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Emotional Well-being among Primary Healthcare Workers in the Post-Pandemic Context: A Descriptive Exploratory Study

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ABSTRACT

Background: The COVID-19 pandemic had a substantial impact on the mental health of healthcare workers, but evidence regarding emotional well-being after the acute pandemic period remains limited in primary healthcare settings. This study aimed to describe the emotional well-being of healthcare workers following the COVID-19 pandemic in a primary healthcare setting.

Methods: An observational, descriptive, exploratory, cross-sectional study was conducted among 182 healthcare workers at a primary healthcare unit in Mexico City. Emotional well-being was assessed using the 12-item General Health Questionnaire (GHQ-12). Responses were analysed using Likert, Standard, and Chronic scoring methods and their corresponding predefined cut-offs. Besides, sociodemographic and occupational characteristics were described, and GHQ-12 score distributions and pairwise concordance between classifications were examined using Cohen's kappa.

Results: Participants had a mean age of 35.76 ± 7.33 years old, and 76.4% were women. A history of COVID-19 was reported by 76.4%. The mean GHQ-12 scores were 14.66 ± 4.40 for Likert, 3.76 ± 2.64 for Standard, and 6.86 ± 2.21 for Chronic scoring. The proportion screening positive varied substantially according to the scoring method and cut-off: 84.1% with Likert ≥12, 64.8% with Standard ≥3, 20.9% with Standard ≥6, and 74.2% with Chronic ≥6. Concordance also varied across classifications. The greatest agreement beyond chance was observed between Likert ≥12 and Chronic ≥6 (κ = 0.607), whereas concordance involving Standard ≥6 was lower.

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Conclusions: Impaired emotional well-being remained frequent among healthcare workers in this primary healthcare setting following the COVID-19 pandemic. However, the estimated burden varied substantially according to the GHQ-12 scoring method and cut-off applied. These findings highlight the importance of explicitly reporting and consistently applying scoring and classification criteria when the GHQ-12 is used to assess healthcare worker's emotional well-being.

Keywords: Quality Indicators; Health Care; Primary Health Care; Geriatric Assessment; Program Evaluation; Quality Improvement

Introduction

The COVID-19 pandemic placed extraordinary and prolonged demands on healthcare workers worldwide. Changes in workload and working conditions, repeated exposure to infection, uncertainty, disruption of healthcare delivery, and concerns about personal and family safety were accompanied by a substantial psychological burden. A systematic review and meta-analysis including 239 studies and 271,319 healthcare workers estimated pooled prevalences of 33% for depressive symptoms, 42% for anxiety, 40% for acute stress, 32% for post-traumatic symptoms, 42% for insomnia, and 37% for burnout [1]. Although the psychological consequences of the pandemic were initially studied predominantly during periods of high transmission and healthcare-system pressure, evidence indicates that these effects did not necessarily resolve as the acute emergency subsided. In a prospective cohort of healthcare workers in Spain, Mediavilla et al. found that poor mental health outcomes persisted over the first year of the pandemic; among participants assessed longitudinally, 56% remained symptomatic or worsened in terms of psychological distress [2]. Primary healthcare constitutes a particularly relevant setting in which to examine these consequences. Primary care professionals maintained direct contact with their communities while responding to COVID-19 and simultaneously addressing preventive, acute, and chronic healthcare needs.

Despite this central role, evidence specifically concerning the psychological consequences of the pandemic among primary care workers has been comparatively limited. In a multicentre study conducted among primary healthcare workers in Spain, Aragonès et al. highlighted the scarcity of studies focused specifically on this workforce and documented a substantial burden of common mental disorders during the first COVID-19 outbreak [3]. Evidence obtained using the 12-item General Health Questionnaire (GHQ-12) is particularly relevant for assessing psychological distress in primary care professionals. Zeng et al. evaluated 712 primary care physicians in Chengdu, China, and identified high psychological distress (GHQ-12 ≥3) in 29.2% of participants. Higher psychological distress was associated with lower perceived preparedness, greater occupational impact, contact with infected residents, greater impact on personal life, and COVID-19-related concerns. The investigators also conducted a five-month follow-up using the GHQ-12, allowing changes in psychological distress to be examined beyond the initial assessment [4]. Studies using other validated instruments have similarly documented psychological morbidity among primary care workers. Aragonès et al. screened primary healthcare workers for depression, anxiety disorders, post-traumatic stress disorder, panic attacks, and substance use disorder, demonstrating that the psychological burden associated with the pandemic was also evident outside hospital settings [3].

A longitudinal evidence from northern Spain further showed that psychological difficulties could persist over time. Using the Patient Health Questionnaire-9, Generalised Anxiety Disorder-7, Insomnia Severity Index, and Impact of Event Scale-Revised, Viejo Casas et al. found that the severity of depressive symptoms increased significantly at one-year follow-up, supporting the importance of examining the mental health of primary care professionals beyond the acute phase of the pandemic [5]. More recent evidence provides an important perspective on primary healthcare workers beyond the initial phases of the pandemic. In 2024, Li et al. reported a national study involving 4,246 physicians and nurses from 692 primary healthcare institutions in China [6]. Although the prevalence of several probable mental health disorders was lower than that reported during the early pandemic, probable depression (8.2%), anxiety (5.9%), post-traumatic stress disorder (6.9%), and insomnia (18.0%) remained present [6]. Female sex, multimorbidity, previous psychiatric disorders, quarantine experience, lack of help-seeking, and overtime work were associated with poorer mental health outcomes [6].

These findings indicate that psychological difficulties among primary healthcare professionals may remain relevant even after the period of greatest healthcare-system disruption. The distinction between primary and hospital care is important when interpreting this evidence. Primary healthcare is characterised by first-contact care, accessibility, continuity, comprehensive management of health needs, and sustained interactions with patients and communities. Consequently, findings generated predominantly in hospital or frontline acute-care environments cannot automatically be assumed to represent the experience of primary healthcare personnel. Studies conducted specifically in primary care have demonstrated psychological distress both during the acute pandemic period and at longer-term follow-up, supporting the need to examine this workforce within its own organisational and clinical context [3,5,6]. The emotional well-being of healthcare workers is relevant not only to the professionals themselves but also to the functioning and quality of health-

care services. In a systematic review of 46 studies, Hall et al. found that 16 of the 27 studies assessing well-being reported a significant association between poorer staff well-being and worse patient-safety outcomes, while six additional studies identified associations for some of the measures examined [7]. The authors also emphasised that the predominance of observational evidence limited causal inference and identified a need for further research in primary care [7]. More recent evidence reinforces the relationship between the psychological health of healthcare personnel and care outcomes: a systematic review and meta-analysis of 85 studies involving 288,581 nurses found burnout to be associated with poorer safety climate, medication errors, adverse events, missed care, lower patient satisfaction, and lower perceived quality of care [8]. Taken together, available evidence indicates that the psychological consequences experienced by healthcare workers did not necessarily disappear with the reduction in the acute pressures of the COVID-19 pandemic [2,5,6].

This issue is particularly relevant in primary healthcare, where continuity of care, communication, and sustained professional–patient relationships are central to service delivery, while the well-being of healthcare personnel may also have implications for patient safety and quality of care [7,8]. Therefore, generating evidence on the emotional well-being of healthcare workers in the period following the pandemic may contribute to identifying persisting needs within this workforce and to informing the organisation of primary healthcare services. The aim of this study was to describe the emotional well-being of healthcare workers following the COVID-19 pandemic in a primary healthcare setting.

Material and Methods

Study Design and Setting

An observational, descriptive, exploratory, cross-sectional study was conducted among healthcare workers at Family Medicine Unit No. 3 "La Joya", Instituto Mexicano del Seguro Social (IMSS), Mexico City, Mexico. The study was designed to describe the emotional well-being of healthcare workers in a primary healthcare setting following the COVID-19 pandemic.

Study Population and Participants

The study population comprised healthcare workers assigned to the Family Medicine Unit. Personnel from both work shifts and all age groups were eligible to participate. Participation was voluntary, and all participants provided informed consent before completing the study questionnaire. Healthcare workers who were on sick leave or holiday during data collection were not included. A total of 182 healthcare workers participated in the study. The study included different occupational groups involved in primary healthcare delivery, including medical assistants, nursing personnel, dentists, heads of service, family physicians, non-family physicians, general practitioners, resident physicians, medical interns, nutrition personnel, laboratory and radiology personnel, and social workers.

Data Collection and Study Variables

Data were collected using a structured questionnaire designed to obtain sociodemographic, occupational, COVID-19-related, and emotional well-being information. The variables included age, sex, marital status, occupational category, monthly income, and history of COVID-19 infection. Age was recorded in completed years. Sex was categorised as male or female, whereas marital status was classified as single, married, or cohabiting. Monthly income was grouped into three categories: <5,000, 5,001–10,000, and >10,000 Mexican pesos (MXN). History of COVID-19 infection was recorded as a dichotomous variable (yes/no). The occupational category was recorded according to the institutional position held by each participant.

Assessment of Emotional Well-being

Emotional well-being was assessed using the 12-item General Health Questionnaire (GHQ-12). The 12 items were recorded individually using a four-point response scale ranging from 0 to 3, and the individual scores were summed to obtain the total GHQ-12 score. The 12-item General Health Questionnaire (GHQ-12) has demonstrated an adequate diagnostic performance in Latin American primary care populations. In a validation study conducted in a primary care setting in Santiago, Chile, using the Revised Clinical Interview Schedule (CIS-R) as the reference standard, the GHQ-12 showed a sensitivity of 76% and a specificity of 73% for identifying minor psychiatric disorders [9]. Three scoring methods were applied. For the Likert method, responses were scored 0-1-2-3 and summed to obtain a total score ranging from 0 to 36. For the Standard method, responses were recoded using the 0-0-1-1 scoring scheme, yielding a total score ranging from 0 to 12. For the Chronic method, positively phrased items were scored 0-0-1-1, whereas negatively phrased items were scored 0-1-1-1, also yielding a total score ranging from 0 to 12 [10]. or the interpretation of the resulting scores, the Standard method was classified as 0–5, 6–7, and 8–12, representing minimal, mild, and moderate-to-severe psychological distress, respectively, according to the classification used in the World Health Organization mental health and psychosocial support protocol [11]. For the Likert method, scores of 0–11 were classified as below the screening threshold and scores of 12–36 as indicative of probable emotional disorder, based on the 11/12 threshold validated in a Colombian population (as an additional classification, the Colombian study also identified a 2/3 threshold for the Standard GHQ scoring method: 0–2 below the screening threshold and 3–12 indicative of probable emotional disorder) [12]. For the Chronic method, scores of 0–5 were classified as below the screening threshold and scores of 6–12 as indicative of probable depressive disorder, according to the validated ≥6 cut-off for the Corrected/Chronic GHQ scoring method [13].

Statistical Analysis

A descriptive statistical analysis was performed according to the nature and distribution of the variables. Categorical variables were

summarised using absolute frequencies and percentages, whereas quantitative variables were described using the mean and standard deviation or the median and interquartile range, as appropriate. GHQ-12 scores were analysed using the three predefined scoring methods: Likert (0–36), Standard (0–12), and Chronic (0–12). For each method, the distribution of total scores was described using measures of central tendency and dispersion. Participants were subsequently classified according to the corresponding predefined cut-off points, and the resulting categories were summarised using absolute frequencies and percentages. The distribution of these categories was also described according to sociodemographic characteristics, occupational category, and history of COVID-19. Pairwise concordance between the binary GHQ-12 classifications was assessed using 2 × 2 cross-tabulations. the observed agreement was calculated as the proportion of participants classified concordantly by both classifications in each pair, and the Cohen's kappa coefficient (κ) was used to quantify agreement beyond that expected by chance. Given the descriptive and exploratory nature of the study, no inferential hypothesis testing or measures of association between participant characteristics and GHQ-12 classifications were performed.

Ethical Considerations

The research protocol was reviewed and approved by the Local Health Research Committee No. 3509 of the Instituto Mexicano del Seguro Social (IMSS), with Institutional Registration Number R-2024-3509-029. The participation was voluntary, and the written informed consent was obtained from all participants before data collection. Participants were informed of the purpose of the study and their freedom to decline or withdraw from participation without any consequences. Confidentiality and privacy were maintained throughout data collection, analysis, and reporting, and the information obtained was used exclusively for research purposes. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki and the Nuremberg Code. The ethical principles of autonomy, beneficence, non-maleficence, and justice were observed throughout the research process. Autonomy was ensured through voluntary participation and informed consent; beneficence and non-maleficence were addressed by maintaining a minimal-risk, non-interventional study design and safeguarding participants' information; and justice was observed by applying the same eligibility criteria and study procedures to all potential participants without discrimination.

Results and Discussion

Characteristics of the Study Population

A total of 182 healthcare workers were included in the analysis, with complete data available for the variables examined. The mean age was 35.76 ± 7.33 years old (95% CI: 34.70–36.82), with a median of 35 years old (IQR: 30–40) and an overall range of 21–65 years old. Women accounted for 76.4% (n = 139; 95% CI: 70.3–82.4) of the study population and men for 23.6% (n = 43; 95% CI: 17.6–29.7). Regarding marital status, 48.9% (n = 89; 95% CI: 41.8–56.6) were single, 36.3% (n = 66; 95% CI: 29.7–42.9) were married, and 14.8% (n = 27; 95% CI: 9.9–20.3) were cohabiting. The study population comprised a broad range of primary healthcare occupations. Nursing personnel represented 24.7% (n = 45; 95% CI: 18.1–30.8) of participants, followed by administrative staff (22.5%, n = 41; 95% CI: 16.5–29.1), family physicians (17.6%, n = 32; 95% CI: 12.1–23.1), resident physicians (12.1%, n = 22; 95% CI: 7.1–17.0), and social workers (6.0%, n = 11; 95% CI: 2.7–9.9). Heads of service accounted for 4.9% (n = 9; 95% CI: 2.2–8.2), undergraduate medical interns for 3.3% (n = 6; 95% CI: 1.1–6.6), and laboratory personnel for 2.2% (n = 4; 95% CI: 0.5–4.4). Dentistry personnel, non-family physicians, and general practitioners each represented 1.6% (n = 3; 95% CI: 0.0–3.8), whereas nutritionists represented 1.1% (n = 2; 95% CI: 0.0–2.7) and radiology personnel 0.5% (n = 1; 95% CI: 0.0–1.6). The monthly income was MXN 5,001–10,000 (approximately USD 282–565) in 47.8% of participants (n = 87; 95% CI: 40.0–55.0), >MXN 10,000 (>USD 565) in 41.8% (n = 76; 95% CI: 35.0–49.0), and <MXN 5,000 (<USD 282) in 10.4% (n = 19; 95% CI: 7.0–15.0). A history of COVID-19 was reported by 76.4% of participants (n = 139; 95% CI: 69.8–82.4), whereas 23.6% (n = 43; 95% CI: 17.6–30.2) reported no previous COVID-19.

The distribution of GHQ-12 scores differed according to the scoring method applied. Using the Likert method, the mean score was 14.66 ± 4.40 (95% CI: 14.04–15.30), with a median of 14 (IQR: 12–17) and an observed range of 2–29. Based on the validated classification for emotional disorders, 84.1% of participants (n = 153; 95% CI: 79.0–89.0) screened positive for a probable emotional disorder, whereas 15.9% (n = 29; 95% CI: 11.0–21.0) were below the screening threshold. Using the Standard method, the mean GHQ-12 score was 3.76 ± 2.64 (95% CI: 3.38–4.14), with a median of 4 (IQR: 2–5) and an observed range of 0–12. According to the predefined classification, 79.1% of participants (n = 144; 95% CI: 73.0–85.0) showed minimal psychological distress, 11.5% (n = 21; 95% CI: 7.0–16.0) showed significant psychological distress with a high possibility of caseness, and 9.3% (n = 17; 95% CI: 5.0–14.0) showed moderate-to-severe psychological distress. When the additional classification derived from the Colombian validation was applied, 64.8% (n = 118; 95% CI: 58.0–71.0) screened positive for a probable emotional disorder, whereas 35.2% (n = 64; 95% CI: 29.0–42.0) were below the corresponding screening threshold. Using the Chronic scoring method, the mean GHQ-12 score was 6.86 ± 2.21 (95% CI: 6.54–7.18), with a median of 7 (IQR: 5–8) and an observed range of 0–12. According to the validated classification for this scoring approach, 74.2% of participants (n = 135; 95% CI: 68.0–80.0) screened positive for a probable depressive disorder, whereas 25.8% (n = 47; 95% CI: 20.0–32.0) were below the screening threshold. Overall, the proportion of healthcare workers classified as screening positive varied according to the GHQ-12 scoring approach and reference criterion applied. The proportion of participants screening positive for a probable emotional disorder was 84.1% using the Likert method and 64.8% using the additional

Standard classification, whereas 74.2% screened positive for a probable depressive disorder using the Chronic method.

GHQ-12 Results According to Participant Characteristics

Using the Likert method, 153 participants screened positive for a probable emotional disorder, whereas 29 were below the screening threshold. Among participants screening positive, the mean age was 35.29 ± 6.89 years old, with a median of 35 years old (IQR: 30–39); 78.4% (n = 120) were women and 21.6% (n = 33) were men. A history of COVID-19 was reported by 79.1% (n = 121). Regarding marital status, 47.7% (n = 73) were single, 37.3% (n = 57) were married, and 15.0% (n = 23) were cohabiting. The most frequently represented occupational categories were nursing personnel (28.1%, n = 43), administrative staff (23.5%, n = 36), family physicians (16.3%, n = 25), and resident physicians (10.5%, n = 16). Monthly income was MXN 5,001–10,000 for 51.0% (n = 78), >MXN 10,000 for 39.9% (n = 61), and <MXN 5,000 for 9.2% (n = 14). Among the 29 participants below the screening threshold, the mean age was 38.24 ± 9.02 years and the median was 37 years (IQR: 31.5–42.5); 65.5% (n = 19) were women, 62.1% (n = 18) reported a history of COVID-19, and 55.2% (n = 16) were single. Under the Standard classification, 38 participants met the criterion for psychological distress, whereas 144 were classified as having minimal psychological distress. Among those with psychological distress, the mean age was 36.29 ± 6.65 years old, with a median of 35 years old (IQR: 30.75–40.25); 86.8% (n = 33) were women and 13.2% (n = 5) were men. A history of COVID-19 was reported by 86.8% (n = 33). Regarding marital status, 42.1% (n = 16) were married, 36.8% (n = 14) were single, and 21.1% (n = 8) were cohabiting. Nursing personnel constituted 26.3% (n = 10), administrative staff 21.1% (n = 8), family physicians 15.8% (n = 6), resident physicians 13.2% (n = 5), and social workers 13.2% (n = 5). The monthly income was MXN 5,001–10,000 for 55.3% (n = 21), >MXN 10,000 for 39.5% (n = 15), and <MXN 5,000 for 5.3% (n = 2). Among the 144 participants classified as having minimal psychological distress, the mean age was 35.63 ± 7.51 years old and the median was 35 years old (IQR: 30–40); 73.6% (n = 106) were women and 73.6% (n = 106) reported a history of COVID-19.

When the additional Standard classification derived from the Colombian validation was applied, 118 participants screened positive for a probable emotional disorder, whereas 64 were below the corresponding screening threshold. Among participants screening positive, the mean age was 35.58 ± 7.56 years old, with a median of 35 years old(IQR: 30–39); 78.0% (n = 92) were women and 22.0% (n = 26) were men. A history of COVID-19 was reported by 81.4% (n = 96). Regarding marital status, 48.3% (n = 57) were single, 36.4% (n = 43) were married, and 15.3% (n = 18) were cohabiting. Nursing personnel accounted for 29.7% (n = 35), administrative staff for 24.6% (n = 29), family physicians for 16.9% (n = 20), and resident physicians for 9.3% (n = 11). The monthly income was MXN 5,001–10,000 for 50.8% (n = 60), >MXN 10,000 for 39.0% (n = 46), and <MXN 5,000 for 10.2% (n = 12). Among the 64 participants below this screening threshold, the mean age was 36.09 ± 6.92 years old and the median was 35 years old (IQR: 30.25–40); 73.4% (n = 47) were women and 67.2% (n = 43) reported a history of COVID-19. Based on the Chronic method, 135 participants screened positive for a probable depressive disorder, whereas 47 were below the screening threshold. Among participants screening positive, the mean age was 35.47 ± 6.56 years old, with a median of 35 years old (IQR: 30–40); 77.8% (n = 105) were women and 22.2% (n = 30) were men. A history of COVID-19 was reported by 79.3% (n = 107). Regarding marital status, 48.1% (n = 65) were single, 35.6% (n = 48) were married, and 16.3% (n = 22) were cohabiting. Nursing personnel represented 28.9% (n = 39), administrative staff 24.4% (n = 33), family physicians 15.6% (n = 21), and resident physicians 9.6% (n = 13). Monthly income was MXN 5,001–10,000 for 54.8% (n = 74), >MXN 10,000 for 36.3% (n = 49), and <MXN 5,000 for 8.9% (n = 12). Among the 47 participants below the screening threshold, the mean age was 36.60 ± 9.20 years old and the median was 35 years old (IQR: 30–41); 72.3% (n = 34) were women and 68.1% (n = 32) reported a history of COVID-19.

Distribution of GHQ-12 Scores Across Scoring Methods

Visual inspection of the score distributions provided an additional context for the differences observed across the GHQ-12 classifications (Figure 1). Under Likert scoring, most observations were concentrated around and above the corresponding screening threshold. For Standard scoring, the distribution was particularly informative because the two predefined cut-offs intersected different regions of the same score distribution, with a substantial concentration of observations between them. Thus, applying the alternative thresholds resulted in markedly different classifications without any change in the underlying Standard scores. For Chronic scoring, the cut-off was located within the main concentration of the distribution, leaving a large proportion of observations above the screening threshold. Taken together, the distributions illustrate how the interpretation of GHQ-12 results is influenced not only by the scoring method but also by the threshold selected for classification. Distribution of GHQ-12 scores according to the three scoring methods among the 182 healthcare workers. (A) Likert scoring (0–36), with the screening threshold at ≥12; (B) Standard scoring (0–12), showing the ≥3 threshold derived from the Colombian validation and the ≥6 threshold used for the Standard classification; and (C) Chronic scoring (0–12), with the screening threshold at ≥6. Vertical lines indicate the corresponding cut-off points.

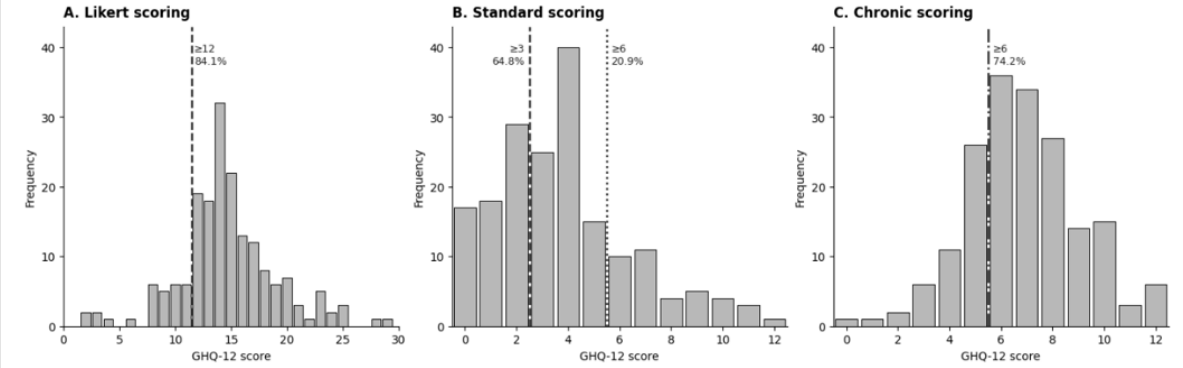

Figure 1: Distribution of GHQ-12 Scores According to the Likert, Standard, and Chronic Scoring Methods.

Concordance Analysis Across GHQ-12 Scoring Classifications

Pairwise concordance varied across the GHQ-12 classifications (Table 1). The greatest agreement beyond chance was observed between the Likert and Chronic classifications, with a Cohen's κ of 0.607, whereas concordance involving the Standard ≥6 classification was consistently lower. The additional Standard classification based on the Colombian cut-off showed intermediate concordance with both the Likert and Chronic classifications. The two classifications derived from the Standard scoring method showed a distinctive pattern because they apply different thresholds to the same underlying score. Consequently, participants meeting the ≥6 criterion necessarily also met the ≥3 criterion, while discordance was restricted to scores between these thresholds. Overall, these findings indicate that classification concordance depends on both the scoring approach and the cut-off applied, despite all classifications being derived from the same GHQ-12 responses. Observed agreement represents the number and percentage of participants classified concordantly by both classifications in each pair. Cohen's κ was used to quantify agreement beyond that expected by chance. Standard ≥3 corresponds to the additional cut-off derived from the Colombian validation. All analyses included 182 participants.

Table 1: Pairwise Concordance Between GHQ-12 Scoring Classifications.

GHQ-12 classifications	Observed agreement, n (%)	Cohen's κ	p-value
Likert ≥12 vs Standard ≥6	67 (36.8)	0.095	0.003
Likert ≥12 vs Standard ≥3	135 (74.2)	0.353	<.001
Likert ≥12 vs Chronic ≥6	158 (86.8)	0.607	<.001
Standard ≥6 vs Standard ≥3	102 (56.0)	0.25	<.001
Standard ≥6 vs Chronic ≥6	85 (46.7)	0.168	<.001
Standard ≥3 vs Chronic ≥6	131 (72.0)	0.346	<.001

Discussion

The burden of impaired emotional well-being observed in our population was higher than that reported in several studies of primary healthcare workers during the pandemic [3,4] and remained substantial when compared with more recent post-pandemic evidence. Liu et al. reported depressive symptoms in 50.7% and anxiety symptoms in 26.4% of primary healthcare workers in China during the post-pandemic period [14]. Although these outcomes were assessed with different instruments and cannot be directly equated with GHQ-12 classifications, our findings indicate a greater burden of psychological distress than that reported for several primary care populations. Together with longitudinal evidence showing persistent mental health problems among healthcare workers [2,5], these findings suggest that the end of the acute pandemic period did not necessarily coincide with recovery of healthcare workers' emotional well-being. The magnitude of this burden, however, depended strongly on how the GHQ-12 was scored and classified. Likert, the Colombian Standard threshold, and Chronic scoring identified substantially more affected workers than the more restrictive Standard classification. This variability is consistent with previous evidence showing that GHQ-12 estimates are sensitive to both scoring procedure and cut-off [12,13].

Donath, comparing three GHQ-12 scoring methods in an Australian population, found differences in discriminatory performance and in the optimal thresholds according to the scoring procedure used [15]. Our findings therefore suggest that differences between reported GHQ-12 estimates may reflect not only variation in emotional well-being between populations but also in methodological decisions concerning how questionnaire responses are transformed into screening classifications. This effect was particularly evident when the two Standard thresholds were applied to the same score distribution. Because the questionnaire responses and scoring algorithm were identical, the marked difference between these classifications resulted exclusively from the selected cut-off. Goldberg et al., analysing GHQ data from 15 centres, similarly demonstrated that the optimal threshold varies between settings and is related to the underlying prevalence of psychiatric morbidity [16].

Our findings provide a direct illustration of this problem: moving the threshold within the same Standard score distribution substantially changed the number of workers classified as having psychological distress. The score distributions help explain why these differences occurred. Psychological distress was distributed along a continuum rather than forming two clearly separated groups, and a considerable number of participants had scores located between the alternative Standard thresholds. Comotti et al., in a psychometric evaluation of the GHQ-12 among healthcare workers, also showed that information on psychological impairment extends beyond a simple positive/negative classification [17]. Examining the underlying score distribution therefore provides information that is lost through dichotomisation and, in our population, showed directly why changing the cut-off resulted in markedly different screening estimates.

The Chronic classification provides an additional perspective. Goodchild and Duncan-Jones developed this scoring approach to address the possibility that persistent symptoms may be overlooked when respondents consider pathological experiences to be "no more than usual" [18]. Its behaviour in our population may therefore be relevant after a prolonged period of pandemic-related disruption, during which some psychological symptoms could have become part of workers perceived usual state. This offers a plausible explanation for the greater burden identified by Chronic scoring compared with the Standard criterion. Nevertheless, this interpretation does not establish chronic psychological morbidity, because the cross-sectional design cannot determine symptom duration. The concordance analysis further demonstrated that the alternative classifications were not interchangeable. Likert and Chronic scoring showed the closest concordance, whereas agreement involving the restrictive Standard classification was considerably weaker. Piccinelli et al. compared conventional, Likert, and Chronic GHQ scoring in primary care and found broadly similar screening performance across the three approaches, with sensitivity ranging from 71% to 75% and specificity from 73% to 76% [19].

Moreover, our findings add an important distinction: similar screening performance does not necessarily mean that different methods identify the same individuals. This was particularly evident for the two Standard thresholds, where disagreement resulted solely from the selected cut-off. Despite this methodological variability, the overall pattern indicates that the impaired emotional well-being remains relevant among primary healthcare workers after the pandemic. These findings represent screening outcomes rather than diagnoses of psychiatric disorders, but the consistently elevated burden across several GHQ-12 approaches warrants attention. Given the relationship between healthcare worker well-being, patient safety, and quality of care [7,8], continued assessment of staff emotional well-being remains important in primary care. At the same time, comparisons between populations require explicit reporting of the scoring method and cut-off used, as these decisions can substantially influence both, the estimated magnitude of psychological distress and the individuals identified.

Limitations and Applications

This study has several strengths. It provides post-pandemic evidence on emotional well-being among healthcare workers in a primary healthcare setting, an area in which evidence remains more limited than in hospital-based populations. The inclusion of different occupational groups provides a broader representation of the primary care workforce rather than restricting the assessment to physicians or nurses. A further strength is the analysis of the GHQ-12 using three scoring methods and alternative validated thresholds. Examining both score distributions and concordance between classifications allowed us to determine not only how the estimated burden changed according to the analytical approach, but also whether the different classifications identified the same individuals. This provides a more comprehensive interpretation of GHQ-12 screening results than relying on a single scoring method or cut-off. Several limitations should also be considered. The cross-sectional design provides a snapshot of emotional well-being and does not allow changes from the pandemic to the post-pandemic period, symptom persistence, or causal relationships to be established.

The study was conducted in a single primary healthcare unit, which limits the generalisability of the findings to other healthcare settings and populations. Although several occupational groups were represented, some categories included few participants, limiting interpretation at the occupational level. The GHQ-12 is a screening instrument rather than a diagnostic assessment; consequently, positive classifications indicate probable psychological morbidity and should not be interpreted as psychiatric diagnoses. Finally, the substantial variation observed across scoring methods and cut-offs demonstrates that estimates of psychological distress are sensitive to the classification approach selected. Although this represents an important finding of the study, it should also be considered when comparing our results with studies using different GHQ-12 scoring procedures or thresholds.

Conclusion

The GHQ-12 can be used to assess emotional well-being among healthcare workers in primary healthcare settings, including during the post-pandemic period. Our findings show that the same questionnaire responses can produce substantially different estimates of psychological distress depending on the scoring method and cut-off applied. The differences observed in score distributions and the concordance analysis between classifications indicate that these approaches should not be considered interchangeable. The instrument can therefore be applied in primary care for population-based assessment and screening of healthcare workers, provided that the scoring method and cut-off are defined according to the purpose of the assessment and are explicitly reported.

When the objective is descriptive or epidemiological, analysing the score distribution together with categorical classifications provides a more complete representation of emotional well-being and

facilitates comparisons between populations. When the GHQ-12 is used for screening, positive results should be interpreted as indicating the need for further assessment rather than an evidence of a psychiatric diagnosis. Our findings also demonstrate the importance of maintaining the same scoring and classification criteria when the GHQ-12 is used for comparisons between groups, settings, or periods, since changing the cut-off can substantially alter both, the estimated frequency of psychological distress, and the individuals identified. In primary healthcare services, the GHQ-12 may therefore provide a brief and standardised approach to identifying psychological distress among healthcare workers and informing subsequent assessment or support. Its value depends not on a single scoring method or universal threshold, but on consistent application appropriate to the population and purpose of assessment.

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Competing Interests

"Authors have declared that no competing interests exist."

Authors' Contributions

All authors contributed to conceptualization (ideas, formulation, or development of research goals and objectives), formal analysis (application of statistical, mathematical, computational, or other formal techniques to analyse or synthesize study data), writing - original draft (preparation, creation, and/or presentation of the published work, specifically writing the initial draft), writing - review and editing (preparation, creation, and/or presentation of the published work by the research group, specifically critical review, commentary, or revisions, including pre- or post-publication stages), and visualization (preparation, creation, and/or presentation of the published work, specifically data visualization/presentation). Anguiano Velázquez Tabata Gabriela and López Hernández Daniel, in addition to the above, contributed to project administration (responsibility for managing and coordinating the planning and execution of the research activity), investigation (development of a research process, specifically experiments or data collection/testing), methodology (development or design of methodology, creation of models), supervision (responsibility for supervision and leadership in the planning and execution of the research activity, including external mentoring), and validation (verification, whether as part of the activity or separately, of the overall replicability/reproducibility of the results/experiments and other research outcomes).

Disclaimer

Authors hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text-to-image generators have been used during writing or editing of manuscripts.

Consent

The study was conducted using medical records, and no informed consent was obtained. The handling of the information was approved by the ethics committee, ensuring compliance with the appropriate ethical standards.

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