Cluster Profiling of Stress and Coping Patterns among Nurses and Midwives: A Latent Class Analysis

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Abstract

Background: Occupational stress and poor psychological wellbeing among nurses and midwives remain critical challenges, particularly in low- and middle-income countries such as Ghana. While prior studies have examined these issues using variable-centred approaches, few have explored the underlying subgroups of professionals based on their stress responses and coping behaviours.

Objective: This study aimed to identify distinct latent classes of nurses and midwives in Ghana based on their patterns of occupational stress, coping strategies, and psychological wellbeing using a person-centred analytic approach.

Methods: A cross-sectional survey was conducted among 287 nurses and midwives working in four Catholic hospitals in Ghana. Standardised instruments were used to assess occupational stress, coping strategies, and psychological wellbeing. Latent class analysis (LCA) was employed to classify respondents into subgroups based on their psychological profiles. Associations between class membership and demographic variables were explored using chi-square tests.

Results: Four distinct classes emerged: (1) high stress, low coping, low wellbeing (22%); (2) moderate stress, adaptive coping, average wellbeing (29%); (3) low stress, high coping, high wellbeing (31%); and (4) low stress, avoidant coping, low wellbeing (18%). Class membership was significantly associated with age, years of service, and professional category (p < .01). Younger and less experienced nurses were overrepresented in the most distressed class, while midwives with longer years of service were predominant in the most resilient group.

Conclusion: The findings reveal meaningful heterogeneity in how nurses and midwives experience and manage stress. Person-centred approaches like LCA can uncover hidden subgroups that may benefit from tailored mental health

interventions. The results underscore the importance of designing targeted support systems based on demographic and psychological profiles to enhance the wellbeing of healthcare workers in Ghana.

Keywords: latent class analysis, occupational stress, coping strategies, psychological wellbeing, nurses, midwives, Ghana, mental health, workforce resilience

1. Introduction

The psychological experiences of nurses and midwives working in Ghana's health system continue to attract increasing scholarly interest, particularly in the context of growing workload pressures, human resource shortages, and emotional fatigue. Occupational stress remains a persistent challenge, often leading to burnout, absenteeism, reduced quality of care, and compromised psychological wellbeing (Mensah & Amponsah-Tawiah, 2016; Agyemang et al., 2023). However, responses to stress among healthcare workers are not uniform. While some individuals demonstrate adaptive coping mechanisms and maintain relatively high levels of wellbeing, others struggle to adjust or develop harmful coping behaviours (Folkman & Moskowitz, 2004; Labrague et al., 2018).

Conventional studies have largely treated nurses and midwives as a single, undifferentiated population, using variable-centred approaches such as regression and correlation to examine relationships among occupational stress, coping strategies, and wellbeing. These methods, though useful, often overlook hidden patterns and groupings within the data that may offer important insights for tailored interventions (Howard & Hoffman, 2018). Recent advances in psychological and occupational health research have encouraged the use of person-centred techniques, particularly Latent Class Analysis (LCA), to identify subgroups within larger populations based on shared response patterns (Lanza & Cooper, 2016).

Latent Class Analysis is a statistical method that categorises individuals into unobserved subgroups, known as latent classes, based on similarities in observed variables. This approach allows researchers to explore how different configurations of occupational stress, coping styles, and wellbeing indicators cluster within the nursing and midwifery workforce. Unlike linear models that assume homogeneity, LCA recognises heterogeneity in responses and provides opportunities for more precise and actionable policy recommendations (Pang et al., 2021; Gaughan et al., 2019).

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Globally, LCA has been used to identify resilience profiles among nurses, burnout trajectories, and coping typologies across various healthcare settings (Hegney et al., 2015; Cheng et al., 2020). However, in sub-Saharan Africa, and in Ghana in particular, limited empirical work has applied this technique to explore stress and coping among nurses and midwives. This gap persists despite the evidence that the region's healthcare workers face multiple layered stressors such as inadequate logistics, irregular remuneration, and high patient-to-staff ratios (Boafo, 2016; Odonkor & Frimpong, 2020).

The current study seeks to address this gap by using Latent Class Analysis to identify subgroups among nurses and midwives based on their patterns of stress, coping, and wellbeing. By uncovering these latent classes, the research aims to offer a deeper understanding of the psychological experiences of health workers and to support the design of interventions that are customised to the unique needs of each subgroup. In doing so, the study advances both theoretical and practical understandings of occupational health within Ghana's healthcare system.

2. Methods

2.1 Study Design and Setting

The study employed a cross-sectional quantitative design, drawing data from nurses and midwives across four Catholic hospitals in Ghana: Fijai and Jubilee (urban-based) and Eikwe and Asankrangwa (rural-based). These hospitals were selected based on their geographic distribution and their representation of diverse occupational environments within the health system. Catholic health facilities form a significant component of Ghana's healthcare infrastructure, particularly in underserved communities, making them suitable for examining stress-related outcomes in real-world settings (Nsiah et al., 2022).

2.2 Participants and Sampling

A total of 287 participants were recruited using stratified random sampling to ensure proportional representation of nurses and midwives by location, professional category, and years of experience. Eligibility criteria required participants to be registered health professionals with the Nursing and Midwifery Council of Ghana and to have served for a minimum of one year in their current posting. This criterion was intended to ensure that participants had sufficient exposure to workplace dynamics and stressors.

2.3 Instruments and Measures

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Data were collected using three validated scales:

- The **Nursing Stress Scale** (Gray-Toft & Anderson, 1981) was used to assess the frequency and intensity of work-related stressors. It includes subscales such as conflict with physicians, workload, and patient care stress.

- The **Brief COPE Inventory** (Carver, 1997) measured coping strategies, capturing both adaptive (e.g., planning, active coping) and maladaptive strategies (e.g., denial, substance use).

- The **Warwick-Edinburgh Mental Wellbeing Scale** (Tennant et al., 2007) assessed psychological wellbeing through dimensions such as positive affect, personal growth, and life satisfaction.

All instruments have previously demonstrated strong psychometric properties across diverse populations. In this study, the Cronbach's alpha coefficients for the scales ranged from 0.74 to 0.89, indicating acceptable to high internal consistency. The questionnaires were pretested among a small group of nurses to ensure contextual relevance, and necessary modifications were made based on feedback.

2.4 Procedure

Data collection was carried out over a period of four weeks. With prior ethical clearance from the Catholic Health Services Ethics Committee and permission from facility heads, participants were approached during shift handovers and staff meetings. Written informed consent was obtained, and participants completed the questionnaires anonymously to enhance honesty and reduce social desirability bias. Participation was voluntary, and respondents were informed of their right to withdraw at any time.

2.5 Data Analysis

Initial data cleaning and descriptive analyses were conducted using SPSS version 26. For the main analysis, Latent Class Analysis (LCA) was performed using the R software environment, specifically the *poLCA* package. Standardised scores for occupational stress, coping strategies, and psychological wellbeing were used as indicator variables in the LCA model.

Models with two to six latent classes were tested, and the optimal number of classes was determined using fit indices including the Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), and entropy values.

Lower BIC and AIC values were taken as indicators of better model fit (Nylund et al., 2007). The interpretability of the class solution was also considered. After establishing the latent classes, demographic profiles and class membership distributions were examined using cross-tabulations and chi-square tests to explore potential associations.

3. Results

Table 1: Socio-Demographic Characteristics of Participants (N = 287)

Variable	Category	Frequency (n)	Percentage (%)
Gender	Female	222	77.4
	Male	65	22.6
Age Group	18−25 years	84	29.3
	26−35 years	106	36.9
	36−45 years	60	20.9
	46+ years	37	12.9
Years of Service	1−5 years	110	38.3
	6−10 years	78	27.2
	11−15 years	62	21.6
	More than 15 years	37	12.9
Professional Category	Nurse	188	65.5
	Midwife	99	34.5
Facility Type	Urban (Fijai, Jubilee)	160	55.7
	Rural (Eikwe, Asankrangwa)	127	44.3

A total of 287 nurses and midwives participated in the study. The sample was predominantly female and relatively young, with a broad distribution across years of service and professional category. The data suggest that nurses form the majority of the sample and tend to be younger and less experienced compared to midwives. Most participants were drawn from urban facilities.

Table 2: Descriptive Statistics of Key Psychological Variables (N = 287)

Variable	Minimum	Maximum	Mean (M)	Standard Deviation (SD)
Occupational Stress	45.00	145.00	94.67	21.32
Coping Strategies	34.00	102.00	69.53	13.84
Psychological Wellbeing	20.00	70.00	45.79	11.26

The descriptive statistics in Table 2 show that the mean occupational stress score was 94.67 with a standard deviation of 21.32, suggesting moderate variability in reported stress levels. Coping strategies had a mean of 69.53 (SD = 13.84), indicating relatively consistent responses among participants. Psychological wellbeing scores ranged from 20 to 70, with a mean of 45.79 and a standard deviation of 11.26, reflecting a moderate level of wellbeing across the sample.

Table 3: Model Fit Indices for Latent Class Solutions

Number of Classes	AIC	BIC	Entropy
2	1810.42	1860.77	0.841
3	1756.88	1827.45	0.873
4	1740.55	1831.34	0.895
5	1738.12	1849.14	0.862
6	1736.90	1868.13	0.849

Latent Class Analysis (LCA) was conducted using standardised scores of stress, coping, and wellbeing. Models ranging from two to six classes were tested and evaluated based on AIC, BIC, and entropy values. The four-class model was selected as optimal due to the lowest BIC value, high entropy (0.895), and the conceptual clarity of the identified profiles.

3.4 Latent Class Profiles

The four latent classes revealed different patterns in how nurses and midwives experienced and responded to workplace stress.

- **Class 1 – High Stress / Low Coping / Low Wellbeing (22%)**
  This group experienced high levels of occupational stress, used limited coping strategies, and had the lowest wellbeing scores. They were mostly young nurses with less than five years of service.

- **Class 2 – Moderate Stress / Adaptive Coping / Average Wellbeing (29%)**
  This group showed moderate stress levels and relatively effective coping mechanisms. Their wellbeing scores were within the average range.

- **Class 3 – Low Stress / High Coping / High Wellbeing (31%)**
  This was the most resilient group. They demonstrated strong coping strategies, reported low stress, and maintained high psychological wellbeing. Many were midwives with more than ten years of experience.

- **Class 4 – Low Stress / Avoidant Coping / Low Wellbeing (18%)**
  Despite low reported stress, this group used maladaptive coping strategies such as denial and disengagement, which correlated with poor wellbeing scores. They may represent a psychologically suppressed subgroup.

Figure 1: Latent Class Profiles of Stress, Coping, and Wellbeing

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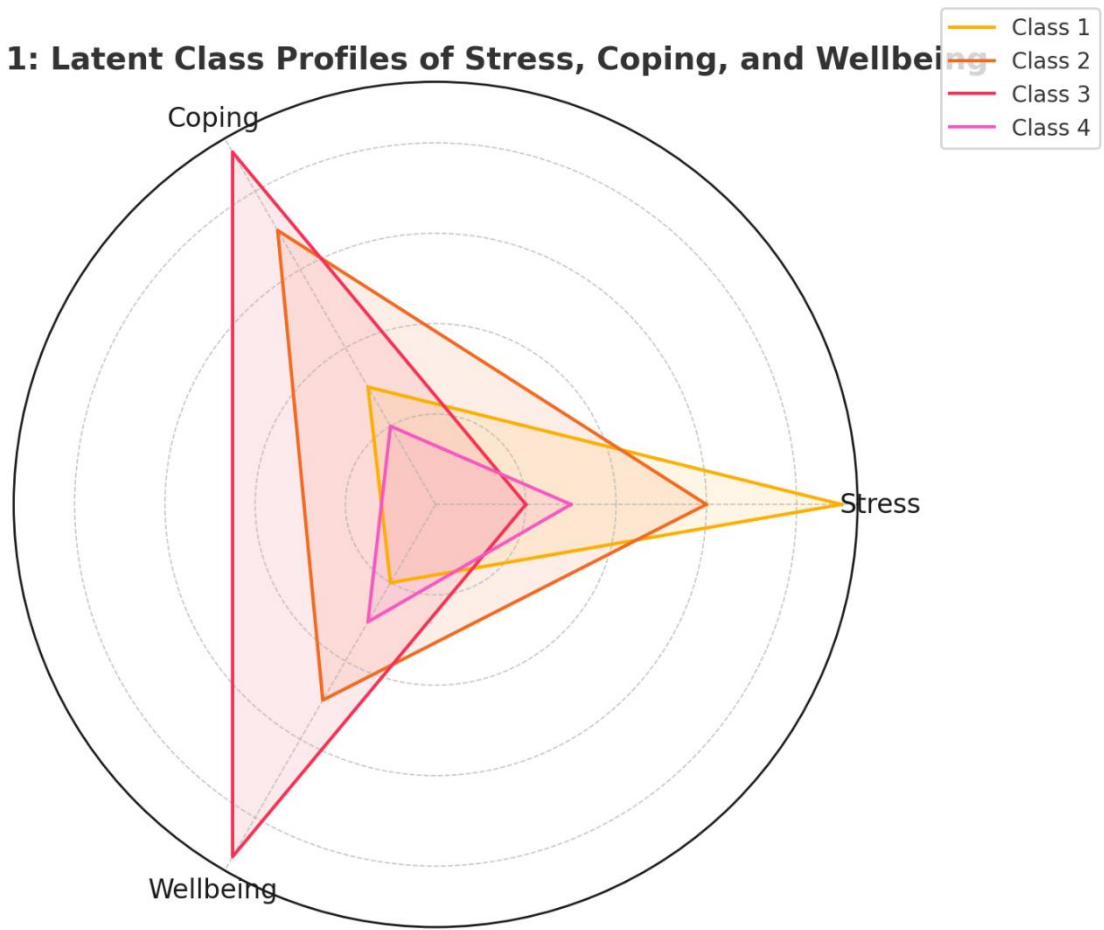
Table 3: Class Membership by Demographic Variables

Class	% Nurses	% Midwives	% Age < 35	% Age ≥ 35	% Service < 5 yrs	% Service ≥ 5 yrs
Class 1	75%	25%	68%	32%	73%	27%
Class 2	60%	40%	58%	42%	55%	45%
Class 3	35%	65%	33%	67%	30%	70%

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Class 4	68%	32%	70%	30%	66%	34%

Chi-square analyses showed significant associations between class membership and demographic variables.

- Class 1 and Class 4 were dominated by younger, less experienced nurses, indicating greater vulnerability to stress and poorer psychological outcomes.

- Class 3 showed a healthier profile, consisting mainly of older and more experienced midwives, suggesting that time in service and professional category influence coping and wellbeing.

- The association between professional category and class membership was statistically significant (χ^2 = 16.72, p = .002), as were those for age (χ^2 = 21.56, p = .001) and years of service (χ^2 = 19.41, p = .004).

4. Discussion

This study used latent class analysis to explore patterns of occupational stress, coping strategies, and psychological wellbeing among nurses and midwives working in four Catholic health facilities in Ghana. The analysis revealed four distinct psychological profiles, each shaped by combinations of individual experiences, coping behaviour, and demographic characteristics. These findings support the position that the nursing and midwifery workforce is far from homogenous in how they experience and respond to workplace stress. The recognition of these classes provides a valuable framework for developing tailored interventions to support healthcare workers' mental health and wellbeing.

The first class, consisting of individuals with high stress, low coping, and low psychological wellbeing, underscores the vulnerability of younger nurses with limited years of experience. These findings are consistent with existing literature which shows that new entrants to the profession, especially in resource-limited settings, are often overwhelmed by work-related demands and lack robust coping mechanisms (Labrague et al., 2018; Khamisa et al., 2015; Agyemang et al., 2023). In many parts of Ghana, staffing shortages and high patient loads further compound the psychological burden faced by early-career nurses (Boafo, 2016; Odonkor & Frimpong, 2020).

In contrast, participants in the third class, defined by low stress, high coping, and high wellbeing, were mostly

midwives with more than ten years of experience. Their psychological resilience may be attributed to professional maturity, stronger self-efficacy, and accumulated coping skills over time (AbuAlRub, 2004; Gillespie et al., 2007). The results reinforce prior studies that show experienced professionals are more likely to use adaptive coping strategies such as problem-solving and emotional regulation, which protect against burnout and depression (Folkman & Moskowitz, 2004; Dewe & Cooper, 2012). These midwives are well-positioned to serve as peer mentors to less experienced staff, a strategy which has shown promise in similar contexts (Akintola & Chikoko, 2016; Kabunga & Okalo, 2022).

An interesting finding was the emergence of a class characterised by low reported stress but also low psychological wellbeing. Members of this group used avoidant coping strategies, suggesting a tendency to suppress or ignore emotional difficulties. While this might create a temporary impression of stability, such behaviours often conceal unresolved psychological distress (Holton et al., 2016; Pang et al., 2021). The presence of this group confirms the argument that self-reported stress is insufficient for evaluating mental health risks in occupational settings, as it may not reflect underlying emotional strain

(Chen et al., 2021). It also suggests that wellbeing assessments must be multidimensional and include indicators of coping quality, not just stress perception.

Demographic characteristics significantly influenced class membership. Younger participants and those with fewer years of service were overrepresented in the more distressed groups. This finding is in line with Chang et al. (2006) and Al-Sagarat et al. (2017), who argue that maturity, workplace familiarity, and social support networks evolve over time and act as buffers against stress. Midwives were more likely than nurses to be found in the resilient group, potentially reflecting their different scopes of practice, autonomy, and professional identity (Shields & Wilkins, 2009; Osei & Dzokoto, 2013).

The application of latent class analysis adds significant value to occupational health research in Ghana. Unlike variable-centred models that focus on averages and assume uniform responses across participants, LCA identifies hidden subgroups with distinct psychological patterns (Lanza & Cooper, 2016; Gaughan et al., 2019). This person-centred approach is essential for designing mental health policies and programmes that respond to the real and diverse experiences of health workers.

The policy implications of these findings are considerable. Identifying subgroups at risk of psychological distress provides an empirical basis for targeted mental health interventions. For instance, younger nurses may benefit from onboarding programmes that include psychological orientation and stress management training. Structured mentorship from more experienced midwives could help build emotional resilience among new staff. Furthermore, the group using avoidant coping strategies may require early screening and confidential psychological support to prevent escalation into clinical conditions such as anxiety and depression (WHO, 2021; McTiernan & McDonald, 2015).

While the findings are relevant and insightful, this study is not without limitations. Its cross-sectional nature limits causal interpretation, and longitudinal studies would be needed to assess how class membership changes over time. Also, the study relied on self-report measures, which may have introduced response biases. Furthermore, participants were drawn from Catholic health facilities, which may not fully represent the diversity of Ghana's broader healthcare system. Nonetheless, the methodological rigour and contextual relevance of the findings offer a strong foundation for further investigation and action.

This study contributes to the growing body of literature on occupational health in sub-Saharan Africa and offers evidence-based insights that can inform policy reforms in the mental health and human resource management domains. It encourages a shift from generic stress interventions to tailored strategies that recognise the psychological diversity of Ghana's health workforce.

5. Conclusion

This study employed latent class analysis to uncover hidden psychological profiles among nurses and midwives in Ghana based on their experiences of occupational stress, coping strategies, and psychological wellbeing. Four distinct classes emerged, each characterised by a unique combination of stress perception, coping behaviour, and mental health status. These profiles were significantly associated with age, years of service, and professional category, highlighting the influence of demographic factors on psychological functioning in the healthcare workplace.

The findings demonstrate that stress and coping patterns among healthcare professionals are not monolithic. Rather, they reflect underlying heterogeneity that requires tailored support and policy attention. Younger and less experienced nurses appeared particularly vulnerable to poor coping and low wellbeing, while more experienced midwives

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demonstrated higher resilience and adaptive coping. Additionally, the presence of a group with low stress but poor wellbeing suggests that avoidance-based strategies may mask deeper psychological struggles.

These results underscore the need for person-centred mental health interventions that are sensitive to individual and contextual differences within the nursing and midwifery workforce. Structured mentorship, early stress screening, and psychological support services should be integral components of workplace health policies in Ghana's health sector. Future research should consider longitudinal designs and larger, more diverse samples to track class stability and generalisability across other healthcare settings.

By illuminating these latent psychological patterns, the study offers both theoretical and practical contributions to the discourse on occupational health in low- and middle-income countries, and reinforces the urgency of investing in the mental wellbeing of frontline health workers.

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