

Caring Under Pressure: A Mixed-Methods Study of Work-Related Stress Among Skilled Health Personnel Providing Maternity Care in Nigeria

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Abstract

Background

Nigeria bears the highest burden of maternal deaths globally; however, limited evidence exists on the work environments in which Skilled Health Personnel (SHPs) deliver maternity care and how these conditions shape care processes. Work-related stress (WRS), which arises when job demands exceed available resources, may undermine workforce wellbeing, care quality, and patient safety. Although workforce shortages and resource constraints are widely recognised challenges in LMICs, empirical evidence linking workplace stress to maternity service delivery remains limited. This study assessed the burden, drivers, consequences, and coping strategies associated with WRS among SHPs in Northern Nigeria.

Methods

We conducted a convergent mixed-methods study involving 194 SHPs from 48 public and private facilities in Kaduna, Bauchi, and Kwara States. Quantitative data were collected using the USDAW Workplace Stress Questionnaire, a single-item current stress measure, and a 1–10 stress severity scale and analysed using descriptive statistics and bivariate tests (Spearman's correlation, t-tests, and ANOVA). Qualitative data from 7 focus group discussions and 8 key informant interviews were thematically analysed.

Results

Overall, 76% (147/194) of SHPs reported current stress, and 73% (107/147) attributed their stress primarily to work-related factors. Workload pressures were prominent: 36.6% worked > 60 hours/week, and 24.7% saw > 40 patients/day. Frequently reported stressors were heavy workload (39.2%), overcrowding (32.5%), and lack of equipment (31.4%). Stress severity was strongly correlated with heavy workload ($r = 0.58$, $p < 0.01$) and inadequate breaks ($r = 0.50$, $p < 0.01$). Mean stress scores differed significantly by cadre ($F(12,181) = 2.58$, $p = 0.004$; $\eta^2 = 0.145$), with higher levels among junior cadres. Qualitative findings described physical and emotional strain and perceived impacts on consultation quality of provider–patient interactions. Most participants (88.1%) reported no formal workplace stress support systems.

Conclusion

WRS among SHPs providing maternity care in Northern Nigeria is widespread, driven by structural and organisational conditions. Addressing WRS through workload-responsive staffing, supportive supervision, and institutionalised psychosocial support should be integrated into maternal health system strengthening efforts. Strengthening workforce wellbeing may be critical for sustaining safe, responsive, and high-quality maternity care delivery in high-burden settings.

Introduction

Maternal and newborn mortality remain critical global health challenges, with significant disparities between high-income and low- and middle-income countries (LMICs). According to the World Health Organization (WHO), approximately 260,000 women died from pregnancy-related complications in 2023, with 95% of these deaths occurring in LMICs [1]. Similarly, 2.3 million neonatal deaths were recorded in 2022 [2]. To address these challenges, global initiatives including Every Woman Every Newborn Everywhere [3], implement solutions that aim to reduce maternal mortality to the Sustainable Development Goals (SDGs) targets of less than 70 deaths per 100,000 live births and neonatal mortality to below 12 per 1,000 live births by 2030 (SDGs 3.1 and 3.2) [4]. Achieving these targets requires expanding access to skilled birth attendance (SBA), improving healthcare infrastructure, and ensuring the availability of essential medicines and equipment.

Skilled Health Personnel (SHPs) are central to achieving skilled births and improving maternal and newborn outcomes. In line with the WHO definition, SHPs refer to maternal and newborn health professionals who are educated, trained, and regulated to meet national and international standards and are competent to provide evidence-based, respectful, and culturally appropriate care, facilitate physiological childbirth, and identify, manage, or refer complications. However, their ability to perform these roles depends on an enabling work environment with adequate resources, supportive supervision, and policies prioritising their well-being [5].

Despite their essential contributions, SHPs in LMICs face multiple occupational challenges, including work-related stress (WRS). Work-related stress is defined as the response people may have when presented with work demands and pressures that are not matched to their knowledge and abilities and which challenge their ability to cope [6]. The WHO recognises WRS as a key occupational health risk that contributes to burnout, job dissatisfaction, and workforce attrition [7]. Globally, up to 49% of healthcare workers experience burnout [8]. In the UK, 71% of General Practitioners report compassion fatigue [9]. Mental health support, work-life balance, and stress management policies are essential for sustaining a motivated workforce; however, such interventions remain limited in many LMICs [10].

In Nigeria, the incidence of WRS among healthcare workers is alarmingly high. Recent studies indicate that up to 65% of the surgical workforce reports moderate to severe WRS, driven by excessive workload, high cognitive demands, inadequate remuneration, poor infrastructure, limited

institutional support, and insecurity [11]. These system-level pressures have contributed to rising burnout and a worsening retention crisis, with increasing migration among SHPs, thereby threatening the sustainability and quality of maternal and newborn health services [12–14].

Over 9,000 healthcare professionals reportedly left Nigeria between 2016 and 2018, with approximately 74% of those remaining expressing an intention to emigrate [15]. This persistent brain drain has further strained the overstretched workforce, deepening the burden on those left behind and threatening the sustainability of the maternal and newborn health services.

Nigeria accounted for over one-quarter (28.5%) of all estimated global maternal deaths in 2023, with approximately 75,000 maternal deaths. The maternal mortality ratio (MMR) is 993 deaths per 100,000 live births, and neonatal mortality is 34 per 1,000 live births [16]. However, these national averages obscure substantial regional disparities, with maternal mortality ratios in Northern Nigeria nearly double those in the South (709 vs. 365 per 100,000 live births) [17]. These inequities highlight the urgent need to strengthen health system performance in high-burden regions. Beyond infrastructure and service expansion, sustained reductions in maternal mortality depend on the well-being and effectiveness of the health workforce.

To address these gaps, Nigeria has implemented several policies to strengthen maternal and newborn health services. One key initiative is the Midwives Service Scheme (MSS), launched in 2009 to deploy newly graduated, unemployed, and retired midwives to underserved rural communities to increase skilled birth attendance and reduce maternal mortality [18, 19]. Second, in 2024, the Federal Government of Nigeria launched the Maternal Mortality Reduction Innovation Initiative (MAMII), which aims to expand access to maternal health services, train healthcare workers, and improve resources in maternity units [20]. While these interventions can potentially contribute to improving service availability and access, they have largely neglected the welfare, working conditions, and systemic support of SHP. These factors are equally critical for improving maternal and newborn outcomes and ensuring workforce sustainability [21, 22].

Evidence is needed to inform policies and interventions that mitigate the effects of WRS on the delivery of maternal and newborn health services. This study addresses this gap by examining WRS among SHPs delivering maternity care in Northern Nigeria and situating stress experiences within the realities of routine service delivery. Moving beyond prevalence estimates, the mixed-methods design integrates quantitative and qualitative findings to provide deeper insight into how institutional, interpersonal, and workload-related stressors shape providers' well-being and influence maternity care processes. Specifically, this study aims to (i) describe the burden and perceived severity of work-related stress among SHPs, (ii) identify key structural, organizational, and relational stressors, (iii) examine the health and care delivery consequences associated with stress, and (iv) explore the coping strategies and support systems available to SHPs. The findings are intended to inform context-specific, system-level interventions that strengthen workforce support, improve care quality, and ultimately contribute to better maternal and newborn health outcomes in high-burden settings.

Methods

Study Design

A convergent mixed-methods design was employed; whereby quantitative and qualitative data were collected concurrently, analysed separately, and integrated during interpretation to provide complementary insights into work-related stress among SHPs.

Study Settings

The study was conducted in three states in Northern Nigeria: Kaduna (Northwest), Bauchi (Northeast), and Kwara (North-Central), selected based on accessibility, security, and representativeness. Within each state, three Local Government Areas (LGAs) were selected to capture sub-regional variations.

Study Population and Sampling

Data were collected from 48 functional health facilities that actively provided maternity services and routinely reported service data through DHIS2. These included 18 Primary Health Centres (PHCs), nine secondary facilities, three tertiary hospitals, and 18 private and faith-based facilities. Facility selection was conducted in collaboration with the State and LGA health authorities.

The study population comprised SHPs working in maternity units across selected facilities in Kaduna, Bauchi, and Kwara States, including doctors, midwives, nurses, and Community Health Extension Workers (CHEWs), who play a central role in primary-level maternity care in Nigeria [23].

Quantitative sampling

For the quantitative survey, a census of all eligible SHPs present during the data collection period was conducted at the selected facilities. The inclusion criteria required at least six months of experience in the current maternity unit. Within each selected facility, the participant information sheet was shared with all eligible SHPs through unit heads one week prior to the data collection. Recruitment targeted staff in antenatal clinics,

labour wards, postnatal wards, family planning units, and obstetric wards. Participation was voluntary. Non-participation primarily occurred due to workload constraints at the time of data collection.

Sample Size Calculation (Quantitative Component)

The sample size for the quantitative component was calculated using the formula for determining the sample size for cross-sectional studies [24].

$n = Z^2P(1-P)/d^2$. Where: **n** = required sample size

- **Z** = standard normal deviate at 95% confidence level = 1.96
- **P** = estimated prevalence (86.2%), based on a prior study in three high-volume hospitals in Lagos, Nigeria [25].
- **d** = margin of error (5%)

The calculated sample size was **185**, and a 5% non-response buffer was added, yielding a final sample size of **194**.

Data Collection tools

Quantitative data were collected using the Union of Shop, Distributive, and Allied Workers (USDAW) Workplace Stress Questionnaire [26]. The instrument assesses work-related stress across six domains: job demands (including workload), control over work, role clarity, managerial and peer support, workplace relationships, and organisational change. The USDAW questionnaire has demonstrated internal consistency in public sector and healthcare settings and aligns with the UK Health and Safety Executive (HSE) Management Standards for assessing workplace stress. It has also been applied in low- and middle-income countries, including healthcare settings in India, supporting its relevance in resource-constrained environments [27–29].

In addition to the USDAW domains, participants were asked whether they were currently experiencing stress (yes/no). All respondents were asked to rate their perceived stress severity on a scale of 1–10, where 1 indicated minimal stress and 10 indicated extreme stress. The sociodemographic and professional characteristics collected included age, gender, cadre, and years of experience.

Data were collected using a self-administered electronic questionnaire developed on the SurveyCTO platform and administered on study tablet devices.

Qualitative Sampling and Data Collection

Purposive sampling was used to recruit SHPs involved in maternity care at participating facilities. During the quantitative data collection, an additional participant information sheet outlining the qualitative component was distributed to eligible SHPs. Those who expressed interest and provided written informed consent were contacted and interviewed. The FGDs were stratified by cadre (doctors, nurses/midwives, and CHEWs) to encourage open discussion among professional peers, while maternity unit heads were purposively selected for key informant interviews.

The interview and focus group discussion guides were developed specifically for this study based on the study objectives and relevant literature. The interview guide is provided as Supplementary File 1.

Eight KIIs were conducted with maternity unit heads across different levels of care. Seven FGDs were conducted across the three states (three in Kaduna, two in Bauchi, and two in Kwara). Discussions were held in neutral, non-facility venues to ensure confidentiality and minimise workplace-related influences. Participants were provided with modest refreshments and reimbursement for transportation in accordance with ethical guidelines.

Interviews were conducted by the first author and trained research assistants who were not affiliated with facility management and had no supervisory relationship with participants. Data collection was conducted primarily in English; where necessary, participants expressed themselves in local languages, which were translated during transcription. The qualitative data collectors were fluent in both Hausa and English. Interviews were audio-recorded, transcribed verbatim, and anonymised prior to analysis. Reflexive field notes were maintained to enhance the study's trustworthiness. Data saturation was assessed iteratively and was reached when no new themes emerged from successive interviews and discussions.

Data Analysis

Quantitative data were analysed using SPSS version 28. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarise stress exposure and participant characteristics. Item-level responses from the USDAW questionnaire were reported using the original response categories ("Never", "Sometimes", "Often"). Current stress prevalence was calculated as the proportion of participants reporting active stress at the time of the survey. Among those who reported stress, work-attributed stress was defined as the proportion of those who identified work as the primary source. Mean severity scores were computed from the 1–10 self-rated scale.

Associations between stress scores and selected variables were examined using Spearman's correlation and one-way analysis of variance (ANOVA). Independent samples t-tests were used to compare mean stress scores by sex. Where significant differences were observed, post-hoc tests were conducted to identify specific group differences.

Qualitative data were analysed using NVivo 12, following Braun and Clarke's six-step thematic analysis framework [30]. Coding was conducted inductively, with themes being iteratively refined and mapped to the study objectives. The integration of quantitative and qualitative findings occurred at the interpretation stage.

Ethical Considerations

Ethical approval

for this study was obtained from the Liverpool School of Tropical Medicine Research Ethics Committee, the National Health Research Ethics Committee of Nigeria, and the relevant State Health Research Ethics Committees. Written informed consent was obtained from all participants prior to data collection. Participation was voluntary, and confidentiality was ensured through anonymisation and secure data handling procedures. This study was conducted in accordance with the principles of the Declaration of Helsinki.

Results

Participant Characteristics

A total of 194 SHPs participated in this study. Over half were Nurses and Midwives (51.0%), followed by CHEWs and CHOs (30.9%). Residents accounted for 7.2%, while House Officers and Medical Officers each represented 4.6% of the sample. Consultants comprised 1.5% of the participants. The workforce was predominantly female (84%). A more detailed breakdown of the professional categories is provided in Supplementary Table 1.

[Table 1 here]

Table 1
Distribution of Skilled Health Personnel by Cadre and Sex (N = 194)

Cadre	Males	Females	Total (n)	Percentage (%)
Nurses and Midwives [†]	5	94	99	51.0
CHEWs and CHOs [‡]	11	49	60	30.9
House Officers	3	6	9	4.6
Medical Officers (MO and SMO)	6	3	9	4.6
Residents (JR and SR)	4	10	14	7.2
Consultants (Obstetricians & Gynaecologists)	2	1	3	1.5

[†] Includes registered nurses, registered midwives, nurse-midwives, and BSc/NYSC nurses

[‡] Includes Junior and Senior CHEW and Community Health Officers

Work Settings and Work Patterns of Study Participants

Most SHPs were deployed in labour and delivery units (n = 83, 43.3%) and antenatal clinics (n = 67, 34.5%). The remainder worked in postnatal clinics, family planning units, gynaecological emergency units, and antenatal wards.

Workload indicators demonstrate substantial service demands. Most SHPs reported working 48–60 hours per week (n = 79, 40.7%), while 36.6% (n = 71) worked more than 60 hours weekly. In terms of patient volume, 33.5% (n = 65) attended to 20–40 patients daily, and nearly one-quarter (24.7%, n = 48) managed more than 40 patients per day. Night duties were also frequent, with 40.2% (n = 78) reporting 7-14-night shifts per month. The detailed workload distributions are presented in Table 2.

[Table 2 here]

Table 2
Work Patterns of Skilled Health Personnel (N = 194)

Work Pattern indicator	Category	Numbers	Percentage
Number of Working Hours /Week	< 48hrs	44	22.7
	48–<60hrs	79	40.7
	> 60hrs	71	36.6
Number of Patients Seen /Day	< 20	81	41.8
	20–<40	65	33.5
	> 40	48	24.7
Number of Night Duties /Month	< 7 days	109	56.2
	7–14 days	78	40.2
	> 14 days	7	3.6

Prevalence and Perceived Severity of Work-Related Stress

Work-related stress was assessed using the USDAW Workplace Stress Questionnaire, supplemented by a single-item measure of current stress and a self-rated severity scale (0–10) completed by all the participants.

Across the USDAW domains, workload and organisational factors emerged as the most prominent stressors. Within the work processes domain, heavy workload was the most frequently reported stressor (39.2% reporting “often”), followed by inadequate breaks (23.7%). In the work environment domain, overcrowding (32.5%) and lack of equipment (31.4%) were the most reported. Regarding workplace relationships, harassment from patients or relatives (21.6%) and lack of communication from management (17.0%) were the leading stressors (Table 3).

Overall, 76% (147/194) of the SHPs reported experiencing stress at the time of the survey. Among those who reported stress, 73% attributed their stress primarily to work-related factors. Among respondents who completed the severity scale (n = 189), the mean stress rating was 5.6 (SD 2.35) on a 10-point scale.

Despite this burden, 88.1% of SHPs reported no access to formal stress support systems. However, 51.5% of the respondents reported being completely satisfied with their jobs.

[Table 3 here]

Table 3
Most Frequently Reported Workplace Stressors (“Often”) Among SHPs

Category	Stressor	% Reporting Often
Work Processes	Heavy workload	39.2
Work Processes	Inadequate breaks	23.7
Work Environment	Overcrowding	32.5
Work Environment	Lack of equipment	31.4
Workplace Relationships	Harassment (patients/relatives)	21.6
Workplace Relationships	Lack of communication from management	17.0
<i>Note: Percentages represent the proportion of SHPs reporting that the stressor occurred “often”. Full item-level distributions are presented in Supplementary Table S2.</i>		

One-way ANOVA demonstrated no statistically significant differences in mean stress scores across age groups ($F = 1.06$, $p = 0.395$), maternity unit type ($F = 1.29$, $p = 0.255$), or years since their qualification ($F = 0.42$, $p = 0.742$).

In contrast, stress levels differed significantly across professional cadres ($F(12, 181) = 2.58$, $p = 0.004$), with a large effect size ($\eta^2 = 0.145$). Post hoc analysis indicated significantly higher stress levels among junior and transitional clinical cadres, particularly House Officers/NYSC doctors and Junior Registrars, compared with several nursing and community health cadres. Differences were also observed between junior and senior medical ranks. The detailed pairwise comparisons are presented in Supplementary Table S3.

Correlation Between Stress Levels and Workplace Factors

Spearman’s correlation analysis indicated that perceived stress was most strongly associated with work process-related factors. Heavy workload demonstrated the strongest positive correlation with stress ($r = 0.58$, $p < 0.01$), followed by inadequate breaks ($r = 0.50$, $p < 0.01$). Unfair distribution of

work ($r = 0.38, p < 0.01$) and shift work ($r = 0.26, p < 0.01$) also showed significant positive correlations.

Within the work environment domain, noise ($r = 0.32, p < 0.01$) and overcrowding ($r = 0.29, p < 0.01$) were moderately correlated with high stress levels. Poor maintenance of equipment ($r = 0.25, p < 0.01$) and lack of equipment ($r = 0.19, p < 0.01$) showed weaker but statistically significant relationships.

In the workplace relationships domain, harassment from patients or relatives ($r = 0.36, p < 0.01$) and lack of communication from management ($r = 0.33, p < 0.01$) were moderately associated with stress. Other relational factors showed weaker but significant correlations.

Across domains, workload-related factors demonstrated stronger correlations with stress than environmental or relational variables. The detailed correlation matrices are presented in Supplementary Tables S4–S6.

Consequences of Work-Related Stress: Physical and Psychological Symptoms

Several physical and psychological symptoms consistent with occupational strain were reported. The most frequently reported symptoms occurring “often” were backache (34.0%), headache (29.4%), sleeplessness (19.1%), and neck pain (17.0%).

Psychological symptoms were also evident, with irritability (10.8%), anxiety (10.8%), and inability to concentrate (11.3%) reported as occurring “often.” The full symptom distributions are presented in Table 4.

[Table 4 here]

Table 4 Physical and Psychological Symptoms Associated with Work-Related Stress Among SHPs in Nigeria			
Symptom	Never	Sometimes	Often
Headache	22 (11.3)	115 (59.3)	57 (29.4)
Anxiety	93 (47.9)	80 (41.2)	21 (10.8)
Chest Pain/Palpitations	111 (57.2)	69 (35.9)	14 (7.2)
Indigestion/Nausea	125 (64.4)	54 (27.8)	15 (7.7)
Sleeplessness	69 (35.6)	88 (45.5)	37 (19.1)
Irritability	100 (51.5)	73 (37.6)	21 (10.8)
Backache	39 (20.1)	89 (45.9)	66 (34.0)
Neck Pain	72 (37.1)	89 (45.9)	33 (17.0)
Stomach Disorders	119 (61.3)	67 (34.5)	8 (4.1)
Inability to Concentrate	102 (52.6)	70 (36.1)	22 (11.3)

Qualitative Findings: Lived Experiences of Work-Related Stress

The qualitative findings describe how SHPs experience and respond to the WRS within maternity care settings. Five interrelated themes emerged: (1) workload pressures and role strain, (2) resource constraints and organisational dysfunction, (3) relational tensions and hierarchical conflict, (4) physical, emotional, and professional consequences, and (5) coping strategies, support systems, and retention drivers.

Workload pressures and role strain

Participants consistently described excessive workload as the dominant source of stress, driven by understaffing, high patient volumes, and extended shifts, especially during afternoon and night shifts. One tertiary-level unit head explained how workload intensity varied by shift and staffing patterns

“Morning hours you have a full complement of staff. But in the afternoon and night, you may only see two nurses in the labour room manning 10–12 patients. The stress is much more in the afternoon and evening shifts.” (Male Head of O&G, Tertiary Centre)

Workload stress was amplified by role strain, as SHPs reported taking on duties beyond their clinical scope due to limited ancillary staff. A nurse-midwife described the cumulative burden of clinical care and logistics tasks as follows:

“In our facility, even the attendant, we don’t have enough... imagine you will be the one to take patients to the theatre, go to the lab to collect blood, and still take it back to the theatre.” (Female Nurse Midwife, General Hospital)

Workforce gaps caused by staff absences, including maternity leave, were also described as stress-provoking and sometimes created tension among colleagues:

"...Almost half of the residents are on maternity leave, and more are going now. So that puts a lot of stress on those who are not pregnant and the males... The workload is much in this environment." (Female HOD, O&G, Tertiary Centre)

These accounts align with the quantitative pattern showing heavy workload and inadequate breaks as frequently reported stressors.

Resource constraints and organisational dysfunction

Participants described resource shortages and operational bottlenecks as routine, with staff often expected to deliver care without reliable equipment, supplies or functional systems. Several SHPs perceived managerial engagement as inconsistent, with resources appearing mainly during visits by external officials

"Management is like a ghost... they come, inspect, and suddenly everything's available, but not for everyday practice." (Male Doctor, General Hospital)

A related concern was the perception that leadership prioritised revenue generation over staff welfare or safe practice.

"Their only concern is how much revenue your unit generates. But for you that are working there... they don't care." (Female Nurse, Tertiary)

Relational tensions and hierarchical conflict

Stress was also shaped by relational dynamics within maternity teams and across professional hierarchies. Junior staff described intimidation and disrespect as routine experiences that undermined morale and teamwork.

"Some senior doctors will insult you... and honestly, once my senior insults me or intimidates me, the patient suffers." (Male Doctor Intern, Tertiary Centre)

Tensions between cadres were commonly reported, particularly regarding communication norms and perceived disrespect. A nurse described an encounter with a junior doctor that escalated the workplace strain:

"...Some of the doctors take themselves so high (proud)... A house officer came to do a procedure, didn't even greet us, but later needed our help. We had to remind him about basic courtesy." (Female Nurse, General Hospital)

Patient-related hostility was another major relational stressor, with SHPs describing verbal aggression and threats from patients or relatives, particularly during delays:

"If you don't attend to a patient immediately, there will be chaos. Even with security, it doesn't help." (Female Nurse, General Hospital)

"Some men even say they will beat you. We usually have such incidents." (Female Head of Maternity, General Hospital)

Physical, emotional, and professional consequences of stress

Participants described stress as physically depleting and emotionally draining, often worsened by missed meals, long shifts, and lack of protected breaks. Several accounts highlighted dizziness and hypoglycaemia episodes linked to continuous work without food

"I remember when I passed out (from hypoglycaemia) ... I'm always with Coke, morning review, I am always with my tea, on rounds I am always with my food." (Female Intern, Tertiary Hospital)

"Yes, there was dizziness... I had to rush to get her a drink because there was not enough staff, and she had to continue working." (Female Head of ANC, General Hospital)

Some participants described severe consequences with no perceived organisational empathy or support:

"...I started spotting due to the workload, running up and down. I was rushed to another hospital, and when I called to inform them, their only response was 'why didn't you come to our facility?' No empathy." (Female Nurse, General Hospital)

Stress was also described as affecting care processes through fatigue, reduced concentration, and hurried interactions. A medical officer explained how exhaustion shaped patient engagement:

"Most times you are tired... you just ask, 'Okay, what is your problem?' You write one or two lines, and that's it. In the long run, it affects the patients." (Male Medical Officer, General Hospital)

Emotional exhaustion also contributed to irritability and strained communication with patients.

"If you're not happy, you won't treat the patient well... We get complaints about rudeness, doctors not listening, and patients feeling ignored. It's all part of stress." (Female HOD, Tertiary Centre)

The effects extended into their personal lives, with SHPs describing strained relationships and the need for family members to adapt to post-shift exhaustion:

"My daughter now expects me to leave for work every day. If she sees me at home, she feels something is wrong." (Female Nurse, General Hospital)

Coping strategies, support systems, and retention drivers

Participants described coping strategies as largely informal and self-directed. Peer support and emotional venting were common.

"Sometimes it's just complaining to a colleague... or going for tea or Coke when I can." (Female Doctor, Tertiary Hospital)

Many SHPs relied on their intrinsic motivation and passion for maternal care to sustain them:

"...Because I have a passion for my job... I do not even count it as stress at times. The joy I have for the job keeps me going." (Female Nurse, General Hospital)

Rest management was a prominent coping mechanism, often requiring explicit negotiation within households.

"Everyone in my family knows not to call me within certain hours because I will be sleeping. Sunday is my rest day breakfast, sleep, lunch, sleep again. During the week, I barely sleep." (Male Consultant, General Hospital)

Recreational activities and self-care practices were also used to decompress after shifts.

"...I burn turaren wuta (incense), it makes me happy... it gives me joy." (Female Doctor, Tertiary Hospital)

Support systems

Most participants described the absence of formal workplace stress support mechanisms, with relief depending on informal, ad hoc decisions by supervisors

"Support system? I will say there is none, but... if they see it's genuine (your stress), they (supervisors) allow you to go (and rest)." (Female Doctor, Tertiary Hospital)

Some unit heads described informal internal coping arrangements such as shift swaps and temporary relief:

"When they are stressed, we usually sit with them and discuss issues. Sometimes we give them time off... or swap shifts with staff from less stressful units." (Female Head of Maternity, PHC)

In the absence of institutional support, domestic help and family members were described as essential external buffers.

"I have my sister with me, she cooks before I get home, so I just eat, pray, and rest." (Female Nurse, General Hospital)

Retention drivers

Despite stress, many SHPs described their continued commitment to maternity care, often grounded in their professional identity and fulfilment from positive outcomes.

"What gives me joy, being a midwife, is seeing the mother and the baby in good health." (Female Nurse, General Hospital)

Workplace relationships and appreciation were repeatedly cited as reasons for staying:

"If there's love and appreciation from superiors and colleagues, I feel encouraged to stay." (Male Doctor, Tertiary Hospital)

Recognition, both formal and informal, was described as morale-boosting:

"Every year they rate the nurses and doctors... end-of-the-year parties... it makes you feel appreciated." (Female Nurse, General Hospital)

However, pay dissatisfaction and perceived inequities were strongly demotivating:

"The workload is more than the salary we are taking... the salary is too small, while the workload is big." (Female Nurse, General Hospital)

"My salary is not even up to 60,000 naira (\$42), but on ANC days, I see up to 60 patients alone." (Female midwife, PHC)

Together, these findings highlight a workforce navigating sustained operational pressure with limited institutional support, relying largely on personal resilience and informal networks to remain engaged in maternity care delivery.

Discussion

This mixed-methods study examined the prevalence, determinants, and consequences of WRS among SHPs who provide maternity care in Northern Nigeria. We identified a high burden of perceived stress, driven primarily by heavy workloads, inadequate breaks, overcrowding, and resource constraints. Stress levels varied significantly across professional cadres, with junior cadres reporting higher stress levels, which were most strongly associated with workload intensity and organisational pressures. By linking stress exposure to perceived implications for clinical performance and care delivery, this study extends the existing evidence beyond individual well-being to position WRS as a system-level challenge within maternal health service delivery.

Among respondents who reported current stress, 73% identified work-related factors as the primary source. This attribution is consistent with the strong quantitative associations observed between stress and workload or organisational factors, as well as the qualitative narratives centred on staffing shortages, resource constraints, and hierarchical pressures. Together, these findings indicate that the stress experienced by SHPs in this setting was predominantly occupational.

These findings can be interpreted through the Job Demands-Resources (JD-R) framework, which conceptualises occupational stress as arising when job demands exceed the available job resources [31, 32]. In this study, high job demands, particularly workload intensity, time pressure, shift burden, and role strain, coexisted with constrained job resources, including inadequate staffing, limited supervision, insufficient breaks, and the absence of structured stress-support mechanisms. Both quantitative associations and qualitative narratives illustrate how this imbalance was experienced in the routine delivery of maternity care. Although the JD-R framework was not prospectively operationalised in the study design, the convergence of findings suggests that the demand-resource imbalance provides a coherent explanatory lens for understanding WRS among SHPs in low-resource maternity settings. Importantly, this interpretation situates WRS within systemic service delivery conditions rather than framing it solely as individual vulnerability.

To further synthesise these relationships, we developed a conceptual pathway linking structural demands, stress-related strain, and potential implications for maternity care delivery (Fig. 1).

Within this conceptual framing, job demands in our study were reflected in structural and organisational conditions, including staffing shortages, heavy workloads, long working hours, and limited infrastructure. These pressures were consistently reported across all cadres and were associated with higher perceived stress severity. Similar demand-driven stress patterns have been documented in other LMIC maternity settings, where workforce shortages, high patient volumes, and infrastructural deficits contribute to occupational strain among frontline providers [33–35].

Sustained exposure to high job demands in the absence of adequate organisational resources aligns with the health-impairment pathway of the JD-R framework. SHPs in this study described psychological and physical manifestations consistent with this pathway, including emotional exhaustion, fatigue, sleep disturbances, headaches, and musculoskeletal discomfort. Comparable symptom patterns have been reported among healthcare providers in other LMIC contexts, where workload pressures and weak institutional support structures are linked to burnout and stress-related strain [36–38].

Importantly, the pathway also identifies informal job resources and buffering mechanisms, including peer support, intrinsic motivation, family support, and self-care practices. While these resources provide partial protection against stress, their informal and inconsistent nature underscores the absence of institutionalised support mechanisms and limits their capacity to sustainably offset high job demands.

Taken together, this empirically grounded application of the JD-R framework situates work-related stress as a system-level determinant of maternity care performance rather than solely an occupational health concern. By linking workforce conditions, stress-related strain, care process impairment, and potential delivery risks, the framework offers a transferable lens for understanding how healthcare worker stress interacts with service delivery in resource-constrained maternity systems. These findings highlight the need for integrated interventions that strengthen both organisational resources and workforce conditions as core components of maternal health system strengthening.

Qualitative accounts described delayed emergency responses, rushed consultations, and emotional detachment during patient engagement as effects of work-related stress. Although patient outcomes were not directly measured, the participants consistently linked stress to reduced attentiveness and impaired decision-making capacity, suggesting potential implications for care quality. These findings align with evidence from other LMICs, including Ghana, Kenya, Ethiopia, and South Africa, where workforce shortages, long shifts, and weak institutional support have been associated with burnout and reduced healthcare provider performance [13, 34, 39–42].

Stress levels did not significantly differ by gender, age, or years since qualification, suggesting that occupational stress in this setting is more closely linked to structural and professional conditions than to individual demographics. This contrasts with studies from Kenya and Ghana, which reported higher stress among female providers, attributed to emotional labour and role conflict [13, 34]. Such differences may reflect the contextual variations in workforce structures and social norms. Nonetheless, our findings are consistent with broader evidence indicating that institutional and environmental conditions are stronger predictors of stress and burnout than demographic characteristics alone [10, 40].

In contrast, cadre-specific disparities were observed. Junior CHEWs, House Officers/NYSC doctors, Senior Medical Officers, and Junior Registrars reported significantly higher stress levels than other cadres. These differences likely reflect the structural and role-based vulnerabilities within the

health system. Transitional and mid-level cadres often carry substantial clinical responsibilities with limited decision-making authority, inadequate supervision, and constrained institutional support. Junior cadres may be disproportionately exposed to frontline emergency care and prolonged shifts, whereas senior mid-level clinicians may shoulder supervisory and administrative burdens without commensurate resources.

Most LMIC studies on work-related stress do not disaggregate findings by professional cadre [10]. By identifying cadre-level disparities within maternity care teams, this study provides context-specific evidence to inform targeted interventions, such as structured mentorship, workload redistribution, and stress-support mechanisms tailored to transitional and lower-tier cadres.

Workload emerged as the strongest quantitative correlate of stress ($r = 0.58, p < 0.01$), with over one-third of SHPs working more than 60 hours weekly and nearly one-quarter attending to more than 40 patients per day. While excessive workload has been widely documented as a stressor in Nigeria [11, 12], our mixed-methods findings illustrate how WRS is experienced in routine maternity care settings in Northern Nigeria. Respondents described ongoing fatigue, impaired concentration, and emotional strain, noting that these challenges compromised consultation quality and clinical judgement. These findings suggest that workforce stress may have direct implications for care safety and service performance. These accounts provide contextual insights into how sustained workload pressures shape care provision in high-demand maternity units.

Institutional gaps further intensified stress exposure. The majority of SHPs (88%) reported no access to formal workplace stress-support systems, relying instead on informal peer support, family assistance, or self-care practices. Similar patterns have been reported in other African settings, where structured staff well-being policies are limited [36]. Reliance on informal coping underscores the absence of institutionalized support mechanisms capable of sustainably mitigating chronic stress.

Unlike workload, shift work demonstrated only a weak association with perceived stress. This may reflect the normalisation of shift patterns within a relatively young workforce. However, studies from Saudi Arabia and Korea have reported stronger associations between shift work and burnout [43], and systematic reviews have highlighted its adverse consequences for sleep and long-term health [38]. These differences reinforce the importance of context-specific interpretations of the drivers of occupational stress.

Environmental and infrastructural deficits, including overcrowding, inadequate ventilation, poor lighting, and equipment shortages, were moderately associated with stress in our study. These facility-level constraints appear to exacerbate psychological strain and function as chronic stress amplifiers in resource-limited maternity units.

Interpersonal stressors were also prominent. Hierarchical conflict, poor supervisory relationships, and harassment from patients or relatives were the recurrent themes in the qualitative narratives. Although their quantitative associations were moderate, the qualitative narratives revealed a substantial emotional toll. Similar findings have been reported in Ethiopia and Saudi Arabia, where poor communication from management and strained supervisory relationships were significant predictors of stress [41, 43]. These results suggest that leadership culture and communication structures may meaningfully influence stress experiences among maternity teams.

The mixed-methods design allowed for triangulation between the survey findings and lived experiences, revealing psychosocial dimensions of stress that may not be fully captured through quantitative scales alone. Notably, while quantitative analysis showed no significant sex differences in stress scores, qualitative accounts highlighted gender-specific stress experiences among female SHPs, including miscarriage, marital strain, and caregiving burdens. These findings reiterate the value of qualitative enquiry in illuminating dimensions of occupational strain that may remain statistically indistinguishable yet are practically significant.

Finally, although peer support and intrinsic motivation emerged as key coping mechanisms, the heavy reliance on informal strategies reflects a culture of endurance within the maternity workforce. Suppression and avoidance coping may provide short-term adaptation but risk concealing chronic burnout. Without institutionalized support systems such as counselling services, structured debriefings, and protected rest policies, this culture of silent resilience may contribute to psychological distress, reduced job satisfaction, long-term workforce instability, patient care safety issues and poor quality of care.

Strengths and Limitations

A major strength of this study is that it represents, to our knowledge, the first mixed-methods investigation of work-related stress among SHPs providing maternity care in Northern Nigeria. By combining quantitative and qualitative approaches within a convergent design, the study enabled triangulation of statistical findings with in-depth experiential accounts. This integration provided nuanced explanatory insight into how stress is experienced, interpreted, and managed within routine maternity care settings.

The inclusion of multiple facility types public and private and across primary, secondary, and tertiary levels enhanced contextual breadth and strengthened the applicability of findings across the health system. Importantly, the study examined stress across diverse professional cadres of SHPs, allowing for identification of both cadre-specific disparities and system-level stress patterns that are frequently underexplored in LMIC research. The use of a validated instrument to assess psychosocial working conditions further enhances methodological rigor and comparability with global literature.

This study has several limitations. The use of non-probability sampling and self-reported measures introduces potential selection and reporting biases. The cross-sectional design limits causal inference, and the stress-care delivery pathways were not formally tested. Additionally, limited facility-level data restricted a deeper analysis of how institutional characteristics may shape stress patterns. The study was conducted in selected northern states; therefore, the findings should be interpreted as contextually transferable rather than nationally generalisable.

Implications to policy and practice

Addressing work-related stress among SHPs requires moving beyond individual coping strategies toward structural and institutional reforms within maternity care systems. Based on these findings, the following actions are recommended:

- **Strategic workforce planning and redistribution**, particularly in primary and secondary facilities, are required to address staffing shortages and workload concentration.
- **Implementation of workload-responsive staffing models**, including task-sharing and clearer role delineation, to reduce the pressure on overburdened cadres.
- **Institutionalization of structured staff-support systems**, such as regular debriefings, protected rest periods, psychosocial support services, and stress management programmes, should be integrated into routine facility management.
- **Strengthening leadership and communication structures** to reduce hierarchical conflict, improve supervisory support, and foster collaborative team culture.

These interventions should be embedded within existing health system governance and workforce frameworks to enhance their feasibility, sustainability, and alignment with broader maternal health system strengthening efforts.

Conclusion

Work-related stress is pervasive among SHPs providing maternity care in Northern Nigeria and is driven primarily by structural and organisational conditions, particularly heavy workload, limited rest, resource constraints, and weak institutional support. Although SHPs demonstrate resilience through informal coping strategies, these mechanisms are insufficient to offset sustained demand-resource imbalances.

Addressing WRS in maternity services requires systemic action, including workload-responsive staffing, protected rest policies, strengthened supervisory and communication structures, and institutionalized psychosocial support for the staff. Integrating workforce well-being into maternal health system strengthening efforts is essential for sustaining provider resilience and care quality.

Abbreviations

ANC
Antenatal care
CHO
Community Health Officer
CHEW
Community Health Extension Worker
JCHEW
Junior Community Health Extension Worker
SCHEW
Senior Community Health Extension Worker
HO
House Officer
MO
Medical Officer
SMO
Senior Medical Officer
OBGYN
Obstetrician and Gynaecologist
SHP
Skilled Health Personnel
USDAW
Union of Shop, Distributive and Allied Workers
WRS
Work-Related Stress.

Declarations

Ethical Approval and Consent to Participate

Ethical approval was obtained from the Liverpool School of Tropical Medicine Research Ethics Committee (Ref: 22-017) and the National Health Research Ethics Committee of Nigeria (NHREC/01/01/2007/23/08/2022). Additional approvals were obtained from the State Health Research Ethics Committees of Kaduna (HREC/17/03/2018; MOH/ADM/744/VOL.1/942), Bauchi (NREC/03/11/19B/2021/61), and Kwara (ERC/MOH/2022/08/072). Written informed consent was obtained from all participants prior to data collection. This study was conducted in accordance with the principles of the Declaration of Helsinki.

Consent for Publication

Not applicable.

Availability of Data and Materials

The datasets generated and/or analysed during the current study are not publicly available due to ethical and confidentiality considerations but are available from the corresponding author upon reasonable request.

Competing Interests

The authors declare no competing interests.

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Authors' contributions

HM: Conceptualization; Methodology; Investigation; Data curation; Formal analysis; Project administration; Writing – original draft; Writing – review & editing.

DS: Formal analysis; Methodology; Writing – review & editing.

YS: Methodology; Writing – review & editing.

EK: Investigation; Data curation; Writing – review & editing.

MA: Investigation; Data curation; Writing – review & editing.

AL: Methodology; Formal analysis; Writing – review & editing.

FD: Methodology; Formal analysis; Writing – review & editing.

SW: Methodology; Formal analysis; Writing – review & editing.

AT: Methodology; Supervision; Writing – review & editing.

JP: Conceptualization; Supervision; Methodology; Writing – review & editing.

CAA: Conceptualization; Methodology; Supervision; Funding acquisition; Writing – review & editing.

All authors read and approved the final manuscript.

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Figures

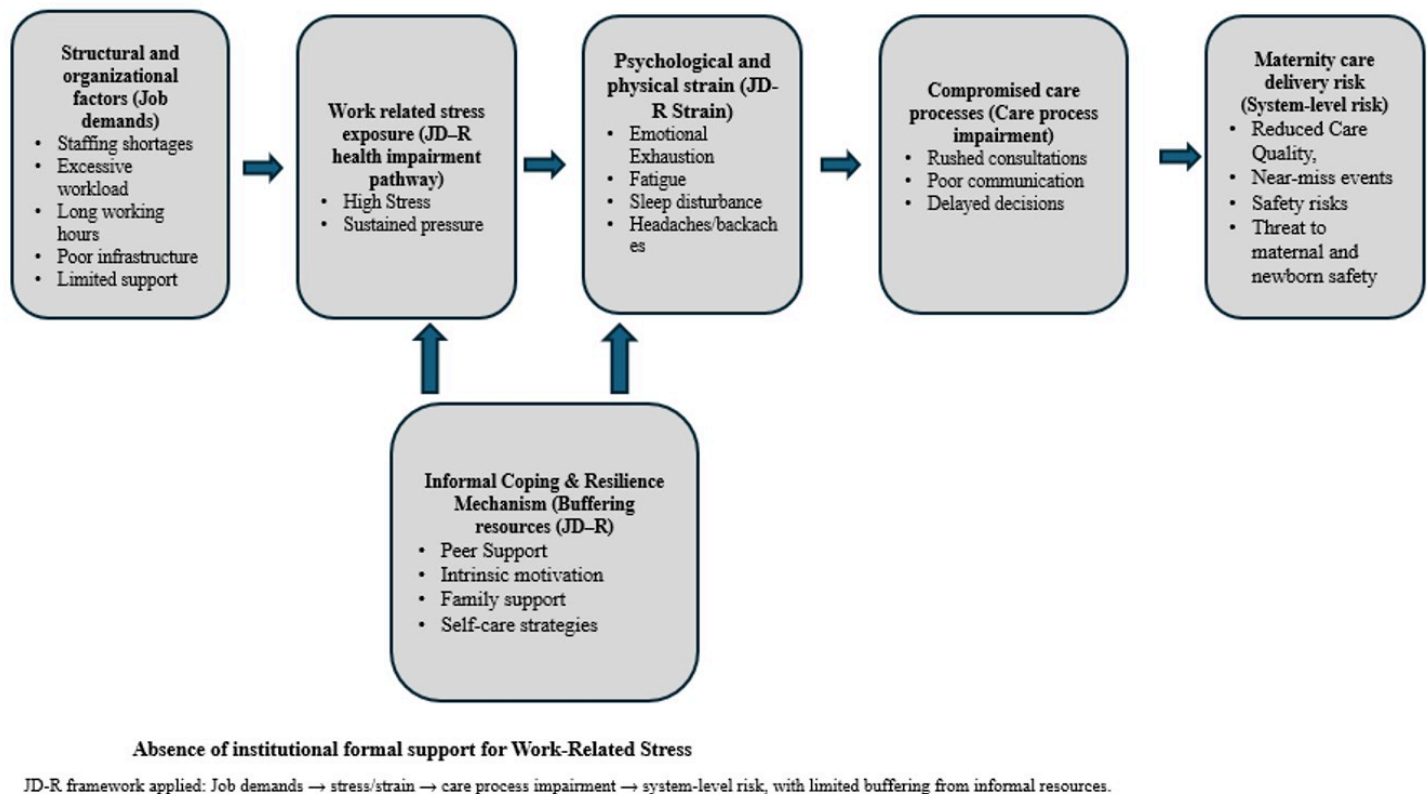


Figure 1

Conceptual Pathway Linking Work-Related Stress to Maternity Care Delivery Risks

Supplementary Files

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