

ORIGINAL RESEARCH ARTICLE

Cross-cultural insights into psychosomatic symptoms, depression, and anxiety: A comparative study of China and Pakistan

S. Mudasser Shah^{1,2}, Chand Taneja^{3,4}, Chenguang Jiang², Wei Xu², Sun Taipeng², Chen Gang², Tianyu Wang², Wenhao Jiang^{2*}, and Yonggui Yuan^{2,5*}

¹Department of Psychology, Institute of Developmental Psychology, Beijing Normal University, Beijing, China

²Department of Psychosomatics and Psychiatry, Zhongda Hospital, School of Medicine, Southeast University, Nanjing, Jiangsu, China

³Department of Psychology and Division of Medical Sciences, University of Victoria, Victoria, British Columbia, Canada

⁴Department of Neuropsychology Program, Queen Alexandra Center for Children's Health, Victoria, British Columbia, Canada

⁵Department of Psychosomatics and Psychiatry, Zhongda Hospital, School of Medicine, Jiangsu Provincial Key Laboratory of Brain Sciences and Medicine, Southeast University, Nanjing, Jiangsu, China

Abstract

Psychosomatic refers to an illness in which stress causes or exacerbates physical symptoms, and it may occur in transient or along with more acute mood disorders. The current study aimed to enhance understanding of the prevalence and cultural factors affecting psychosomatic symptoms, depression, and anxiety in China and Pakistan. A comparative cross-cultural study was conducted using a non-probability sampling technique. A total of 1633 samples were collected, including 598 healthy controls (300 from China and 298 from Pakistan) and 1035 patients (521 from China and 514 from Pakistan). Three assessment tools were utilized: Psychosomatic symptom scale (PSSS), patient health questionnaire-9, and generalized anxiety disorder-7. There were significant differences in the symptoms of patients and control groups with psychosomatic symptoms, depression, and anxiety in both countries. *Post hoc* testing revealed that Pakistani patients with mood disorders reported more psychosomatic symptoms than Chinese patients ($p < 0.001$), whereas the Chinese control group had more psychosomatic symptoms than the Pakistani control group ($p = 0.001$). Analysis of PSSS ratings in Chinese patients demonstrated a strong correlation between "depressed mood" and "loss of interest." Pakistani PSSS displayed strong correlations on the somatic subscale and psychological subscale. In the present study, Pakistani patients exhibited higher levels of psychosomatic complaints, depression, and anxiety compared to Chinese patients. Notably, network analysis reveals that Pakistani patients displayed more physical symptoms, whereas Chinese patients experienced more psychological symptoms.

Keywords: Psychosomatics; Depression; Anxiety; Cross-cultural; China; Pakistan; Network analysis

*Corresponding authors:

Wenhao Jiang
 (wjjiang43@outlook.com)
 Yonggui Yuan
 (101011406@seu.edu.cn)

Citation: Shah SM, Taneja C, Jiang C, *et al.* Cross-cultural insights into psychosomatic symptoms, depression, and anxiety: A comparative study of China and Pakistan. *J Clin Basic Psychosom.* 2026;4(1):64-77.
 doi: 10.36922/JCBP025100019

Received: March 6, 2025

Revised: April 9, 2025

Accepted: June 4, 2025

Published online: July 9, 2025

Copyright: © 2025 Author(s). This is an Open-Access article distributed under the terms of the Creative Commons Attribution License, permitting distribution, and reproduction in any medium, provided the original work is properly cited.

Publisher's Note: AccScience Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.

1. Introduction

The relationship between psychological and physical symptoms is complex, and more studies in this area are necessary from a cultural perspective. The term “psychosomatic” refers to an illness in which stress causes or exacerbates physical symptoms, and it may occur in transient or along with more acute mood disorders.¹⁻³ Somatization refers to a condition where psychological or emotional distress manifests as physical symptoms that cannot be fully explained by a medical condition.⁴ These disorders arise from the complex interaction of biological, psychological, and social factors, with stress and emotional conflict often playing key roles in symptom development and maintenance.⁵ The biopsychosocial model, proposed by Engel,⁶ highlights the importance of understanding this interplay, as emotional stress can affect bodily systems, such as the autonomic nervous system and immune response. Individuals with psychosomatic disorders may experience a wide range of symptoms – headaches, body pain, gastrointestinal issues, and fatigue – without an identifiable medical cause. Treatment can be challenging and often requires a multidisciplinary approach.^{6,7}

It is thought that in psychosomatic disorders, patients may focus on their physical symptoms as a way to minimize psychological pain at times of stress.⁸ The biopsychosocial model posits that an individual’s health, psychological state, and social environment are interconnected, contributing to the development of somatic symptom disorders. Psychosomatic disorders arise from the interplay of biological, psychological, and social factors, often accompanied by emotional distress stemming from one’s circumstances.⁹ Mental health problems, including anxiety, depression, and other psychosomatic conditions, have been reported a significant global rise from 2000 to 2018,⁹ resulting in increased health-care costs.¹⁰ A study conducted in China in three waves (i.e., in February 2020, March 2020, and April 2022, respectively) reported that the prevalence of psychosomatic disorders was 22%, 28%, and 39%, respectively.¹¹ In this regard, the psychosomatic approach has gained the interest of physicians and clinicians, consequently forming various subdisciplines, including functional neurology, psycho-immunology, psycho-nephrology, psycho-oncology, psycho-dermatology, and psycho-neuroendocrinology, among others. These subdisciplines have established dedicated medical journals, scientific societies, and clinical services.^{12,13}

Psycho-neuroimmunology and psycho-oncology have seen significant advancements in China and Pakistan, with a focus on the relationship between psychological factors and physical health. In China, the Psycho-neuroimmunology

Research Society has expanded in the Asia–Pacific region, emphasizing research on stress and immune function.¹⁴ In Pakistan, studies link psychological stress, especially from large-scale disasters, to suppressed immune responses.¹⁵ Psycho-oncology in China integrates psychosocial measures into cancer care,¹⁶ while Pakistan highlights the need for multidisciplinary tumor boards to address the psychosocial impacts of cancer.¹⁷ Both countries have demonstrated significant progress in psycho-dermatology and psycho-neuroendocrinology. Chinese studies have reported untreated depression and anxiety in dermatological patients,¹⁸ whereas Pakistan is raising awareness of mental health issues related to skin conditions.¹⁹ Research on psycho-neuroendocrinology in both nations examines the impact of stress on the hypothalamic-pituitary-adrenal axis, emphasizing interventions such as exercise. Cultural factors, including family systems, marriage practices, language, religion, beliefs, and social events, significantly influence psychosomatic symptoms in the distinct contexts of China and Pakistan.²⁰

Psychosomatic symptoms are common in both chronically ill and reasonably healthy individuals. Conditions, such as diabetes, hypertension, and cardiovascular diseases, often involve somatic symptoms linked to mood.²¹ Patients with chronic illnesses frequently experience psychosomatic symptoms that can exacerbate their conditions, increase health-care costs, and reduce their quality of life.^{22,23} For instance, individuals with fibromyalgia or irritable bowel syndrome often suffer from overlapping psychological and somatic symptoms, complicating their management and treatment.^{24,25} Addressing these psychosomatic symptoms through integrated care approaches can significantly improve patient outcomes and reduce the burden on health-care systems.

Although there has been a growing interest in the social, economic, and political ties between China and Pakistan, especially through projects such as the China–Pakistan Economic Corridor, relatively little attention has been given to the psychological aspects of this relationship.^{26,27} Thus far, most research has focused on cross-cultural business practices and diplomacy, but there is a noticeable lack of studies that investigate behavioral and mental health issues, particularly psychosomatic disorders, depression, and anxiety, in both countries. Psychosomatic disorders have been extensively researched in Western populations, including the field of functional neurology, but there is a notable lack of studies focusing on Asian populations. Hence, the present research aims to address this significant gap in the literature. Significant differences in the medical expression of disorders

primarily emerge across Asian countries; for instance, the unique sociocultural, economic, and religious landscapes of nations such as China and Pakistan profoundly influence how psychosomatic symptoms are experienced and understood. Examining these influences offers the potential to unlock groundbreaking perspectives. The study's findings could significantly enhance cultural competence among health-care professionals, empowering them to deliver truly patient-centered care that honors and integrates cultural differences in symptom expression and treatment preferences. Psychosomatic symptoms often lead to repeated medical visits, unnecessary diagnostic procedures, and excessive treatments, all of which escalate healthcare costs. By exploring these symptoms through a cultural lens, this research could help mitigate such challenges. Furthermore, it would make a vital contribution to the growing field of cross-cultural mental health, shedding light on underexplored populations, such as those in China and Pakistan. The insights gained may also resonate with other cultures sharing similar sociocultural dynamics, thereby advancing the global understanding of psychosomatic symptoms and their management.

This study investigated the prevalence of psychosomatic symptoms, depression, and anxiety among Chinese and Pakistani patients, aiming to reveal the profound impact of cultural factors on mental health. By examining these differences, the research aspires to shape culturally attuned clinical practices and mental health policies. The contrasting cultural norms, societal structures, economic conditions, and educational systems of China and Pakistan may significantly shape the manifestation of psychosomatic symptoms, depression, and anxiety. The findings hold the potential to drive the development of targeted mental health interventions and policies tailored to the unique needs of each country. Our investigation in this study was based on several hypotheses: (i) Chinese patients exhibit significantly lower levels of psychosomatic symptoms compared to Pakistani patients; (ii) Pakistani patients have significantly higher levels of depression than Chinese patients; and (iii) Chinese patients have significantly lower levels of anxiety compared to Pakistani patients.

2. Methods

2.1. Participants

The study was approved by the Ethics Committee of Zhongda Hospital, Southeast University (registration no. 2021ZDSYLL347-P01). During this cross-cultural study, data were gathered from both China and Pakistan using a non-probability sample technique. This approach was chosen due to its practicality in accessing patients and control participants within hospital settings, particularly

where random sampling was not feasible. This study included 1633 participants, consisting of a control group of 598 individuals (300 from China and 298 from Pakistan) and a patient group of 1035 individuals (521 from China and 514 from Pakistan). In China, the participants were selected from 14 centers, and all subjects were asked to sign a written informed consent form. In Pakistan, the participants were selected from both outpatient and inpatient departments at two centers. The inclusion criteria for the patients were: (i) either the outpatient or inpatient department; (ii) age over 18 years; and (iii) diagnosed with one of the following disorders: generalized anxiety disorder (GAD), major depressive disorder, somatic symptom disorder, panic disorder, coronary heart disease, hypertension, peptic ulcer, hyperthyroidism, diabetes, cancer, asthma, or other psychosomatic disorders reviewed by trained researchers. The exclusion criteria for the patients were: (i) psychiatric disorders that caused suicidal behavior or aggression; and/or (ii) severe diseases, such as uremia, respiratory failure, acute cerebral infarction, and acute myocardial infarction. The inclusion criteria of healthy controls were: (i) age over 18 years; and (ii) willingness to sign the informed consent form. The exclusion criteria were: (i) no history of psychiatric disorder; and/or (ii) no current diagnosis of acute physical disease.

2.2. Assessment tools

To assess psychosomatic symptoms, depression, and anxiety in the current study, three scales were utilized. The psychosomatic symptom scale (PSSS) was used to measure psychosomatic symptoms, whereas the patient health questionnaire-9 (PHQ-9) and GAD-7 were used to measure signs of depression and anxiety, respectively. In China, these questionnaires have demonstrated strong validity and reliability in their Chinese-language version; in Pakistan, the Urdu versions of these questionnaires have relatively fair validity and reliability.

The PSSS is a short self-rated questionnaire measuring both psychological (P-subscale) and somatic symptoms (S-subscale) over the past 4 weeks, with several response categories: "never" scored as 0, "several days a week or rarely" scored as 1, "more than half the day" scored as 2, and "every day or whole day or most of the time" scored as 3. The PSSS scale comprises 26 items, with 19 items evaluating somatic symptoms (S-subscale) related to urogenital, neurological, digestive, pulmonary, and other organ systems. The remaining seven items in the P-subscale assess anxiety, depression, obsessive-compulsive symptoms, suicidal thoughts, and anger.^{28,29} The Urdu version of the PSSS demonstrated high reliability, with a Cronbach's alpha of 0.974,²⁸ whereas the Chinese version has a Cronbach's alpha of 0.907.²⁹

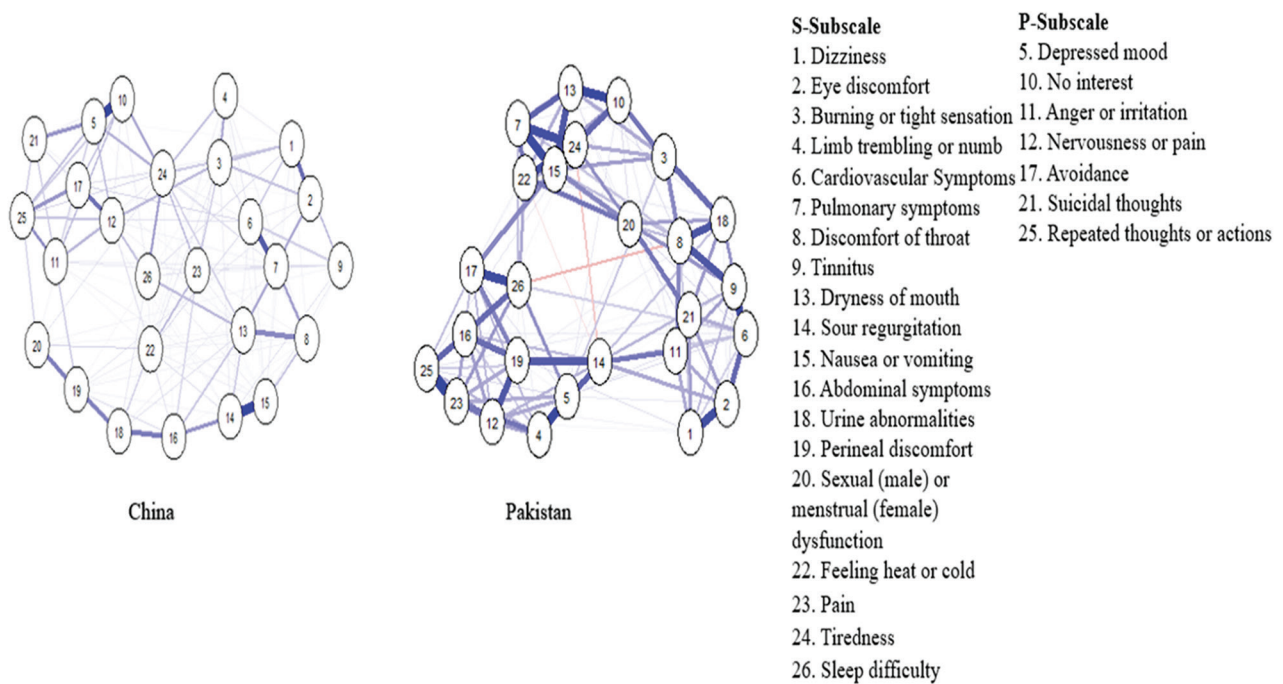


Figure 1. Network structure of the psychosomatic symptom scale (PSSS)
Abbreviations: P-subscale: Psychological subscale; S-subscale: Somatic subscale.

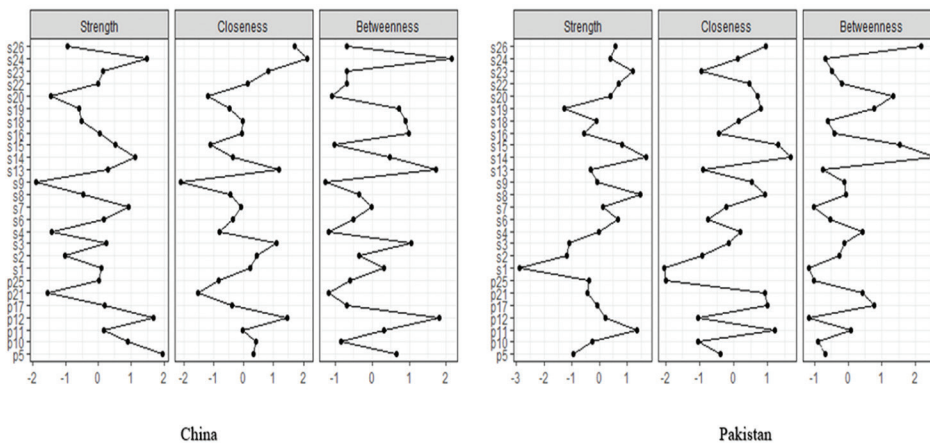


Figure 2. Centrality indices of the psychosomatic network structure in China and Pakistan

The PHQ-9 is a valid and reliable instrument for screening depression. For this assessment, a translated version of the PHQ-9 was utilized to evaluate depressive symptoms experienced over the past 2 weeks. The scale consists of nine items, each rated on a four-point scale: “not at all” scored as 0, “several days” scored as 1, “more than half the day” scored as 2, and “nearly every day” scored as 3. In China, the PHQ-9 has been culturally adapted and validated, demonstrating a reliability coefficient of 0.86.³⁰ In addition, the Urdu version of the PHQ-9 used in Pakistan has a Cronbach’s alpha of 0.91, further supporting its reliability in measuring depressive symptoms.³¹

The GAD-7 scale is a valid and reliable scale for screening the frequency of anxiety symptoms over the past 2 weeks. Each of the seven items is scored on a scale from 0 (not at all) to 3 (nearly every day), resulting in a total score that ranges from 0 to 21. Scores are interpreted as follows: 0 – 4 (minimal anxiety), 5 – 9 (mild anxiety), 10 – 14 (moderate anxiety), and 15 – 21 (severe anxiety). The reliability of GAD-7 was reported to be 0.79 – 0.91.³² The GAD-7 was translated and validated for use in China, with adjustments made to ensure cultural relevance in measuring anxiety symptoms, yielding a Cronbach’s alpha of 0.91.³³ In Pakistan, the Urdu version demonstrated a Cronbach’s alpha of 0.92.³⁴

2.3. Statistical analysis

Statistical tests for distribution and measurement were carried out on both healthy control and patient groups. These tests aimed to compare the mean scores between healthy controls and patients, as well as between patients from the two different countries. Specifically, analysis of variance was used to identify differences between variables, such as age, education, PSSS, P-subscale, S-subscale, PHQ-9, and GAD-7, with subsequent Tukey's *post hoc* analyses and correlation analyses. Results were presented in mean and standard deviation. In addition, a Chi-square test was conducted to evaluate differences between genders. All the statistical analyses were performed through IBM SPSS version 23.0 and R Studio.

2.4. Network estimate

Network analysis is a novel technique that can examine the dynamic and complex interrelationships among psychiatric symptoms, conceptualizing a specific disorder as an interacting cluster of interconnected symptoms rather than isolated entities. The nodes in network analysis represent psychiatric symptoms; the edges among the nodes represent the relationship between symptoms, with the activation spread through the network from one symptom to another.³⁵

Network analysis was performed using the “qgraph” and “bootnet” packages in R programming. Model selection was based on the Extended Bayesian Information Criterion (EBIC), which identified more edges compared to other models.³⁶ The tuning parameter γ was set to 0.5 during network model selection to strike a balance between model simplicity and the detection of meaningful relationships between variables. We chose EBIC over alternatives such as AIC or the standard BIC because it is especially useful when working with complex psychological data that may include many weak or potentially misleading associations. EBIC applies an extra penalty that filters out weaker connections, which makes the final network easier to interpret and more likely to reflect true underlying patterns – an important consideration in psychological research.³⁷ During network analysis, strength, closeness, and betweenness were measured to examine node importance in the network.³⁸ These centralities were measured using the “qgraph” package, and normalized z-scores were plotted for each node. Strength measures the significance of each individual symptom in the network by summing the absolute edge weights of all direct connections between a particular node and other nodes. The frequency of a node that appears on all shortest paths to other nodes is known as “betweenness,” and it reflects how important a symptom is as a “connector” to other symptoms. The reciprocal of the sum of a node's shortest path distances to all other nodes in

a network is called “closeness,” and it denotes how strongly one symptom is connected to other symptoms indirectly.³⁹

2.5. Estimation of network stability

Previous studies tested the stability and accuracy of networks using the R package “bootnet.” First, for the accuracy of estimating the edge weight, a non-parametric bootstrap procedure (1000 replicates; eight cores) was conducted to compute 95% confidence intervals (CIs) for the edge values. Bootstrap was then used to investigate significant differences between node strengths and edge weights. Finally, to investigate the stability of centrality, a case-dropping bootstrap (1000 replicates; eight cores) was conducted to determine the correlation stability coefficients. Correlation values were calculated between subsets and the original sample. The stability coefficient indicates the maximum number of cases that can be removed from the original sample set. For example, with 95% probability, the correlation coefficient between centrality in the case subset and the original network reached 0.7. Stability coefficients should not fall below 0.25, with values above 0.5 considered ideal.^{37,39}

3. Results

3.1. Demographic characteristics

As displayed in Table 1, there were significant between-group differences in mean age and sex, with patients being older than healthy controls ($p < 0.001$), and male patients were predominant ($p < 0.001$). The number of years of education displayed a significant interaction between group and culture ($F = 9.27$; $p = 0.002$), whereas the main effects of group ($F = 2.34$; $p = 0.126$) and culture ($F = 0.529$; $p = 0.467$) individually were not significant.

Analysis of the PSSS revealed a significant group and culture interaction effect ($F = 35.74$; $p < 0.001$), indicating that the differences in psychosomatic symptoms between groups are influenced by cultural background. *Post hoc* tests further corroborated these findings. Specifically, a significant difference in PSSS total scores was found between the Chinese patient group (CHP) and Pakistani patient group (PKP), with the PKP group exhibiting higher levels of psychosomatic symptoms ($p < 0.001$). In addition, significant differences were observed between the Chinese control group (CHC) and the Pakistani control group (PKC), where the CHC reported higher levels of psychosomatic symptoms ($p = 0.001$).

Regarding the main effects of culture, both CHP and PKP exhibited significantly higher levels of psychosomatic symptoms than their respective control groups (CHC and PKC), with $p < 0.001$ in both cases. This suggests that patients, regardless of culture, experience higher levels of psychosomatic

Table 1. Demographic information of all groups

Characteristic	Group ^a				Test								
	China		Pakistan		Group		Culture		Group and culture interaction				
	CHP (n=521)	CHC (n=300)	PKP (n=514)	PKC (n=298)	Main effect	p-value	Ad p	Main effect	p-value	Ad p-value			
Age (years)	42.07 (16.8)	33.92 (13.04)	41.9 (13.13)	32.67 (6.81)	153.97	0.000	0.087	1.01	0.314	0.001	0.593	0.441	0.000
Sex (male, %)	37.8	41.3	42.60	23.60	0.041 ^b	0.839	-	1.08 ^b	0.298	-	-	-	-
Education (years)	16.51 (6.59)	15.03 (6.31)	15.73 (6.72)	16.12 (6.26)	2.34	0.126	0.001	0.529	0.467	0.000	9.27	0.002	0.006
PSSS	23.26 (13.04)	6.49 (8.19)	27.95 (8.137)	3.04 (1.38)	934.76	0.000	0.365	0.823	0.365	0.001	35.74	0.000	0.002
P-subscale	7.68 (5.14)	1.79 (2.8)	7.89 (5.01)	0.74 (0.90)	891.34	0.000	0.356	3.34	0.042	0.002	7.92	0.005	0.005
S-subscale	15.58 (9.34)	4.73 (5.92)	20.06 (13.67)	2.29 (1.21)	816.09	0.000	0.336	4.14	0.042	0.003	47.73	0.000	0.029
PHQ-9	10.65 (7.34)	2.19 (3.31)	13.18 (5.37)	1.85 (0.69)	1292.8	0.000	0.445	15.90	0.000	0.01	27.26	0.000	0.017
GAD-7	8.66 (6.29)	1.7 (3.0)	10.91 (4.79)	1.38 (2.24)	1235.38	0.000	0.434	10.48	0.001	0.006	37.86	0.000	0.023

Note: ^aData is presented as mean (standard deviation), except for ^bSex; ^bχ² value. Abbreviations: Ad: Adjusted; CHC: Chinese control group; CHP: Chinese patient group; GAD-7: Generalized anxiety disorder-7; P-subscale: Psychological subscale; PHQ-9: Patient health questionnaire-9; PKC: Pakistani control group; PKP: Pakistani patient group; PSSS: Psychosomatic symptom scale; S-subscale: Somatic subscale.

symptoms compared to control groups, but cultural variations still play a crucial role in the intensity of these symptoms, as evidenced by the significant interaction effect.

Further analysis of the factor scores of the PSSS, with comparative results of the psychological (P) and somatic (S) factor scores, is presented in the Appendix.

Analysis of the PHQ-9 revealed a significant main effect for groups (F = 1292.8; p<0.001), indicating that overall, patients have higher levels of depressive symptoms than control groups. There is also a significant main effect for culture (F = 15.90; p<0.001), suggesting that cultural differences influence the level of depressive symptoms. In addition, the significant group and culture interaction (F = 27.26; p<0.001) highlights that the relationship between group (patient vs. control) and depressive symptoms varies by culture.

Post hoc tests further corroborated these findings. A significant difference in PHQ-9 scores was found between CHP and PKP, with Pakistani patients reporting higher levels of depressive symptoms (p<0.001). However, no significant difference was found between CHC and PKC (p=0.439), indicating similar depressive symptoms between these two control groups. Cultural differences were significant when comparing CHP and CHC (p<0.001) and PKP and PKC (p<0.001), with both CHP and PKP reporting higher levels of depression than their respective control groups.

Analysis of the GAD-7 scores revealed a significant interaction between group and culture (F = 37.86; p<0.001), indicating that the relationship between anxiety symptoms and group (patients vs. controls) is influenced by cultural factors. Post hoc analyses displayed a significant difference in anxiety symptoms between the CHP and the PKP, with Pakistani patients exhibiting higher anxiety levels (p<0.001). However, no significant difference was found between CHC and PKC (p=0.067). In addition, both Chinese and Pakistani patients had significantly higher levels of anxiety symptoms compared to their respective control groups (CHC vs. CHP, p<0.001; PKC vs. PKP, p<0.001). This suggests that, while both patient groups exhibit elevated anxiety symptoms relative to controls, more Pakistani patients experience anxiety than their Chinese counterparts.

3.2. Network structure of PSSS

Network structure analysis of the PSSS in China and Pakistan revealed notable differences and patterns in symptom correlations. In China, the PSSS network is composed of 26 nodes with 167 out of 325 non-zero edges, indicating a substantial number of symptom connections. Key findings include a strong correlation between “depressed mood” and “no interest,” as well as

strong edges between “sour regurgitation” and “nausea or vomiting,” and between “dizziness” and “eye discomfort.” These strong edges highlight clusters of symptoms that are closely related, suggesting that these symptom pairs may co-occur more frequently in Chinese patients.

In Pakistan, the PSSS network also consists of 26 nodes, but with slightly fewer non-zero edges (145/325). While many items in the Pakistani network also have strong edges, indicating robust symptom correlations, some items exhibit weaker connections. For example, weaker edges are observed between “discomfort of throat” and “sleep difficulty,” as well as between “sour regurgitation” and “tiredness” as shown in Figure 1.

3.3. Centrality indices of the psychosomatic network structure in China and Pakistan

The centrality indices for the PSSS network structure in China and Pakistan revealed key symptoms that play central roles in the networks. In the Chinese PSSS, item p5 “depressed mood” stands out with the highest centrality (z-score = 2.0), followed by item p12 “nervousness” (z-score = 1.7) and item s24 “tiredness” (z-score = 1.5), indicating these symptoms are highly influential in the network. In terms of closeness, which reflects how quickly a symptom can influence others, item s24 “tiredness” (z-score = 2) is highly ranked, along with item p12 “nervousness” (z-score = 1.5) and item s26 “sleep difficulty” (z-score = 1.5). High betweenness, which suggests that a symptom acts as a bridge connecting different parts of the network, was observed in item s24 “tiredness” (z-score = 2), item s13 “dryness of mouth” (z-score = 1), and item s3 “burning or tight sensation” (z-score = 1).

In the Pakistani PSSS, item 14 “sour regurgitation” exhibited the highest strength (z-score = 1.6), followed by

item s8 “discomfort of the throat” and item p11 “difficulty breathing,” both with z-scores >1. Item 14 also reported high closeness and betweenness, suggesting its strong interconnectivity with other symptoms and a critical bridging role in the network. In addition, item p11 demonstrated high closeness (z-score >1), whereas item s26 “sleep difficulty” displayed high betweenness as shown in Figure 2.

3.4. Bootstrap CI

The edge weight bootstrap technique was applied to assess the accuracy of the estimated network, running at a 95% CI around the edge weights. The results, as depicted in Figure 3, indicate that the data lines and CIs were not excessively wide, suggesting reliable and stable edge estimates in the network. The close alignment of the original sample (red line) with the bootstrap estimates (black line), along with the gray-shaded 95% CI, confirms the robustness of the network structure. However, for edges with larger bootstrapped CIs, caution should be exercised when interpreting their strength and order, as these may indicate less stability or variability in those particular connections. Overall, the bootstrap CIs suggest that the network is generally well-estimated, but careful interpretation is needed for edges with wider intervals.

3.5. Stability of centrality indices based on the case-dropping subset bootstrap

The stability of the centrality indices was assessed using the case-dropping subset bootstrap technique, and the results indicated stable centrality values for both China and Pakistan, with values remaining around 0.5. In the graphs (Figure 4), the x-axis represents the percentage of the sample used at each step, while the y-axis displays the average correlations between the centrality indices from

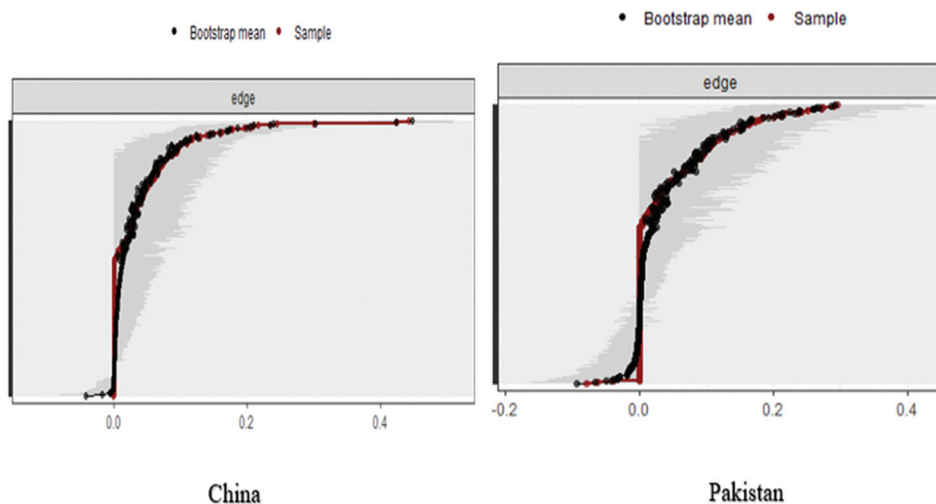


Figure 3. Bootstrap confidence interval

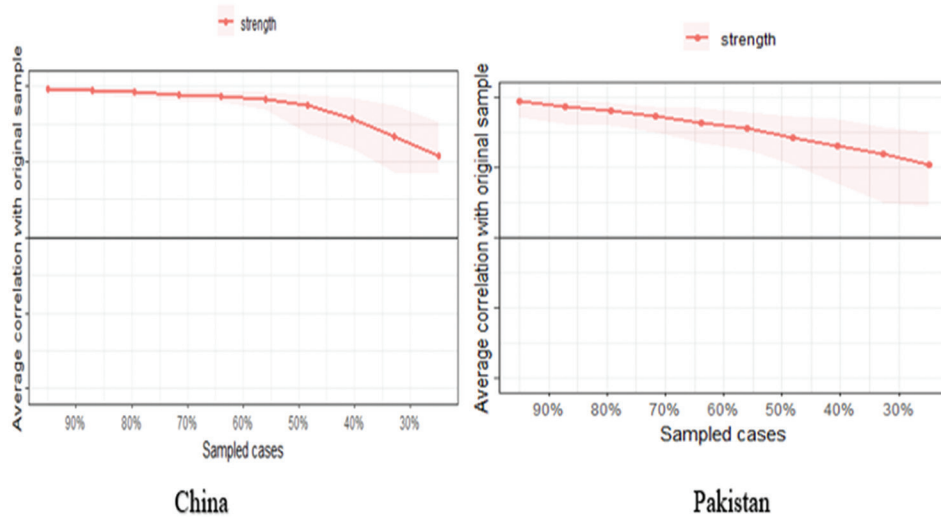


Figure 4. Stability of centrality indices based on the case-dropping subset bootstrap

the re-estimated networks and the original network. As increasing percentages of cases dropped, the stability of the centrality indices remained relatively high, reflecting a robust network structure.

At the start of the analysis, the CI (red) was relatively narrow, indicating precise estimates. However, as the sample size decreased, the CI gradually widened, suggesting increasing variability in the estimates as fewer cases were included. Despite this, the overall stability of the centrality indices remained strong, highlighting that the network’s centrality estimates are reliable and resistant to changes even when subsets of the sample are dropped. This reinforces confidence in the robustness of the network and its centrality measures; however, wider CIs at lower sample sizes suggest that more caution is warranted when interpreting results with reduced data.

4. Discussion

This study sought to uncover the most prominent psychosomatic symptoms shared between China and Pakistan, highlighting the psychological and somatic experiences most frequently reported by individuals. Although many network studies have explored psychiatric symptoms within Asian populations, this research is the first to specifically investigate psychosomatic networks among Chinese and Pakistani patients.

The current study found some noteworthy links or correlations between somatic and psychological symptoms. The Chinese patients have a strong link or correlation between “cardiovascular symptoms” and “pulmonary symptoms” on the S-subscale. Chest tightness and breathlessness are the most common symptoms of emotional distress in this group. Chest tightness, pain,

and palpitations are frequent symptoms in psychosomatic conditions, creating a diagnostic challenge for emergency and general practice providers when evaluating patients with these complaints.⁴⁰ As such, it is important for mental health providers to be aware of this connection.⁴¹

China and Pakistan are distinct countries with diverse cultures, lifestyles, languages, social norms, religions, and differing political, economic, and business conditions. In Pakistan, high socioeconomic pressure is strongly linked to elevated levels of depression, anxiety, and somatic symptoms, primarily due to the widespread prevalence of low socioeconomic status. Low socioeconomic status and financial crises exacerbate inequalities, material disadvantages, and poor educational opportunities, which collectively contribute to higher rates of depression, anxiety, and psychosomatic complaints. A study conducted by Patel *et al.*⁴² highlights the elevated rates of mental illness among individuals in Pakistan, a low- and middle-income country.⁴² This increase may be attributed to several factors, including the prevalence of natural disasters, armed conflict, and violence, which adversely impact mental well-being and development, with approximately 80% of mental health disorders occurring in middle- and low-income countries. In Pakistan, low educational attainment further exacerbates the risk of depression and anxiety, contributing significantly to the overall burden of common mental disorders, such as anxiety, somatoform disorders, and depression.⁴³

Another reason for the discrepancy in mental health prevalence between the two countries could be the availability of mental health services. China has about 3000 mental health institutions that provide services to patients with mental health illnesses, including numerous psychiatric hospitals and a large number of specialized

psychiatrists.⁴⁴ In contrast, Pakistan has a severe shortage of mental health providers, with fewer than 344 psychiatrists available across the entire country. More than 90% of people with common mental disorders remain untreated. In 1993, China established a psychosomatic society that significantly contributed to psychosomatic medicine, focusing on the prevalence, diagnosis, treatment, and etiology of psychosomatic illnesses. The society has also published more than five journals dedicated to advancing research in this field.^{45,46} Conversely, Pakistan lacks such facilities in the relevant field and would benefit from increased support.

There is significant literature that highlights how health and illness are differently perceived in different cultures.^{47,48} Cultural beliefs profoundly influence practical outcomes, shaping individuals' decisions to pursue treatment, how they manage symptoms, and the extent of support they receive from their families and communities. It also determines where they seek assistance, whether from mental health professionals, primary care doctors, religious figures, or traditional healers, as well as the steps they take to access care and their overall treatment outcomes.^{48,49} According to Helman,⁵⁰ cultures vary in how they explain the causes of illnesses, with some attributing it to personal factors, natural events, or social conditions. For example, certain cultures may link illness to superstitious or supernatural causes, such as spirit possession, the "evil eye," curses, or breaking cultural taboos. In these cases, healing is often entrusted to traditional healers, elders, or other influential community members. Furthermore, religion and spirituality significantly influence these perspectives, often viewing illness as tied to a broader spiritual or moral framework. As a result, solutions are typically sought within the boundaries of these cultural and spiritual systems.⁵¹

In some provinces of Pakistan, such as Sindh and Punjab, individuals with depression or other mental illnesses are treated with "magic" or amulets; in some cases, they are taken to grave sites and shrines for spiritual healing.⁵² Moreover, limited awareness and cultural stigma surrounding mental illnesses often lead individuals to turn to spiritual healers for support. In addition, there is a significant shortage of specialized mental health professionals and facilities, coupled with insufficient financial resources and low mental health budgets.^{53,54} For the entire population, there are fewer than 500 psychiatrists, only four major psychiatric hospitals, and 654 psychiatric units within general hospitals. This inadequate ratio results in a substantial treatment gap, leaving approximately 90% of individuals with common mental disorders without access to proper care.^{55,56}

Numerous illnesses are recurrent, with a high likelihood of relapse.⁵⁷ Offering additional, tailored psychological interventions to address mild or early symptoms is essential for minimizing functional impairment and enhancing overall well-being.⁵⁸ However, despite the high prevalence of mental disorders, only about 20% of affected individuals have ever consulted a mental health professional. In China, there is also a shortage of mental health professionals, particularly trained social workers and psychologists. The financial burden of psychological counseling is further compounded by inadequate coverage under medical insurance plans.^{59,60} In comparison to Pakistan, China has significantly more developed mental health facilities.

Across the United States of America (USA), Asians and Asian Americans (collectively referred to as Asians) exhibit the lowest rate of mental health service usage (25%) compared to other racial and ethnic groups, who utilize these services at rates of 39–52%. This disparity persists despite high levels of depression, anxiety, and suicidal thoughts within the Asian community.^{61,62} The COVID-19 pandemic has further exacerbated mental health challenges among Asian populations, leading to significant increases in mental health concerns.⁶³ Between 2019 and 2020, diagnoses of depression among Asians in the USA rose by 104%, while anxiety disorders increased by 97%.⁶⁴ In 2021, over 40% of Asian individuals reported experiencing mental health symptoms,⁶⁵ and one in six Asian adults reported being targeted by hate crimes or incidents.⁶⁶

Stigma, defined as a social process that excludes individuals from full societal acceptance, is deeply rooted in cultural norms and values and varies across cultural groups.^{67,68} Racial and ethnic differences in stigma levels are well-documented, including the endorsement of negative stereotypes about individuals with mental disorders (e.g., perceiving them as dangerous) and a desire for social distance.^{69,70} Asian Americans report higher stigma levels than other groups, including White individuals, potentially due to concerns about bringing shame to their families.⁷⁰⁻⁷²

Elevated stigma among Asian Americans impacts their help-seeking attitudes, likely hindering the decision-making process.⁷⁰ Loya *et al.*⁷³ found that stigma differences accounted for variations in help-seeking attitudes between White and South Asian American college students. Although Asian Americans generally report higher stigma levels than White individuals, the extent and causes of this disparity vary across Asian American subgroups. For instance, Chinese Americans may avoid mental health services due to perceived shame rather than skepticism toward Western medicine,⁷⁴ while cultural mistrust contributes to negative help-seeking attitudes among Filipino Americans.⁷⁵

This study presented a cross-cultural clinical comparison of psychosomatics, depression, and anxiety between China and Pakistan. Due to the unavailability of an updated Urdu version, we utilized older versions of the PHQ and GAD scales for data collection. In addition, cultural and genetic factors, both of which may influence the prevalence and expression of psychosomatic symptoms, depression, and anxiety, were not included in the current analysis. A slight difference in the average age between the two groups was also observed, which may have had an impact on the findings.

5. Conclusion

Psychosomatic symptoms, depression, and anxiety were significantly different between the participants from China and Pakistan, with the Pakistani group displaying markedly higher symptom levels. The network analysis uncovered unique patterns of interconnected symptoms, illuminating the complex interplay between emotional and physical health as influenced by cultural factors. These findings emphasize the dynamic interplay between mental and physical well-being across diverse populations, sparking the need for deeper exploration in these countries and other Asian populations to uncover whether similar symptom patterns prevail.

Acknowledgments

The authors acknowledge the participants who participated in the study.

Funding

None.

Conflict of interest

Yonggui Yuan is the Editor-in-Chief and Wenhao Jiang is the Associate Editor of this journal, but were not in any way involved in the editorial and peer-review process conducted for this paper, directly or indirectly. Separately, other authors declared that they have no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

Author contributions

Conceptualization: Yonggui Yuan, Wenhao Jiang, S. Mudasser Shah

Formal analysis: S. Mudasser Shah, Chenguang Jiang, Wenhao Jiang

Investigation: S. Mudasser Shah

Methodology: S. Mudasser Shah

Writing—original draft: S. Mudasser Shah, Chand Taneja

Writing—review & editing: Yonggui Yuan, Chand Taneja,

Wei Xu, Sun Taipeng, Chen Gang, Tianyu Wang, Wenhao Jiang

Ethics approval and consent to participate

The study was approved by the ethical committee of Zhongda Hospital at the Southeast University, Nanjing, Jiangsu, China (registration no. 2021ZDSYLL347-P01). All participants signed an informed consent form before participation.

Consent for publication

The informed consent forms were completed and signed by all participants in our study.

Availability of data

Data will be available upon request from the corresponding authors.

References

1. Bauer AM, Bonilla P, Grover MW, Meyer F, Riselli C, White L. The role of psychosomatic medicine in global health care. *Curr Psychiatry Rep.* 2011;13(1):10-17. doi: 10.1007/s11920-010-0162-2
2. Andreas S, Schulz H, Volkert J, *et al.* Incidence and risk factors of mental disorders in the elderly: The European MentDis_ICF65+ study. *Aust N Z J Psychiatry.* 2022;56(5):551-559. doi: 10.1177/00048674211025711
3. Fischbein JE. Psychosomatics: A current overview. *Int J Psychoanalysis.* 2011;92(1):197-219. doi: 10.1111/j.1745-8315.2010.00389.x
4. Barsky AJ, Borus JF. Functional somatic syndromes. *Ann Intern Med.* 1999;130(11):910-921. doi: 10.7326/0003-4819-130-11-199906010-00016
5. Gatchel RJ. Comorbidity of chronic pain and mental health disorders: The biopsychosocial perspective. *Am Psychol.* 2004;59(8):795-805. doi: 10.1037/0003-066X.59.8.795
6. Engel GL. The need for a new medical model: A challenge for biomedicine. *Science (New York).* 1977;196(4286):129-136. doi: 10.1126/science.847460
7. Dimsdale JE. Psychological stress and cardiovascular disease. *J Am Coll Cardiol.* 2008;51(13):1237-1246. doi: 10.1016/j.jacc.2007.12.024
8. Morton L, Elliott A, Thomas R, Cleland J, Deary V, Burton C. Developmental study of treatment fidelity, safety and acceptability of a Symptoms Clinic intervention delivered by General Practitioners to patients with multiple medically unexplained symptoms. *J Psychosom Res.*

- 2026;84:37-43.
doi: 10.1016/j.jpsychores.2016.03.008
9. Cosma A, Stevens G, Martin G, *et al.* Cross-national time trends in adolescent mental well-being from 2002 to 2018 and the explanatory role of schoolwork pressure. *J Adolesc Health.* 2020;66(6S):S50-S58.
doi: 10.1016/j.jadohealth.2020.02.010
 10. Joustra ML, Janssens KAM, Schenk HM, Rosmalen JGM. The four week time frame for somatic symptom questionnaires reflects subjective symptom burden best. *J Psychosom Res.* 2018;104:16-21.
doi: 10.1016/j.jpsychores.2017.11.006
 11. Yue Y, Li L, Liu R, *et al.* The dynamic changes of psychosomatic symptoms in three waves of COVID-19 outbreak and fatigue caused by enduring pandemic in China. *J Affect Disord.* 2023;331:17-24.
doi: 10.1016/j.jad.2023.03.032
 12. Fava GA, Sonino N. Psychosomatic medicine. *Int J Clin Pract.* 2010;64(8):1155-1161.
doi: 10.1111/j.1742-1241.2009.02266.x
 13. Wise TN. Psychosomatic medicine: An approach needed now more than ever. *Int J Clin Pract.* 2010;64(8):999-1001.
doi: 10.1111/j.1742-1241.2009.02268.x
 14. Kelley KW, Peng YP, Liu Q, *et al.* Psychoneuroimmunology goes East: Development of the PNIRS_{China} affiliate and its expansion into PNIRS_{Asia-Pacific}. *Brain Behav. Immun.* 2020;88:75-87.
doi: 10.1016/j.bbi.2020.04.026
 15. Ahmed TA, Rana MH, Tipu HN, Ahmed D, Bashir MM. Suppression of humoral immune response due to psychological stress in survivors of large scale natural disaster. *Pak J Pathol.* 2008;19(3):78-81.
 16. Hyde MK, Chambers SK, Shum DID, Dunn J. Psycho-oncology assessment in Chinese populations: A systematic review of quality of life and psychosocial measures. *Eur J Cancer.* 2016;25(5):691-718.
doi: 10.1111/ecc.12367
 17. Saleem A, Khan AM, Ali SM, Abbasi AN. Filling the void: The need for psycho-oncology multidisciplinary tumour boards in hospitals across Pakistan. *Int J Cancer Res Ther.* 2023;8(4):170-171.
 18. Tang TR, Wang M, Li H, *et al.* Untreated depression and anxiety in patients with common skin diseases: A cross-sectional study in China. *Front Psychol.* 2023;14:1150998.
doi: 10.3389/fpsyg.2023.1150998
 19. Iftikhar U, Jafferany M, Khawaja AR. Awareness and knowledge toward psychodermatology in South Asia: A Pakistani perspective. *Int J Dermatol.* 2020;59(6):e219-e221.
doi: 10.1111/ijd.14756
 20. Jawwad G, Anjum AF, Rasul A, *et al.* Role of exercise in modulating neuroendocrine response to psychological stress. *Age (years).* 2021;30:6.
 21. Jafar TH, Jehan I, de Silva HA, *et al.* Multicomponent intervention versus usual care for management of hypertension in rural Bangladesh, Pakistan and Sri Lanka: Study protocol for a cluster randomized controlled trial. *Trials.* 2017;18(1):272.
doi: 10.1186/s13063-017-2018-0
 22. Henningsen P. Management of somatic symptom disorder. *Dialogues Clin Neurosci.* 2018;20(1):23-31.
doi: 10.31887/DCNS.2018.20.1/phenningsen
 23. Barsky AJ, Orav EJ, Bates DW. Somatization increases medical utilization and costs independent of psychiatric and medical comorbidity. *Arch Gen Psychiatry.* 2005;62(8):903-910.
doi: 10.1001/archpsyc.62.8.903
 24. Donnay A, Ziem G. Prevalence and overlap of chronic fatigue syndrome and fibromyalgia syndrome among 100 new patients with multiple chemical sensitivity syndrome. *J Chronic Fatigue Syndr.* 1999;5(3-4):71-80.
 25. Keefer L, Palsson OS, Pandolfino JE. Best practice update: Incorporating psychogastroenterology into management of digestive disorders. *Gastroenterology.* 2018;154(5):1249-1257.
doi: 10.1053/j.gastro.2018.01.045
 26. Miller MC. Available from: <https://www.cfr.org/article/how-china-and-pakistan-forged-close-ties> [Last accessed on 2025 Apr 08].
 27. Khan MZU, Khan MM. China-Pakistan economic corridor: Opportunities and challenges. *Strat Stud.* 2019;39(2):67-82.
 28. Shah SM, Jahangir M, Xu W, Yuan Y. Reliability and validity of the Urdu version of psychosomatic symptoms scale in Pakistani patients. *Front Psychol.* 2022;13:861859.
doi: 10.3389/fpsyg.2022.861859
 29. Li L, Peng T, Liu R, *et al.* Development of the psychosomatic symptom scale (PSSS) and assessment of its reliability and validity in general hospital patients in China. *Gen Hosp Psych.* 2020;64:1-8.
doi: 10.1016/j.genhosppsyg.2020.01.008
 30. Wang W, Bian Q, Zhao Y, *et al.* Reliability and validity of the Chinese version of the Patient Health Questionnaire (PHQ-9) in the general population. *Gen Hosp Psych.* 2024;36(5):539-544.
doi: 10.1016/j.genhosppsyg.2014.05.021
 31. Ahmad S, Hussain S, Akhtar F, Shah FS. Urdu translation and validation of PHQ-9, a reliable identification, severity and treatment outcome tool for depression. *J Pak Med. Assoc.* 2018;68(8):1166-1170.

32. Williams N. The GAD-7 questionnaire. *Occup Med*. 2014;64(3):224-224.
33. Zeng QZ, He YL, Liu, H, *et al*. Reliability and validity of Chinese version of the Generalized Anxiety Disorder 7-item (GAD-7) scale in screening anxiety disorders in outpatients from traditional Chinese internal department. *Chin Ment Health J*. 2013;27(3):163-168.
34. Ahmad S, Hussain S, Shah FS, Akhtar F. Urdu translation and validation of GAD-7: A screening and rating tool for anxiety symptoms in primary health care. *J Pak Med Assoc*. 2017;67(10):1536-1540.
35. Borsboom D. A network theory of mental disorders. *World Psychiatry*. 2017;16(1):5-13.
doi: 10.1002/wps.20375
36. Heeren A, Jones PJ, McNally RJ. Mapping network connectivity among symptoms of social anxiety and comorbid depression in people with social anxiety disorder. *J Affect Dis*. 2018;228:75-82.
doi: 10.1016/j.jad.2017.12.003
37. Epskamp S, Borsboom D, Fried EI. Estimating psychological networks and their accuracy: A tutorial paper. *Behav Res Methods*. 2018;50(1):195-212.
doi: 10.3758/s13428-017-0862-1
38. Pan H, Liu Q. Difference of depression between widowed and non-widowed older people in China: A network analysis approach. *J Affect Disord*. 2021;280(Pt B):68-76.
doi: 10.1016/j.jad.2020.11.058
39. Wang Y, Hu Z, Feng Y, Wilson A, Chen R. Changes in network centrality of psychopathology symptoms between the COVID-19 outbreak and after peak. *Mol Psychiatry*. 2020;25(12):3140-3149.
doi: 10.1038/s41380-020-00881-6
40. Bovier PA, Chamot E, Perneger TV. Perceived stress, internal resources, and social support as determinants of mental health among young adults. *Qual Life Res*. 2004;13(1):161-170.
doi: 10.1023/B: QURE.0000015288.43768.e4
41. Campbell KA, Madva EN, Villegas AC, *et al*. Non-cardiac chest pain: A review for the consultation-liaison psychiatrist. *Psychosomatics*. 2017;58(3):252-265.
doi: 10.1016/j.psych.2016.12.003
42. Patel V, Chisholm D, Parikh R, *et al*. Addressing the burden of mental, neurological, and substance use disorders: Key messages from Disease Control Priorities, 3rd edition. *Lancet*. 2016;387(10028):1672-1685.
doi: 10.1016/S0140-6736(15)00390-6
43. Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJ. Global and regional burden of disease and risk factors, 2001: Systematic analysis of population health data. *Lancet*. 2006;367(9524):1747-1757.
doi: 10.1016/S0140-6736(06)68770-9
44. Shi S. What will the development of psychiatry in China be in 10 years? *Gen Psychiatry*. 2019;32(2):e100025.
doi: 10.1136/gpsych-2018-100025
45. Jiang W, Zhang Y, Turner JA, Yuan Y. Editorial: Psychosomatic medicine in general hospitals: Cross-Disorder and interdisciplinary collaboration. *Front Psychiatry*. 2022;13:1099678.
doi: 10.3389/fpsyt.2022.1099678
46. Yuan Y, Wu A, Jiang W. Psychosomatic medicine in China. *Psychother Psychosom*. 2015;84(1):59-60.
doi: 10.1159/000365420
47. Biswas J, Gangadhar BN, Keshavan M. Cross cultural variations in psychiatrists' perception of mental illness: A tool for teaching culture in psychiatry. *Asia J Psychiatry*. 2016;23:1-7.
doi: 10.1016/j.ajp.2016.05.011
48. Nguyen D, Bornheimer LA. Mental health service use types among Asian Americans with a psychiatric disorder: Considerations of culture and need. *J Behav Health Serv Res*. 2014;41(4):520-528.
doi: 10.1007/s11414-013-9383-6
49. USDHHS *Mental Health: Culture, Race, and Ethnicity: A Supplement to Mental Health: A Report of the Surgeon General*; 2001.
50. Helman CG. *Culture, Health and Illness*. 5th ed. London: Hodder Arnold; 2007.
51. Hechanova R, Waelde L. the influence of culture on disaster mental health and psychosocial support interventions in Southeast Asia. *Mental Health Relig Cult*. 2017;20:31-44.
doi: 10.1080/13674676.2017.1322048
52. Shah SM, Sun T, Xu W, Jiang W, Yuan Y. The mental health of China and Pakistan, mental health laws and COVID-19 mental health policies: A comparative review. *Gen Psychiatry*. 2022;35(5):e100885.
doi: 10.1136/gpsych-2022-100885
53. Munawar K, Abdul Khaiyom JH, Bokhary IZ, Park MS, Choudhry FR. A systematic review of mental health literacy in Pakistan. *Asia Pac Psychiatry*. 2020;12(4):e12408.
doi: 10.1111/appy.12408
54. Sadiq F, Khan Q. Barriers and challenges to mental health care in Pakistan. *Pak J Neurolog Sci*. 2021;16:1-2.
55. Sikander S. Pakistan. *Lancet Psychiatry*. 2020;7(10):845.
doi: 10.1016/S2215-0366(20)30387-4
56. Javed A, Khan MS, Nasar A, Alina, R. Mental healthcare in Pakistan. *Taiwanese J Psychiatry*. 2020;24(1):6-14.

- doi: 10.4103/TPSY.TPSY_8_20
57. Gitlin MJ, Miklowitz DJ. The difficult lives of individuals with bipolar disorder: A review of functional outcomes and their implications for treatment. *J Affect Disord.* 2017;209:147-154.
doi: 10.1016/j.jad.2016.11.021
58. Miziou S, Tsitsipa E, Moysidou S, et al. Psychosocial treatment and interventions for bipolar disorder: A systematic review. *Ann Gen Psychiatry.* 2015;14:19.
doi: 10.1186/s12991-015-0057-z
59. Liang D, Mays VM, Hwang WC. Integrated mental health services in China: challenges and planning for the future. *Health Policy Plan.* 2018;33(1):107-122.
doi: 10.1093/heapol/czx137
60. Zhang X, Zhang X, Chen X. Happiness in the air: How does a dirty sky affect mental health and subjective well-being? *J Environ Econom Manag.* 2017;85:81-94.
doi: 10.1016/j.jeem.2017.04.001
61. Liu W, Alt M, Pittsinger R. The role of the Social Class Worldview Model in the assessment, diagnosis, and treatment of mental and physical health. In: *Handbook of Multicultural Mental Health: Assessment and Treatment of Diverse Populations.* 2nd ed. United States: Academic Press; 2023. p. 111-125.
62. Augsberger A, Yeung A, Dougher M, Hahn HC. Factors influencing the underutilization of mental health services among Asian American women with a history of depression and suicide. *BMC Health Serv Res.* 2015;15:542.
doi: 10.1186/s12913-015-1191-7
63. Saw A, Yi SS, Doan LN, et al. Improving Asian American health during the syndemic of COVID-19 and racism. *EClinicalMedicine.* 2022;45:101313.
doi: 10.1016/j.eclinm.2022.101313
64. Lee J, Howard JT. Increased self-reported mental health problems among Asian-Americans during the COVID-19 pandemic in the United States: Evidence from a nationally representative database. *J Racial Ethn Health Dispar.* 2023;10(5):2344-2353.
doi: 10.1007/s40615-022-01414-3
65. AAPI. *COVID-19 Needs Assessment Project*; 2023. Available from: <https://www.aapicovidneeds.org/mentalhealth> [Last accessed on 2024 Dec 23].
66. Huang JT, Krupenkin M, Rothschild D, Lee Cunningham J. The cost of anti-Asian racism during the COVID-19 pandemic. *Nat Hum Behav.* 2023;7(5):682-695.
doi: 10.1038/s41562-022-01493-6
67. Corrigan PW. Mental health stigma as social attribution: Implications for research methods and attitude change. *Clin Psychol Sci Pract.* 2000;7(1):48-67.
doi: 10.1093/clipsy/7.1.48
68. Corrigan P. How stigma interferes with mental health care. *Am Psychol.* 2004;59(7):614-625.
doi: 10.1037/0003-066X.59.7.614
69. Leong FT, Lau AS. Barriers to providing effective mental health services to Asian Americans. *Mental Health Serv Res.* 2001;3(4):201-214.
doi: 10.1023/a:1013177014788
70. Eisenberg D, Downs MF, Golberstein E, Zivin K. Stigma and help seeking for mental health among college students. *Med Care Res Rev.* 2009;66(5):522-541.
doi: 10.1177/1077558709335173
71. Griffiths KM, Nakane Y, Christensen H, Yoshioka K, Jorm AF, Nakane H. Stigma in response to mental disorders: A comparison of Australia and Japan. *BMC Psychiatry.* 2006;6:21.
doi: 10.1186/1471-244X-6-21
72. Gee CB, Khera GS, Poblete AT, Kim B, Buchwach SY. Barriers to mental health service use in Asian American and European American college students. *Asian Am J Psychol.* 2020;11(2):98107.
doi: 10.1037/aap0000178
73. Loya F, Reddy R, Hinshaw SP. Mental illness stigma as a mediator of differences in Caucasian and South Asian college students' attitudes toward psychological counseling. *J Couns Psychol.* 2010;57(4):484-490.
doi: 10.1037/a0021113
74. Yang LH, Phelan JC, Link BG. Stigma and beliefs of efficacy towards traditional Chinese medicine and Western psychiatric treatment among Chinese Americans. *Cult Divers Ethnic Minor Psychol.* 2008;14(1):10-18.
doi: 10.1037/1099-9809.14.1.10
75. David EJ. Cultural mistrust and mental health help-seeking attitudes among Filipino Americans. *Asian Am J Psychol.* 2020;1(1):57-66.
doi: 10.1037/a0018814

Appendix

The psychosomatic subscale (P-subscale) indicated a significant difference in group and culture interactions ($F = 7.92$; $p=0.005$). *Post hoc* analysis revealed that in “group,” the Chinese patient group (CHP) and Pakistani patient group (PKP) displayed no significant difference ($p=0.414$), while the Chinese control group (CHC) and the Pakistani control group (PKC) displayed a significant difference ($p=0.004$). CHC reported higher levels of psychological symptoms compared to PKC. In “culture,” the *post hoc* analysis revealed that CHP versus CHC ($p<0.001$) and PKP versus PKC ($p<0.001$) displayed significant differences, suggesting that in both countries, more patients exhibited psychological symptoms compared to the control group.

The somatic subscale (S-subscale) indicated a significant difference in the main effect of group and culture interactions ($F = 47.73$; $p<0.001$). The *post hoc* test revealed that in “group,” CHP versus PKP ($p<0.001$) and CHC versus PKC ($p<0.001$) displayed a significant difference. In addition, more Pakistani patients have somatic symptoms than Chinese patients. The *post hoc* analysis for “culture” revealed a significant difference for CHP versus CHC ($p<0.001$) and PKP versus PKC ($p<0.001$). In both countries, more patients exhibit somatic symptoms compared to the control groups (Table 1).