controls	Mental state disorders	Mental state disorders co-occurring with PD	*p*
	n = 717 (100%)	*n* = 364 (50.8%)	*n* = 239 (33.3%)	*n* = 114 (15.9%)	
Age (years)	56.5 (41.9–68.6)	60.3 (46.2–72.3)	54.8 (38.8–64.6)	51.5 (38.2–62.5)	<0.001
Education					0.373
No secondary	289 (40.5%)	159 (43.9%)	93 (39.1%)	37 (32.7%)	
Secondary	112 (15.7%)	56 (15.5%)	37 (15.6%)	19 (16.8%)	
University	148 (20.8%)	67 (18.5%)	56 (23.5%)	25 (22.1%)	
TAFE/Trade	164 (23.0%)	80 (22.1%)	52 (21.9%)	32 (28.3%)	
Marital status					0.001
Single/never married	52 (7.3%)	19 (5.2%)	20 (8.4%)	13 (11.4%)	
Married	509 (71.0%)	268 (73.6%)	171 (71.6%)	70 (61.4%)	
Separated/divorced	79 (11.0%)	27 (7.4%)	28 (11.7%)	24 (21.1%)	
Widowed	77 (10.7%)	50 (13.7%)	20 (8.4%)	7 (6.1%)	
SES					0.082
Quintile 1[a]	109 (15.2%)	44 (12.1%)	43 (18.0%)	22 (19.3%)	
Quintile 2	78 (10.9%)	35 (9.6%)	31 (13.0%)	12 (10.5%)	
Quintile 3	293 (38.8%)	153 (42.0%)	85 (35.6%)	40 (35.1%)	
Quintile 4	133 (18.5%)	61 (16.8%)	50 (20.9%)	22 (19.3%)	
Quintile 5	119 (16.6%)	71 (19.5%)	30 (12.6%)	18 (15.8%)	
BMI (kg/m^2)	27.1 (23.8–32.1)	26.8 (24.0–31.8)	27.0 (23.5–31.4)	28.8 (24.2–34.2)	0.07
Physical activity (active)	521 (7.3%)	262 (73.0%)	183 (76.6%)	76 (67.3%)	0.185
Smoking status (current)	80 (11.2%)	33 (9.1%)	29 (12.2%)	18 (15.8%)	0.120
WHOQOL-BREF (poor)					
Physical	302 (42.1%)	114 (31.3%)	109 (45.6%)	79 (69.3%)	<0.001
Psychological	379 (52.9%)	150 (41.2%)	131 (54.8%)	98 (86.0%)	<0.001
Social	294 (41.5%)	113 (31.3%)	100 (42.7%)	81 (71.1%)	<0.001
Environmental	329 (45.9%)	152 (41.8%)	103 (43.1%)	74 (64.9%)	<0.001

Note: [a]Greatest disadvantage; PD = Personality Disorder; SES=Socio Economic Status; BMI=Body Mass Index; WHOQOL-BREF = World Health Organisation Quality of Life scale.

worse functioning, and persistence of disorders over time [31], in turn impacting on quality of life. Skodol [32] suggested that individuals with co-occurring mental state disorder and PD experience cumulative effects, and the findings of the current study support this notion.

An important finding of the current study is that women with co-occurring mental state disorders and PD perceived their psychological health to be markedly poorer than control participants; and the odds ratio for this relationship was considerably higher than any other association found in the current study. Moreover, this group also had substantially poorer psychological health than those with mental state disorders without PD, suggesting that the added burden of PD markedly diminished positive psychological experiences over and above the experience of mental state disorders. This is likely due to the amplified burden of psychopathology which is present in the co-occurrence of mental state disorders and PD, which tends to cut across disorder boundaries [33], and greatly impairs psychological quality of life. Poor psychological quality of life may be influenced by the notion that the co-occurrence of PD among those with mental state disorders (namely, depression) leads to poor treatment response in some cases [34,35]. However, other research, including the most recent review by our group [under review, [36]], does not support such an association [37,38], suggesting that the low quality of life experienced by this group may exist regardless of treatment response.

Our finding that women with mental state disorders co-occurring with PD is associated with low physical quality of life, is similar to findings put forward by Penner-Goeke et al. [6]. Although the cumulative effects of mental state disorders and PD were not studied, they found that, in addition to mood and psychotic disorders, PD represented considerable quality of life dysfunction. In particular, depressive, borderline, and schizotypal PDs were associated with the lowest quality of life scores among the psychiatric conditions studied. The increased risk of poor physical quality of life among this group is likely explained by the high rates of co-occurring mental state disorders, PD, and physical health conditions. Recent data from the Geelong Osteoporosis Study demonstrated that, compared with healthy peers, women with any PD were more likely to have recurrent headaches, syncope and seizures [39], and these data were inclusive of participants with mental state disorders. Additionally, PD is a risk factor for poor health choices, including smoking, drinking, and lack of exercise, which serve as risk factors for both mental and physical ill health and have been associated with poor quality of life in adulthood [40]. These physical health experiences are of particular concern, given that PD is associated with increased morbidity and mortality [41]. Notably, the current findings suggest that health factors including BMI, smoking status, and physical activity did not explain the relationship between PD and quality of life.

More women in the co-occurring mental state disorders and PD group were separated or divorced and fewer were married, compared with controls, which reflects the finding that social quality of life was low among this group. Previous research ([i.e., [42]] has also demonstrated people with PD have fewer children, experience substantial anguish and conflicts with relationships, and feelings of loneliness. The conflictual relationships and solitary lifestyle practices experienced and/or preferred by many with PD do not provide opportunities for adequate social connectedness. Thus, this lack of social connectedness does not afford opportunities for individuals to appraise how they think about themselves and process information (which are core features of social connectedness), which ultimately buffers against stressful life events [43].

4.3. Strengths and limitations

Despite the strengths of this large, randomly selected, age-stratified population-based sample, this current study is not without limitations. Firstly, the proportion of participants with Cluster A and B PDs was low, thus statistical power constraints prevented further examination of the results by PD cluster or specific PDs. Secondly, the current study measured mental state disorders over the lifetime; whereas, quality of life was assessed for the two-week period preceding the interview. These findings, however, propose that even though onset of PD occurs during childhood or adolescence [15], its adverse effects are still seen in periods much later in life [44]. Additionally, the current study did not assess for psychotic disorders. Lastly, the dichotomisation of the domain scores of the WHOQOL-BREF might not allow for nuanced interpretation of the quality of life among this sample. Though not

necessarily a limitation, it is important to note that the use of the SCID-II in the current study presented a categorical approach to PD, whereas much of the literature in this context is moving towards a dimensional approach to measuring PD [45,46]. Nevertheless, this study postulates critically important data on the poor physical, psychological, social, and environmental quality of life experienced by those with mental state disorders co-occurring with PD, compared to controls and those with mental state disorders on their own.

4.4. Conclusion

In summary, quality of life is considerably impaired for those who experience mental state disorders, and this impairment is considerably greater for those who experience a co-occurring PD. Improving quality of life, particularly psychological quality of life, among patients with co-occurring mental state disorder and PD should be a clinical focus.

Author contributions

BEK conceptualised the project, completed statistical analyses, and edited and approved the manuscript. ALS conceptualised the project, completed statistical analyses, and edited and approved the manuscript. AT conceptualised the project, edited, and approved the manuscript. OMD conceptualised the project, edited, and approved the manuscript. JAP designed this wave of the Geelong Osteoporosis Study, edited and approved the manuscript. HJJ edited and approved the manuscript. HK-H edited and approved the manuscript. AMC edited and approved the manuscript. LJW conceptualised the project, edited, and approved the manuscript.

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Declaration of Competing Interest

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