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Coping style as a predictor of anxiety in relatives of patients with mental illness-a single-center study

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Abstract

Background Relatives of patients with mental illnesses such as schizophrenia and depression experience significant levels of anxiety. Accurately predicting their anxiety levels is crucial for the development of effective anti-anxiety interventions aimed at mitigating associated adverse outcomes.

Methods In this cross-sectional study, 238 relatives of patients with mental illness were recruited, and their responses were collected using the generalised anxiety disorder-7 (GAD-7) and simplified coping style questionnaire (SCSQ) scales. One-way analysis of variance and t-test were used to assess the mean scores of GAD-7 and SCSQ among relatives with varying characteristics. Pearson's correlations were used to examine the correlation between anxiety levels and coping style. Multi-level regression analyses were used to identify the impact of the independent variables on anxiety.

Results Among all relatives of patients with mental illness who participated in this survey, 238 completed the questionnaire. Females exhibited a higher mean GAD-7 score (9.72 ± 0.25) compared to males. Among participants aged 18–25 years, the GAD-7 (8.12 ± 0.17) score was the highest. Additionally, relatives of patients experiencing their first episode or with a disease duration of < 1 year, as well as relatives of patients with schizophrenia and depression, displayed higher GAD-7 scores. Correlation analysis revealed a positive correlation between anxiety and SCSQ (negative coping styles) ($r = 0.476$, $p < 0.01$). Multi-level regression analyses demonstrated that demographic variables ($R^2 = 0.474$, $F = 21.402$, $p < 0.01$) and SCSQ (R^2 change $= 0.638$, $F = 37.526$, $p < 0.01$) were significantly and positively associated with anxiety among relatives of patients with mental illness.

Conclusions Most relatives of patients with mental illness experience varying levels of anxiety, which are influenced by their coping styles.

Keywords Anxiety, Relatives of patients with mental illness, Coping style

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Introduction

Research indicates that mental illness constitutes 7% of the total global burden of disease, as measured by disability-adjusted life years, and this proportion has increased in recent decades [1]. Providing care for patients with mental illness requires a significant investment of time and effort. Relatives of patients with mental illness are actively involved in their care and support, facing considerable stress and burden that can compromise their health and quality of life, leading to feelings of anxiety and depression [2]. Consequently, it is not surprising that rates of clinically significant distress ranging from 12 to 60% have been reported among family members of patients diagnosed with mental illness [3]. Several studies indicated that patient with non-affective disorders and their siblings were more likely to be subjective well-being when they chose positive coping styles in the face of stress. Meanwhile dysfunctional coping patterns have shown to be related to patients with a first episode of psychosis [4]. However, the anxiety level in relatives of patients with different kind of mental illness need to be further.

Coping styles are defined as the predominant behavioural patterns individuals employ when confronted with new or unfamiliar situations [5]. These styles vary among individuals and influence their sensitivity to environmental stimuli, thereby shaping their responses to events. In psychotherapy for mental disorders, coping styles might significantly impact treatment effectiveness to varying degrees [6]. Additionally, coping is recognised as the process through which individuals manage stress [7] and is considered a crucial and modifiable factor affecting psychological morbidity [5]. Optimistic and active coping styles among relatives of individuals with mental illness can help them overcome the stress associated with caregiving, preserving their health and that of their families [8]. On the contrary, negative coping styles might compromise their health and quality of life, leading to increased anxiety and depression. Evidence from a systematic review suggests that the carers for dementia patients and patients with insomnia disorder experience high levels of anxiety and depression, and which is associated with dysfunctional coping [5]. Another study suggests that coping styles influence family burden in parents of children with psychiatric disorders [9]. Moreover, in cross-sectional studies, the use of dysfunctional coping strategies has been moderately correlated with anxiety and depression and has also predicted depression at 6- and 12-month follow-ups [10]. Thus, coping styles emerge as significant predictors of negative emotions such as anxiety and depression in relatives of patients with mental illness. Moreover, this study to investigate whether there are differences in coping styles among relatives of patients with different kind of mental illness, and whether this further affects their anxiety level.

Demographic characteristics could moderate the association between coping style and outcomes. Some studies shown that patients with high resilience are more likely to adopt a positive coping style, which is beneficial to the outcome of the disease. Furthermore, positive coping style could promote well-being of patient [4]. Additionally, other studies suggest that the interaction between coping style and the type of intervention is crucial in determining outcomes [11]. Schaffer et al. [12] have highlighted that inadequate knowledge, poor communication skills, and inadequate social support might lead relatives of patients with mental illness to experience feelings of abandonment or powerlessness. Education and effective social support could assist these relatives in normalising the experience of stigma, enhancing problem-solving skills, and adopting positive coping strategies. Moreover, Zeng et al. [13] have identified sex, age in years, level of education, and monthly income as risk factors for anxiety among family members of psychiatric patients.

The primary objective of this study was to examine coping styles as predictors of anxiety among relatives of patients with mental illness and to explore how demographic characteristics might influence coping styles and their relationship with anxiety. It was hypothesised that adopting a positive coping style would be effective in reducing anxiety levels among relatives of patients with mental illness, while a negative coping style would be more strongly associated with increased anxiety. Additionally, it was anticipated that demographic characteristics (such as sex, monthly income, type of relative's illness) would be closely related to the coping style individuals employ when facing stress. Females might exhibit a higher likelihood of experiencing anxiety in response to stress and might tend to employ negative coping styles more frequently than males. Relatives of patients experiencing their first episode of mental illness or with a disease duration of <1 year might feel overwhelmed due to a lack of understanding of the disease, potentially leading to a greater tendency towards negative coping strategies. Furthermore, limited financial support might serve as a significant factor influencing the choice of negative coping styles.

Methods

Design

This study used a descriptive cross-sectional design, adhering to the Strengthening the Reporting of Observational Studies in Epidemiology guideline.

Participants

Between January 2023 and August 2023, an anonymous questionnaire survey was conducted among relatives of

patients with mental illness at a tertiary psychiatric hospital in Henan Province through *Wenjuanxing* (a survey platform in China). First, all potential participants were informed about the purpose of the study and provided oral informed consent before participating. Second the overall content of questionnaires (at the beginning, there is a passage that reminds them of the purpose, significance, their rights, and they can voluntarily participate and be allowed to quit halfway) was send to each participant by scan OR code, and they were invited to complete the questionnaires in a quiet, easy, and private room by face-to-face investigator. Meanwhile, the participangts were asked to complete the questionnaire within 15 min and could not repeat the input. Next, a quality-control investigator checked the answers to ensure accuracy, integrity, and consistency (supllement Fig. 1). In total, 238 relatives who completed all questionnaires and met the inclusion criteria were included in the analysis. The inclusion criteria were as follows: (1) individuals aged between 18 and 65 years; (2) those who were relatives of patients with mental illness (the diagnostic criteria for mental illness according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV)); (3) well-established caring role; minimum of 1 year in role, through familial tie and/or cohabitation; (4) those who voluntarily participated and provided accurate responses; (5) those who demonstrated an understanding of the questionnaire content and completed the assessments accurately. The exclusion criteria were as follows: those who were patients with mental illness. All participants provided informed consent before participating in the study, which was approved by the Ethics Board of XinXiang Medical University, China [approval number: XYLL-20230276], and adhered to the most recent version of the Declaration of Helsinki. Data confidentiality and anonymity were ensured, and participation in the study was voluntary for all participants.

Data collection

To ensure the authenticity of responses and minimise potential stigma, questionnaires were randomly distributed through *Wenjuanxing*, a survey platform in China. Responses with missing data or entry errors were excluded from the analysis. Additionally, a minimum threshold of at least five relatives for each type of mental illness was set to ensure an adequate sample size for analysis. Following the sample size calculation method proposed by Ni et al. [14], which suggests a sample size of 5–10 times the number of variables with a consideration of 20% invalid questionnaires. The most items in this study were SCSQ scale, with 20 items, so the sample size was 100–200. Taking into account the recall of the questionnaire and invalid questionnaire, adding 20% of the sample loss, the minimum sample size required for this study is 120. Finally, 238 questionnaires were completed, accounting for 98.4 of the total number of questionnaires distributed.

Measurements

Demographic characteristics

Initially, a self-compiled general demographic questionnaire was employed, which included inquiries regarding age in years, sex, education level, and average monthly income. To further investigate the factors influencing anxiety among relatives of patients with mental illness, additional items were included in the questionnaire. These items encompassed the relationship with the patient, the duration of the relative's illness, and the type of mental illness affecting the relative.

Generalised anxiety disorder (GAD-7)

In this study, the anxiety levels of relatives of patients with mental illness were assessed using the GAD-7 scale [15]. This scale uses a four-point Likert scale, where respondents rate each item from 0 (not at all) to 3 (nearly every day). Total scores range from 0 to 21, with higher scores indicating more severe GAD symptoms. The Cronbach's α coefficient for the total scale was 0.943, indicating high internal consistency, thus affirming the validity and reliability of the scale.

Simplified coping style questionnaire (SCSQ) scale

In this study, the coping styles of relatives of patients with mental illness and their relationship with psychosomatic health were assessed using the SCSQ scale [16]. This scale employs a four-point Likert scale, ranging from 0 (never) to 3 (very often), to rate each item. The SCSQ scale has been widely used in China and has demonstrated satisfactory reliability and validity [17]. Comprising 20 items, the scale comprises two subscales: active coping (12 items) and passive coping (eight items). The Cronbach's α coefficients for positive coping styles and negative coping styles were 0.938 and 0.853, respectively, indicating high internal validity and reliability.

Data analysis

In this study, SPSS version 23.0 was employed for data entry and statistical analysis. Initially, the data were collected and screened. Subsequently, all data were assessed for normality, outliers, and missing values, using methods such as skewness and kurtosis or P-P graph. The measurement data are presented as the mean ± standard error. Statistical analysis included included the t-test for comparing means between two independent groups, one-way analysis of variance for multiple group comparisons (bonferroni correctionand), and Pearson's correlations to explore the correlation between anxiety and coping style. Multi-level regression analyses were conducted to

identify the respective contributions of the independent variables, such as age and duration of relative's illness, as well as coping style, to anxiety levels. Statistical significance was set at $p<0.05$.

Results

Sample demographic characteristics

Table 1 displays the demographic characteristics of the participants. Out of the total respondents ($n=238$), 76 were females (31.9%) and 162 were males (68.1%). Most participants were aged < 50 years. Approximately 60.5% of the respondents did not possess a college degree, while the average monthly income predominantly exceeded RMB 3000. Regarding the duration of the relative's illness, most reported durations fell within the range of 1–5 years. Schizophrenia accounted for the largest proportion (34.1%) among the types of illness affecting the relatives. Furthermore, the study observed that relatives providing care for patients were more likely to be other relatives, adult children, and parents.

GAD-7 and SCSQ scores among relatives with varying characteristics

The GAD-7 scores were significantly higher among female participants compared to male participants ($t=3.907$, $p<0.01$). Conversely, females exhibited lower scores for positive coping ($t=3.773$, $p<0.01$) and higher scores for negative coping ($t=7.515$, $p<0.01$). Participants aged 18–25 years recorded the highest GAD-7 scores ($F(2,235)=4.809$, $p<0.01$), along with the lowest scores for positive coping ($F(2,235)=52.3$, $p<0.01$) and the highest scores for negative coping ($F(2,235)=22.95$, $p<0.01$). Compared to participants with college education ($t=3.062$, $p<0.05$) and university degrees ($t=3.941$, $p<0.01$), those with high school technical education exhibited lowever GAD-7 scores, as well as lower scores for negative coping ($F(3,234)=6.851$, $p<0.01$).

Table 1 Demographic results ($n=238$; n,%)

	Parents (48, 20.2)	Partners (14, 5.9)	Adult children (77, 32.4)	Siblings (10, 4.2)	Others (89, 37.4)
Sex					
Female	32(13.4)	0(0.0)	17(7.1)	0(0.0)	27(11.3)
Male	16(6.7)	14(5.9)	60(25.2)	10(4.2)	62(26.2)
Age in years					
18–25	16(6.7)	14(5.9)	34(14.3)	10(4.2)	18(7.6)
26–49	32(13.4)	0(0.0)	43(18.1)	0(0.0)	54(22.7)
50–65	0(0.0)	0(0.0)	0(0.0)	0(0.0)	17(7.1)
Education					
Junior high school	0(0.0)	0(0.0)	67(28.2)	0(0.0)	0(0.0)
High school technical	32(13.4)	0(0.0)	10(4.2)	10(4.2)	25(10.5)
College	16(6.7)	0(0.0)	0(0.0)	0(0.0)	35(14.7)
University	0(0.0)	14(5.9)	0(0.0)	0(0.0)	29(12.2)
Monthly income					
Less than 1000 Yuan	0(0.0)	0(0.0)	0(0.0)	0(0.0)	9(3.8)
1000–2000 Yuan	0(0.0)	0(0.0)	31(13.0)	0(0.0)	0(0.0)
2000–3000 Yuan	32(13.4)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
3000–5000 Yuan	16(6.7)	0(0.0)	46(19.3)	0(0.0)	0(0.0)
Over 5000 Yuan	0(0.0)	14(5.9)	0(0.0)	10(4.2)	80(33.6)
Length of relative's illness					
First episode of psychiatric	16(6.7)	0(0.0)	0(0.0)	10(4.2)	18(7.6)
Less than 1 Year	32(13.4)	14(5.9)	10(4.2)	0(0.0)	0(0.0)
1–5 years	0(0.0)	0(0.0)	67(28.2)	0(0.0)	55(23.1)
6–9 years	0(0.0)	0(0.0)	0(0.0)	0(0.0)	16(6.7)
Over 10 years	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Type of relative's illness					
Schizophrenia	0(0.0)	14(5.9)	67(28.2)	0(0.0)	0(0.0)
Depression	32(13.4)	0(0.0)	10(4.2)	0(0.0)	18(7.6)
Bipolar Disorder	0(0.0)	0(0.0)	0(0.0)	10(4.2)	34(14.3)
Obsession	0(0.0)	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Sleep disorders	0(0.0)	0(0.0)	0(0.0)	0(0.0)	26(10.9)
Others	16(6.7)	0(0.0)	0(0.0)	0(0.0)	11(4.6)

Participants with the highest monthly income, exceeding 5000 Yuan, recorded the lowest GAD-7 scores ($F(4,233)=2.955$, $p<0.05$). Furthermore, compared to participants with a monthly income ranging from 1000 to 2000 Yuan, those with higher incomes exhibited lower scores for negative coping ($t=2.990$, $p<0.05$), as indicated in Tables 2 and 3.

Based on these findings, the study suggests that various factors including sex, age, education, monthly income, duration of relative's illness, and type of relative's illness could influence the relatives' coping style and their anxiety levels. Moreover, it was observed that relatives of patients experiencing their first episode or with a disease duration of <1 year exhibited higher GAD-7 scores ($F(3,234)=11.2$, $p<0.01$) and were more inclined towards negative coping styles were adopted ($F(3,234)=38.51$, $p<0.01$). Meanwhile, relatives of patients with depression and sleep disorders demonstrated higher GAD-7 scores ($F(4,233)=3.15$, $p<0.05$) along with elevated scores for negative coping ($F(4,233)=7.78$, $p<0.01$).

Correlation analysis

A positive correlation was observed between GAD-7 scores and negative coping styles ($r=0.476$, $p<0.01$). These findings align with our hypothesis, indicating a strong positive association between negative coping styles and GAD-7 scores. Specifically, higher scores in negative coping styles corresponded to elevated GAD-7 scores, supplemnt Table 1.

Predictors of anxiety in relatives of patients with mental illness

Tables 2 and 3 illustrates that most demographic characteristics were significantly associated with anxiety levels in relatives of patients with mental illness. Additionally, supplement Table 1 highlights significant correlations between negative coping styles and GAD-7 scores.

Table 2 Scores of GAD-7 among relatives with different characteristics ($n=238$)

Variable	*N*	GAD-7	F/t	*P*	Comparison between the two groups (Bonferroni correction)
Sex			3.907	< 0.000*	
Female	76	9.72 ± 0.25			
Male	162	8.49 ± 0.18			
Age in years			4.809	0.009*	a > b
a 18–25	92	8.12 ± 0.17			
b 26–49	129	7.55 ± 0.13			
c 50–65	17	7.24.0.33			
Education			5.885	< 0.000*	b < c, b < d,
a Junior high school	99	7.90 ± 0.15			
b High school technical	45	7.20 ± 0.25			
c College	51	8.33 ± 0.31			
d University	43	8.72 ± 0.33			
Monthly income			2.955	0.021*	b > e
a Less than 1000 Yuan	9	8 ± 0.33			
b 1000–2000 Yuan	31	8.35 ± 0.27			
c 2000–3000 Yuan	32	7.97 ± 0.25			
d 3000–5000 Yuan	62	7.47 ± 0.18			
e Over 5000 Yuan	104	7.14 ± 0.24			
Length of relative's illness			11.2	< 0.000*	a > d, b > d, c > d
a First episode of psychiatric	44	8.20 ± 0.19			
b Less than 1 Year	56	8.77 ± 0.31			
c 1–5 years	122	8.07 ± 0.16			
d 6–9 years	16	5.81 ± 0.32			
Type of relative's illness			3.15	0.015*	a > e
a Schizophrenia	81	7.88 ± 0.17			
b Depression	60	8.51 ± 0.22			
c Bipolar Disorder	44	7.75 ± 0.40			
d Sleep disorders	26	8.04 ± 0.24			
e Others	27	7.19 ± 0.21			

*$P<0.05$, *$P<0.01$

GAD: generalized anxiety disorder-7

Table 3 Scores of SCSQ among relatives with different characteristics ($n=238$)

Variable	*N*	SCSQ (*P*)	F/t	*P*	Comparison between the two groups (Bonferroni correction)	SCSQ (*N*)	F/t	*P*	Comparison between the two groups (Bonferroni correction)
Sex			3.773	0.000**			7.515	< 0.000**	
Female	76	16.78 ± 0.40				9.99 ± 0.23			
Male	162	19.30 ± 0.42				7.80 ± 0.17			
Age in years			52.3	< 0.000**	a < b, a < c, b < c		22.95	0.000**	a > b, a > c, b > c
a 18–25	92	14.96 ± 0.16				8.23 ± 0.14			
b 26–49	129	17.31 ± 0.34				7.36 ± 0.14			
c 50–65	17	23.00 ± 0.52				5.88 ± 0.21			
Education			2.818	0.040*	ns		6.851	0.000**	a > b, a > c,b < d
a Junior high school	99	16.34 ± 0.30				7.93 ± 0.13			
b High school technical	45	17.64 ± 0.75				6.91 ± 0.30			
c College	51	17.63 ± 0.59				7.20 ± 0.19			
d University	43	16.02 ± 0.40				7.98 ± 0.23			
Monthly income			2.012	0.013*	ns		2.479	0.041*	b > e
a Less than 1000 Yuan	9	17 ± 1.05				7.56 ± 0.41			
b 1000–2000 Yuan	31	17.32 ± 0.53				8.13 ± 0.18			
c 2000–3000 Yuan	32	18.09 ± 0.68				7.69 ± 0.25			
d 3000–5000 Yuan	62	17.74 ± 0.65				7.48 ± 0.18			
e Over 5000 Yuan	104	18.54 ± 0.44				7.17 ± 0.18			
Length of relative's illness			31.87	< 0.000**	a < c, a < d, b < c, b < d, c < d		38.51	< 0.000**	a > d, b > c, b > d, c > d
a First episode of psychiatric	44	14.95 ± 0.22				7.93 ± 0.19			
b Less than 1 Year	56	14.05 ± 0.17				8.46 ± 0.18			
c 1–5 years	122	17.59 ± 0.35				7.57 ± 0.12			
d 6–9 years	16	21.63 ± 1.46				4.62 ± 0.24			
Type of relative's illness			8.143	< 0.000**	a < c, a < e, b < e, c < e, d < e		7.780	< 0.000**	a < b, a < c, a < e, d > e
a Schizophrenia	81	16.53 ± 0.35				6.87 ± 0.20			
b Depression	60	15.17 ± 0.19				7.96 ± 0.17			
c Bipolar Disorder	44	17.16 ± 0.76				6.89 ± 0.30			
d Sleep disorders	26	16.69 ± 0.63				7.77 ± 0.23			
e Others	27	19.59 ± 0.78				6.52 ± 0.25			

*$P<0.05$, *$P<0.01$. SCSQ (P): simplified coping style questionnaire positive; SCSQ (N): simplified coping style questionnaire negative

In a Multi-level regression analysis, demographic factors such as sex, age, monthly income, were included in model 1, type of relative's illness were included in Model 2. Subsequently, SCSQ (negative coping) was added to Model 3.

As presented in Table 4, these demographic variables were significantly associated with anxiety levels among relatives of patients with mental illness. Specifically, age, sex, monthly income, and the type of relative's illness exhibited a signifinat relationship (β=-0.687-0.465, $p<0.01$). Together, these variables accounted for 47.4% of the variance in anxiety levels among relatives of patients with mental illness ($R^2=0.474$, $F=21.402$, $p<0.01$). In Model 3, the R^2-value increased marginally to 0.638, indicating that SCSQ (negtive coping) explained an additional 16.4% of the variance related to anxiety (R^2 change=0.638, $F=37.526$, $p<0.01$). These results further underscored the positive relationships between demographic variables and SCSQ (negative coping) with anxiety levels among relatives of patients with mental illness.

Discussion

The relatives of patients with mental illness often experience significant mental pressure while providing care, frequently accompanied by feelings of anxiety and depression. The primary objectives of this study were to explore the significance of coping style and demographic characteristics in explaining the anxiety levels experienced by these individuals and to investigate the role of coping style as a predictor of anxiety among relatives of patients with mental illness. These findings underscore the crucial role of coping style and demographic characteristics in influencing anxiety levels among relatives of patients with mental illness. Additionally, the results

Table 4 Predictors of anxiety in relatives of patients with mental disorders ($n = 238$)

Predictors	Model 1				Model 2				Model 3			
	B	SE	β	p	B	SE	β	p	B	SE	β	p
Step 1												
Sex												
Female = 1												
Male = 2	4.403	0.704	0.399	0.000**	1.717	0.689	0.156	0.013*	4.067	0.621	0.369	0.000**
Age in years												
18–25 = 1												
26–49 = 2	-2.444	0.668	-0.238	0.000**	-3.853	0.662	-0.374	0.000**	-2.436	0.569	-0.237	0.000**
50–65 = 3	-4.643	1.273	-0.226	0.000**	-14.104	2.009	-0.687	0.000**	-18.106	1.717	-0.877	0.000**
Monthly income												
Less than 3000 Yuan = 1												
3000–5000 Yuan = 2	1.688	0.837	0.142	0.048*	0.838	0.784	0.071	0.287	-1.285	0.687	-0.110	0.063
Over 5000 Yuan = 3	-1.258	0.767	−0.122	0.102	-0.032	0.806	0.269	0.986	3.910	0.781	0.378	0.000*
Step 2												
Type of relative's illness												
Schizophrenia = 1												
Depression = 2					3.184	0.802	0.269	0.000**	-2.184	0.862	-0.184	0.012*
Bipolar Disorder = 3					-3.223	0.942	-0.243	0.001**	-1.190	0.810	-0.090	0.143
Sleep disorders = 4					7.858	1.562	0.465	0.000**	6.880	1.303	0.407	0.000**
Others = 5					4.934	0.976	0.297	0.000**	0.997	0.905	0.060	0.272
Step 3												
SCSQ (N)									0.934	0.095	0.829	0.000**
R^2(change in R^2)	0.292				0.474				0.638			
Adjust R^2	0.276				0.452				0.621			
F(*p*)	17.99 (0.000)				21.402 (0.000)				37.526 (0.000)			
F change (*p*)	17.996 (0.000)				18.454 (0.000)				96.600 (0.000)			

Note SE = standard error, SCSQ (N): simplified coping style questionnaire negative

*$p < 0.05$, **$p < 0.01$

of hierarchical multiple regression analyses suggest that coping style might serve as a predictor of anxiety in this population.

The findings of this study indicate that several demographic characteristics are associated with anxiety levels among relatives. Specifically, the study observed anxiety levels were significantly higher among female relatives compared to male relatives, a trend that might be influenced by factors such as sexual hormones and societal role dynamics [18]. Additionally, anxiety was found to be more pronounced among younger relatives. These findings are consistent with previous research [19] and are consistent with some studies indicating an increased prevalence of mental health issues with increasing age [20], although other investigations have reported no significant differences [21]. These different findings may be related to different methods of grouping participants' ages in the study, for example, some studies were divided into 3 groups and others were divided into 4 groups. Meanwhile, It was also related to with their heterosexual, cisgender or not. Therefore, further research should be more detailed participants of personal characteristics.

In this study, the duration of the relative's illness and the type of patient's illness were closely associated with the anxiety levels of relatives. This association might stem from feelings of powerlessness and overwhelm experienced by patients and relatives, compounded by perceived insufficiency of support and assistance [22]. Generally, heightened anxiety among relatives is particularly notable when the patient experiences their first episode of psychiatric illness or when the illness duration is <1 year. This phenomenon might be attributed to the significant challenges faced by caregivers, including caregiver stress, feelings of stigma, dependency exhibited by the patient, and disruptions within the family dynamic, all of which can substantially diminish caregivers' resilience [23]. Meanwhile, this study indicated relatives of patients with depression and sleep disorders are more likely to adopt negative coping styles and have higher anxiety scores. Depression patients were in a state of anxiety and depression for a long time and tend towards negative coping style [24], which may affect their relatives. The relatives of depression patient under intense and intangible negative emotion influence, they usually carries significantly greater burden and distress in comparison to various other physical illnesses [25]. Relatives with sleep disorders often experience fragmented sleep and/or disrupted sleep patterns under their influence [26]. Sleep disorders are closely related with anxiety and depression, and use more negative coping style [5].

Exposure to stressful information is inevitable for relatives of patients with mental illness. However, the way individuals cope with such stress varies, and different coping styles can lead to different outcomes [4, 9]. Dysfunctional coping has been found to have moderate correlations with depression and anxiety, whereas solution-focused coping tends to have positive implications on the mental health of caregivers [5]. Thus, the choice of coping style might significantly influence whether caregivers experience anxiety and other negative emotions when dealing with the stress of caring for mentally ill patients. In the current study, the close relationship between negative coping styles and the anxiety experienced by relatives of patients with mental illness was highlighted, meanwhile, current study confirmed that the coping style and anxiety level of relatives of patients with different mental illness diseases were different. This underscores the importance of addressing negative coping styles, which is also an issue deserving of government attention. Therefore, whether negative coping styles could predict anxiety among relatives of patients with mental illness was further investigated. In the initial step, it was found that all demographic variables-such as sex, age, monthly income, and type of relative's illness-were predictors of anxiety among relatives of patients with mental illness, which is partly consistent with previous research [12, 13], compared with previous studies, this study comprehensively compared the effects of demographic variables on different diseases. Subsequently, it was observed that the SCSQ (negative coping), the explained variance related increased by an additional 16.4%. Thus, SCSQ (negative coping) emerged as a potential intervention for reducing anxiety among relatives of patients with mental illness and could serve as a predictor of anxiety in this population. Previous studies have shown that changing one's coping style when faced with stress could improve negative mood [23].

This study has some limitations. First, the members were from a specific locale in China, and the results may not mirror what is happening in the entire country. So, next step of research should be carried out in multiple areas and centers. Second, relatives of patients with mental illness in general were chosen as the target in this study, however such a wide spectrum of disorders affecting quality of life at very different levels are addressed under the same category limits the contribution of the findings. Hence, future research ought to focus on more in-depth study of the impact and mechanism in one kind of mental illness.

In conclusion, there is a crucial need for governmental and healthcare organisations to address the coping styles of relatives of patients with mental illness, as these styles serve as significant positive predictors of their anxiety levels. Therefore, the government and healthcare organisations must provide these relatives with adequate social support and information. This support will enable them to adopt more positive coping strategies when facing

stressors, ultimately reducing anxiety and other negative emotions.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12888-024-06088-1.

Supplementary Material 1

Author contributions

W.L.N and H.G.B designed the content of this study, W.L.N, H.G.B, G.X.L and Z.T. wrote the main manuscript text, Z.T., G.X.L., M.A.N and H.R. drew the tables. H.G.B participated in data collection and made adjustments to the format of the manuscript. The manuscript was examined by all the authors, and all authors are responsible for the content and have approved this final version of the manuscript.

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Data availability

The datasets used and/or analysed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

All participants provided written informed consent before participating in the study, which was approved by the Ethics Board of XinXiang Medical University, China [approval number: XYLL-20230276], and adhered to the most recent version of the Declaration of Helsinki. Data confidentiality and anonymity were ensured, and participation in the study was voluntary for all participants.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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