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PERCEIVED VULNERABILITY TO DISEASE AND EMPLOYEE RESILIENCE AMONG NIGERIAN HEALTHCARE WORKERS: EXAMINING THE MEDIATING ROLE OF SELF-EFFICACY

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ABSTRACT

Healthcare workers routinely operate under heightened risk during communicable disease outbreaks, making it necessary to understand the psychological resources that sustain their resilience. This study examined the relationships among perceived vulnerability to disease (PVD), self-efficacy, and employee resilience, with particular attention to the mediating role of self-efficacy. A correlational survey design was adopted. Data was collected from 477 healthcare workers across three government health facilities in Ondo State, Nigeria, using convenience and purposive sampling techniques. Standardized measures of PVD, self-efficacy, and employee resilience were administered. Pearson correlation and mediation analyses were conducted to test the study hypotheses. Findings revealed no significant association between demographic factors and employee resilience. However, overall PVD was positively associated with employee resilience ($r = .231, p < .01$) and self-efficacy ($r = .226, p < .01$). Mediation analysis further indicated that self-efficacy mediated the relationship between PVD and employee resilience, both directly ($\beta = .089, 95\% \text{ CI } [.0014, .1763]$) and indirectly ($\beta = .059, 95\% \text{ CI } [.049, .0991]$), suggesting a partial mediation. Specifically, self-efficacy partially mediated the relationship between perceived infectability and employee resilience, whereas no significant mediation effect was found for germ aversion. Overall, the findings suggest that although healthcare workers perceive themselves as vulnerable to infectious diseases, self-efficacy enhances their resilience. By highlighting the mediating role of self-efficacy, the study reframes PVD from a threat-based factor to a catalyst that activates adaptive psychological resources. The study recommends targeted interventions aimed at strengthening self-efficacy to enhance resilience among healthcare workers in high-risk settings.

KEYWORDS: Employee Resilience, Perceived Vulnerability to Disease, Healthcare Worker, Germ Aversion, Perceived Infectability, Communicable Disease Outbreaks.

1. INTRODUCTION

The contemporary workplace is increasingly characterised by rapid innovation and technological advancement, recurrent natural disasters, and the emergence of communicable disease outbreaks, all of which continue to reshape how work is organised and performed. These changes place heightened psychological and physical demands on employees, particularly healthcare workers (HCWs) who operate at the frontline of public health crises. Consequently, a high level of employee resilience has become essential for employees to survive, adapt, and thrive in today's challenging work environment (Naswall et al., 2019). Employee resilience is an employee attribute that generates momentum and represents employees' capacity to rebound from difficult job conditions (e.g., communicable disease outbreaks) as well as their penchant to learn from them (De Clercq & Pereira, 2019). It refers to an employee's "stable trajectory of functioning after a highly adverse event and a conscious effort to move forward in an insightful and integrative positive manner as a result of lessons learned from an adverse experience" (Southwick et al., 2014).

Employee resilience does not necessarily imply positive appraisal of change; rather, it reflects the ability to maintain functioning irrespective of whether such changes are perceived as favourable or unfavourable (Bardoel et al., 2014). For example, outbreaks of communicable diseases cause changes in the way HCWs do their work (extra care, use of personal protective equipment, longer hours), which may be unfavourable, but the work continues. During such outbreaks, healthcare workers are exposed to heightened occupational risks, uncertainty about heavy workloads, and emotional strain, which may undermine their psychological well-being and work functioning. Nevertheless, resilient healthcare workers are more likely to withstand these stressors and recover following major disease outbreaks, even when they perceive themselves as vulnerable to infection. In this sense, employee resilience equips employees to sustain performance even amidst negative organisational changes or modifications in the work setting (Bardoel et al., 2014). Owing to the extremely arduous work environment of healthcare workers, employee resilience is a dynamic trait HCWs must possess, principally regarding working during the outbreak of a deadly and transmissible disease. Employee resilience can encourage healthcare workers to fight and bounce back after major outbreaks, despite their perceived vulnerability to the disease. This perspective aligns with Fletcher and Sarkar's (2013)

assertion that personal psychological resources, such as self-assurance and confidence, play a central role in the development and maintenance of employee resilience.

HCWs in Nigeria have consistently faced significant challenges, such as low pay satisfaction and unsafe work environments (Lawal et al., 2022). According to the Nigeria Centre for Disease Control (NCDC) report (2019), Nigerian HCWs are often vulnerable and experience frequent disease outbreaks such as Lassa fever and high infection rates, and sometimes death. This may significantly impact their willingness to tackle a disease outbreak, as it is widely accepted that adversity or stressors are a prerequisite for employee resilience (Vanhove et al., 2016). According to Gupta et al. (2024), employee resilience comprises vulnerability to danger or extreme adversity and constructive adaptation in the face of substantial threats to the developmental phase (Luthar et al., 2000). Working during a communicable disease outbreak in a health facility with infected patients can add another layer of vulnerability to the work of HCWs. The fact that HCWs are vulnerable during communicable disease outbreaks can affect their employee resilience, and this effect is the focus of this study. Southwick et al. (2014) asked a fundamental question: "Should we classify a trauma survivor as resilient if that person develops chronic symptoms of PTSD but also functions at a high level, because they have succeeded in seeking out and using ample personal, material, and social resources?" This study will try to answer this question, as it relates to this study's background: should we conclude that HCWs are resilient despite their perception of vulnerability?

One factor that may significantly shape healthcare workers' adaptive capacity in such contexts is Perceived Vulnerability to Disease (PVD). PVD is a psychological construct reflecting employees' beliefs about their susceptibility to infectious diseases and the emotional discomfort they experience in situations involving potential pathogen exposure (Duncan et al., 2009). The construct has been widely employed to explain individual differences in health-related behaviours, emotional reactions, and psychological outcomes during epidemic and pandemic contexts, including the COVID-19 outbreak. Elevated PVD has been associated with heightened fear, avoidance behaviours, and stress responses, which may erode psychological resources essential for resilient functioning. However, the extent to which PVD translates into diminished or sustained employee resilience may depend on HCWs' beliefs about their capacity to cope effectively

during communicable disease outbreaks. Drawing on social cognitive theory, self-efficacy, defined as beliefs about one's ability to organise and execute actions required to manage prospective situations, represents a key cognitive resource that influences how employees appraise threats, regulate emotions, and persist under stress (Bandura, 1997). Individuals with strong self-efficacy beliefs are more likely to perceive challenging situations, such as working during communicable disease outbreaks, as manageable and engage in adaptive coping strategies, thereby fostering employee resilience. Accordingly, self-efficacy may serve as a critical mechanism through which perceived vulnerability to disease influences employee resilience among HCWs.

2. THEORETICAL FRAMEWORK

This study is grounded in Social Cognitive Theory (SCT) and the Behavioural Immune System (BIS) framework, which together explain how perceptions of disease threat influence psychological functioning and adaptive outcomes. Social Cognitive Theory posits that interactions between personal factors and the environment shape behaviour. This implies that employees' beliefs about their capabilities, particularly self-efficacy, play a central role in shaping how environmental stressors are cognitively appraised, emotionally regulated, and behaviourally managed (Bandura, 1997). According to this framework, self-efficacy (behaviour) is conceptualised as a key cognitive resource that shapes how healthcare workers interpret and respond to PVD, thereby determining whether HCWs view the outbreak of a communicable disease as overwhelming (high) or manageable (low), thereby influencing employee resilience in high-risk situations. While heightened PVD (personal factor) may signal increased threat, strong self-efficacy beliefs may buffer its adverse psychological effects by reinforcing confidence in one's ability to adhere to safety protocols, manage exposure risks, and continue performing professional duties effectively. Conversely, low self-efficacy may amplify the detrimental effects of PVD, leading to heightened stress and reduced employee resilience.

Employee resilience (environmental factor), in this context, represents a dynamic adaptive capacity that enables HCWs to maintain psychological stability and work functioning despite exposure to disease threats and changing work demands. Drawing on organisational resilience literature, employee resilience is not merely an individual trait, but an outcome shaped by the interaction between

perceived environmental demands and personal cognitive resources (Bardoel et al., 2014; Naswall et al., 2019). Complementing this perspective, the Behavioural Immune System framework suggests that humans have evolved psychological mechanisms that detect and respond to pathogen threats (working in a communicable disease ward), often through heightened perceptions of vulnerability, avoidance behaviours, and emotional reactions such as fear or disgust (Schaller & Park, 2011). PVD reflects individual differences in the sensitivity of this system and has been shown to predict stress responses, health anxiety, and behavioural withdrawal during infectious disease outbreaks (Duncan et al., 2009). In occupational contexts, particularly healthcare settings, elevated PVD may intensify perceptions of risk and undermine psychological resources (self-efficacy) necessary for sustained functioning. Thus, the present study positions self-efficacy as a mediating mechanism through which PVD influences employee resilience among HCWs during communicable disease outbreaks.

2.1. *Perceived Vulnerability to Disease and Employee Resilience*

People generally react differently to situations, particularly events they perceive as potentially harmful to themselves and their loved ones. Simply put, individuals differ in their sensitivity to diseases and infections caused by pathogens and other viruses. According to Hoover et al. (2023), "perceived vulnerability to disease (PVD) is a trait-level indicator of behavioural immune system activity that reflects both perceived infectability (PVD-Infection), an individual's belief about their susceptibility to infectious disease, and germ aversion (PVD-Germ), which refers to the level of emotional discomfort experienced in situations where the risk of disease transmission is high" (Duncan et al., 2009).

Studies utilising the PVD construct have consistently shown that individuals who are chronically concerned about disease transmission tend to be more sensitive to cues heuristically associated with disease (Ferreira et al., 2022). For example, Stefanczyk et al. (2024) reported that psychological resilience remained stable over time, suggesting that resilience is more trait-like, in contrast, PVD fluctuated during the COVID-19 pandemic, indicating that it is more state-like in nature. Their findings revealed that individuals reported higher PVD when governments relaxed strict movement restrictions and infection rates increased, compared to periods when harsher

restrictions were in place. This suggests that PVD is strongly influenced by environmental conditions (such as communicable disease outbreaks). Importantly, their results also indicated a partial relationship between PVD and employee resilience: a significant correlation was observed between perceived infectability and employee resilience, but not between germ aversion and employee resilience.

Similarly, Alhalaiqa et al. (2021) examined psychological problems, specifically stress, depression, and anxiety, and levels of employee resilience among HCWs during the COVID-19 pandemic. Findings from HCWs (N = 255) showed high levels of stress, depression, and anxiety, which were associated with lower levels of employee resilience. In a related study, Son et al. (2019) assessed the effects of risk appraisal, emotional experiences, and coping ability on psychological well-being and workplace functioning among hospital workers (N = 280) in South Korea following an infectious disease outbreak. Their findings indicated that high-risk appraisal was associated with reduced psychological resilience among HCWs. Thus, these studies confirm the negative relationship between PVD and employee resilience.

From a behavioural immune system perspective, humans are equipped with psychological mechanisms that detect and avoid pathogens before infection occurs. This system influences social cognition, behaviour, and affective responses, particularly during disease outbreaks such as COVID-19, when heightened PVD predicts both preventive behaviours and psychological distress (Hoover et al., 2023). For instance, Zavuga et al. (2025) examined determinants of employee resilience among HCWs (N = 400) during the 2022 Sudan Virus outbreak. Their results showed that demographic factors, access to counselling, perceived infection risk, and availability of treatment if infected significantly influenced employee resilience. Notably, perceived vulnerability to Sudan Virus Disease and disease-related stigmatisation significantly reduced levels of employee resilience among HCWs.

Consistent evidence also indicates that healthcare workers are particularly vulnerable to adverse psychological outcomes during infectious disease outbreaks. Song et al. (2020) reported that HCWs were vulnerable to mental disorders during the COVID-19 pandemic. Among HCWs (N = 1,521), those working in internal medicine departments reported higher levels of obsessive-compulsive behaviours, anxiety, and interpersonal sensitivity, alongside lower employee resilience, compared to

workers in other departments. These findings imply a negative relationship between germ aversion and employee resilience and further support Stefanczyk et al.'s (2024) conclusion that environmental or state-like conditions influence PVD.

Existing literature largely frames PVD as a risk factor linked to heightened anxiety, avoidance behaviours, and psychological distress (Zavuga et al. (2025; Stefanczyk et al. 2024), particularly during communicable disease outbreaks. Among healthcare workers, these perceptions may be further amplified due to increased exposure to infectious environments, potentially undermining wellbeing and work functioning. However, emerging perspectives suggest that risk perceptions do not uniformly result in maladaptive outcomes. Instead, how individuals interpret and respond to perceived threats may depend on the availability of personal psychological resources. For example, Saleem et al. (2020) examined the relationships among psychosocial strengths, employee resilience, self-efficacy beliefs, and social support, and the perceived severity of COVID-19 among doctors (N = 284) in Pakistan. Their findings indicated that psychosocial strengths played a significant role in reducing perceived disease severity. Similarly, Stangier et al. (2022) reported that both germ aversion and perceived infectability predicted increased engagement in preventive behaviours. Interestingly, mixed patterns have been observed across occupational groups. Beyond healthcare settings, for example, among South African teachers during the COVID-19 pandemic, Padmanabhanunni and Pretorius (2023) reported a positive relationship between germ aversion and employee resilience, but a negative relationship between perceived infectability and employee resilience. Likewise, a positive relationship between perceived vulnerability to COVID-19 and employee resilience was reported among hotel employees (Dalgic et al., 2023).

Empirical evidence indicates that higher PVD is associated with greater fear, stress, and anxiety during epidemics and can fluctuate with environmental conditions that promote increased preventive behaviour and decreased risk behaviour (Stefanczyk et al., 2024; Stangier et al., 2022). Although these studies often focus on behavioural or emotional outcomes, they establish the psychological impact of disease threat appraisals, which may influence broader adaptive outcomes such as employee resilience.

2.2. Self-Efficacy and Employee Resilience

Self-efficacy and employee resilience are two important factors noted in the literature to play influential roles in nurses' clinical performance and are considered resources for improving adaptability (Ghasempour et al., 2024). Self-efficacy, the belief in one's capability to manage task-relevant demands, is a central construct in Social Cognitive Theory and is widely recognised as a key predictor of psychological adaptation in stressful contexts. Individuals with strong self-efficacy are more likely to appraise challenges as manageable, engage in effective coping strategies, and persevere under pressure. Across healthcare settings, empirical studies demonstrate a robust positive relationship between self-efficacy and employee resilience. For example, research among paediatric nurses ($n=99$) found that higher perceived self-efficacy is significantly positively associated with higher employee resilience, highlighting the importance of confidence in one's abilities as a protective resource in high-stress work environments (Bawazier et al., 2025).

Similarly, Ghasempour et al. (2024) investigated the relationship between self-efficacy and employee resilience among Iranian nurses ($N = 280$) working in clinical departments and found that, although nurses reported relatively low employee resilience alongside high self-efficacy, self-efficacy exerted a significant positive influence on employee resilience. Comparable findings were reported by Cabrera-Aguilar et al. (2023), who examined Peruvian nurses ($N = 459$) and found that self-efficacy helps healthcare workers address work-related challenges and perform their duties effectively. Their results demonstrated a significant positive relationship between self-efficacy and employee resilience, suggesting that nurses with higher self-efficacy also exhibited greater employee resilience in the workplace.

Further support for this relationship is provided by longitudinal studies conducted among HCWs during the COVID-19 pandemic. For instance, Mendoza Bernal et al. (2023) reported that self-efficacy was a strong predictor of employee resilience among healthcare workers ($N = 590$), often exerting a greater influence than other protective factors such as optimism and emotional intelligence, particularly during the early stages of the crisis. Additional evidence from nursing populations also indicates that both self-efficacy and employee resilience are negatively associated with burnout and compassion fatigue, reinforcing their central role in sustaining psychological functioning at work (Zhang et al., 2022).

Collectively, this literature underscores a

consistent positive association between self-efficacy and employee resilience in healthcare contexts, suggesting that self-efficacy is a key psychological resource enabling adaptive responses to stress and adversity.

2.3. Self-Efficacy, PVD And Employee Resilience

Although empirical studies directly examining perceived vulnerability to disease (PVD), self-efficacy, and employee resilience within a single mediated framework remain limited, evidence from closely related constructs provides strong theoretical and empirical support for this pathway. Broadly, the stress and coping literature suggests that heightened perceptions of threat or vulnerability can elicit psychological strain, the effects of which depend primarily on individuals' perceived capacity to cope effectively.

Research among healthcare workers during public health crises consistently demonstrates the central role of self-efficacy in translating perceived threat into adaptive psychological outcomes. For instance, Chen et al. (2025) examined medical staff in a general hospital in Yunnan Province during public health emergencies. They found that self-efficacy fully mediated the relationship between perceived stress and employee resilience. Their findings indicate that exposure to stressors does not automatically diminish employee resilience; instead, stress undermines employee resilience primarily when it weakens individuals' confidence in their ability to manage demands. Similarly, Cabrera-Aguilar et al. (2023) reported that self-efficacy mediated the relationships between stress, employee resilience, and job commitment among nurses, further underscoring its role as a key psychological mechanism linking adverse perceptions to work-related and adaptive outcomes.

Evidence linking illness perceptions, conceptually aligned with PVD, to self-efficacy and behavioural adjustment is also well established. Chong et al. (2020), in a study of the general population in Hong Kong during the COVID-19 pandemic, demonstrated that individuals' illness perceptions were positively associated with adherence to preventive behaviours such as physical distancing and hygiene practices. Significantly, this association was partially mediated by coping strategies and self-efficacy. Individuals who perceived COVID-19 as a serious health threat reported lower reliance on avoidance-based coping and greater confidence in their ability to carry out precautionary behaviours, which, in turn, enhanced adherence. These findings suggest that perceptions of vulnerability alone are insufficient to predict

adaptive responses; instead, perceived behavioural control and coping efficacy are critical in converting threat appraisal into practical action.

The broader risk perception literature further supports this integrative model by showing that heightened vulnerability perceptions may increase stress and anxiety, potentially undermining adaptive functioning unless buffered by strong self-efficacy beliefs. Penacoba et al. (2021), studying intensive care unit (ICU) nurses during the COVID-19 pandemic, found that perceived stress was negatively associated with both physical and mental components of quality of life. However, self-efficacy and employee resilience jointly mediated these relationships. Nurses with higher self-efficacy reported greater confidence in managing work demands, fostering employee resilience, and mitigating the adverse effects of stress on well-being. This evidence highlights the role of self-efficacy as a precursor to employee resilience, particularly in high-risk and high-demand occupational settings. Further reinforcing this mechanism, Hsiao et al. (2025) examined the mediating roles of self-efficacy and family support in the relationship between perceived stress and readiness for disaster response among nurses. Drawing on stress and self-regulation frameworks, the study revealed that stress was negatively associated with self-efficacy, whereas self-efficacy was positively associated with disaster response readiness. Notably, self-efficacy significantly mediated the stress-readiness relationship, whereas family support did not. This finding suggests that personal psychological resources (e.g., self-efficacy) may operate as more proximal mechanisms through which perceived threat and stress influence adaptive readiness, compared to external support systems (e.g., family or organisational support).

Taken together, these findings provide compelling indirect evidence for a mediated pathway linking PVD to employee resilience through self-efficacy. Against this backdrop, this study examines the notion that PVD may heighten psychological strain, but HCWs with strong self-efficacy beliefs are better equipped to regulate stress, engage in effective coping, and sustain employee resilience. While PVD is often conceptualised as a psychological risk factor associated with fear and avoidance, this study adopts a more distinct perspective by exploring its potential to activate adaptive psychological resources. Specifically, the study investigates whether self-efficacy serves as a mechanism through which perceptions of vulnerability may be transformed into resilience in

high-risk healthcare contexts. In doing so, the study contributes to emerging discussions on the dynamic interplay between risk perception and adaptive functioning among employees in demanding work environments.

2.4. Demographic Factors and Employee Resilience

Employee resilience is increasingly conceptualised as both a relatively stable psychological disposition and a dynamic capacity that can be strengthened through experience and targeted interventions. In high-risk occupational contexts such as healthcare, employee resilience reflects employees' ability to adapt, recover, and continue functioning effectively despite sustained exposure to stressors, including communicable disease outbreaks. From this perspective, employee resilience is not restricted by demographic classifications; instead, all healthcare workers (HCWs) possess the potential to thrive rather than merely survive in demanding work environments.

Empirical evidence on the influence of demographic factors on employee resilience remains mixed. Gifford and Young (2021) reported that demographic variables, including age, gender, marital status, job tenure, work experience, and educational level, had either negligible or no significant effects on employee resilience. Their findings suggest that employee resilience may represent a fundamental human capacity that operates independently, mainly of demographic characteristics. This position aligns with theoretical models that emphasise psychological and contextual resources over static sociodemographic attributes in explaining adaptive functioning under stress.

Conversely, other studies indicate that demographic and professional characteristics may still shape employee resilience levels among healthcare workers. Lin et al. (2020) found significant differences in employee resilience across professional groups, with nurses reporting lower employee resilience compared to doctors and other medical personnel. Educational attainment also emerged as a differentiating factor, with healthcare professionals with bachelor's degrees reporting higher employee resilience scores than those with diplomas or postgraduate degrees. Similarly, Zavuga et al. (2025) identified age, work experience, and access to psychological counselling as significant correlates of employee resilience among HCWs, suggesting that accumulated professional exposure and institutional support may enhance adaptive capacity over time. Consistent with these findings, Mendoza Bernal et al. (2023) reported that years of professional healthcare

experience were associated with higher employee resilience, highlighting the potential role of experiential learning in fostering psychological employee resilience.

Despite these insights, the literature suggests that while demographic and professional characteristics may be associated with employee resilience, their effects are inconsistent and often weak. This inconsistency indicates that employee resilience among healthcare workers is unlikely to be sufficiently explained by demographic factors alone. Instead, psychological resources, particularly self-efficacy, may serve as key mechanisms through which perceptions of risk and vulnerability influence employee resilience. Although prior research has examined PVD, self-efficacy, and employee resilience in related but fragmented ways, there is limited empirical evidence integrating these constructs within a single mediated framework, especially during communicable disease outbreaks.

More importantly, there is a clear contextual and population gap in the literature, as little is known about how perceived vulnerability to disease and self-efficacy interact to influence employee resilience among Nigerian healthcare workers. Baluszek et al. (2023) specifically highlighted a notable gap in the literature concerning the relationship between employee resilience and self-efficacy among healthcare workers during pandemics. Addressing this gap is critical, given the unique occupational stressors, resource constraints, and public health challenges characterising healthcare delivery in Nigeria. Therefore, the specific objective of the present study is to examine the relationships among perceived vulnerability to disease, demographic factors, and employee resilience, and to test the mediating role of self-efficacy in these relationships, including across the dimensions of PVD during communicable disease outbreaks. In line with these objectives, the study proposes and tests specific hypotheses to clarify the psychological pathways underpinning employee resilience among healthcare workers during communicable disease outbreaks.

3. HYPOTHESES

1. Demographic factors (age, gender, marital status, and specialization) will be significantly associated with employee resilience.
2. Overall perceived vulnerability to disease will significantly predict employee resilience among healthcare workers during communicable disease outbreaks.
3. Self-efficacy will significantly predict employee resilience among healthcare workers

during communicable disease outbreaks.

4. Self-efficacy will significantly mediate the relationship between overall PVD and employee resilience.
5. Self-efficacy will significantly mediate the relationship between PVD-perceived infectability and employee resilience.
6. Self-efficacy will significantly mediate the relationship between PVD-germ aversion and employee resilience.

4. MATERIALS AND METHODS

4.1. Study Design

This study employed a quantitative, cross-sectional survey design to investigate the relationships among perceived vulnerability to disease, self-efficacy, demographic factors, and employee resilience among healthcare workers. The design facilitated the examination of direct and mediated relationships among study variables.

4.2. Sample And Participants

The participants for this study comprised healthcare workers (HCWs) who had direct clinical contact with patients in infectious disease hospitals. Eligibility criteria required that participants had worked for at least 1 year in their current healthcare role and had directly provided care or treatment to patients with infectious or communicable diseases. This inclusion criterion was applied to ensure that respondents had sufficient professional exposure to disease-related risks and could therefore provide informed responses regarding perceived vulnerability to disease, self-efficacy, and employee resilience.

Participants were recruited using a combination of convenience and purposive sampling techniques. Convenience sampling was employed to facilitate access to readily available healthcare workers during the data collection period, while purposive sampling ensured that only individuals who met the predefined inclusion criteria and were directly involved in infectious disease care were selected. This approach was considered appropriate given the practical constraints associated with accessing healthcare workers in high-demand clinical settings and the study's focus on a specific professional population.

4.3. Demographic Characteristics of the Participants

The participants in this study were 477, aged between 19 and 66 years, with a mean age of 31 years

(SD = 10.4). Of the total sample, 274 participants (57.40%) were female, while 203 participants (42.60%) were male, indicating that females were more represented in the study. In terms of marital status, married healthcare workers accounted for the majority of the sample (322 participants, 67.50%). This was followed by single participants, who accounted for 136 (28.50%) of the sample. A smaller proportion of participants were separated (11; 2.30%) or divorced (8; 1.70%). Regarding professional specialisation, nurses were the most represented group, with 289 participants (60.60%) of the total sample. This was followed by doctors, who accounted for 102 participants (21.40%). Laboratory technicians constituted 44 participants (9.20%), while pharmacists accounted for 42 participants (8.80%) of the sampled population.

4.4. Instruments And Measures

Data were collected using a standardised, self-administered questionnaire designed to assess demographic characteristics, perceived vulnerability to disease, self-efficacy, and employee resilience among healthcare workers. The questionnaire comprised four sections as described below.

4.5. Demographic Characteristics

The first section captured participants' demographic and professional information, including age, gender, marital status, and specialization. These variables were included to examine their potential influence on employee resilience.

4.6. Perceived Vulnerability to Disease (PVD) Scale

The Perceived Vulnerability to Disease (PVD) scale is a 15-item self-report conceptualized by Duncan et al. (2009). There are two dimensions of the PVD scale: the germ aversion dimension and the perceived infectability dimension. The scale assesses individuals' beliefs and emotional responses regarding their susceptibility to infectious diseases and consists of two dimensions: perceived infectability and germ aversion. Items are rated on a Likert-type scale, with higher scores indicating greater perceived vulnerability to disease. The germ aversion dimension (Cronbach's $\alpha = .74$) assesses the degree of anguish experienced by individuals due to the likelihood of disease transmission and the perceived infectability dimension (Cronbach's $\alpha = .87$) assess the degree of subjective personal belief that individuals hold about being susceptible to contracting infectious diseases (e.g., "I am more

likely than the people around me to catch an infectious disease"). The perceived vulnerability to disease scale reported a Cronbach's alpha reliability value of 0.90.

4.7. General Self-Efficacy Scale

The belief in one's ability to complete a task (self-efficacy) was measured with the General Self-Efficacy Scale (GSE), a 10-item scale with a four-point response format. Developed by Schwarzer and Jerusalem (1995). The scale assesses positive self-beliefs that help people manage and thrive in challenging situations. The authors reported Cronbach's alpha for the scale ranged from .70 to .90. The scale's overall score ranges from 10-25 for low self-efficacy and 26-40 for high self-efficacy. Therefore, participants who score below 26 will be considered to have low self-efficacy, while those who score 26 or above will be considered to have high self-efficacy. A high score on the scale indicates high self-efficacy. Sequel to the pilot analysis, the scale reported a reliability value of Cronbach's alpha at ($\alpha = 0.88$).

4.8. Employee Resilience Scale (Empres)

Employee resilience among healthcare workers was assessed using the 9-item Employee Resilience Scale (EmpRes) conceptualized by Naswall, Kuntz, and Malinen (2019). The scale requires respondents to answer each question by indicating 1 = almost never, 2 = never, 3 = neutral, 4 = always, and 5 = almost always. Some studies reported Cronbach's alpha of $\alpha = .86$. The Employee Resilience Scale reported a reliability value of Cronbach's alpha at 0.91 ($\alpha = 0.91$).

4.9. Data Collection and Procedures

Data were collected over 6 months from healthcare workers employed at infectious disease hospitals. Prior to data collection, ethical approval was secured from the relevant Institutional Review Board. Participants who met the inclusion criteria, healthcare workers with at least one year of professional experience and direct patient care in infectious disease settings, were approached in person. The purpose of the study, the voluntary nature of participation, and confidentiality of responses were explained to all potential participants. Written informed consent was obtained before administering the questionnaire.

4.10. Ethical Approval

The research proposal and protocol were submitted to the Social Sciences and Humanities

Research Ethics Committee (SSHEC) Institutional Review Board at the University of Ibadan. Based on the submitted documents, the Committee reviewed and granted full ethical approval, assigning the number UI/SSHEC/2021/0003 on October 25, 2021.

4.11. Data Analyses

The data for the study were analysed using IBM SPSS Statistics (SPSS) version 31.0.0.0 (241) and the PROCESS Macro for SPSS. Pearson Product-Moment Correlation was used to test the relationship of the study's variables and Hypothesis 1. Specifically, Hypotheses 2 to 4 were tested using Model 7 of the PROCESS Macro for SPSS (Hayes, 2018) with 5,000 bootstrap samples to generate bias-corrected confidence intervals for the indirect effects and linear regression.

5. RESULTS

5.1. Zero-Order Correlation

Table 1 presents the zero-order (Pearson) correlation coefficients among demographic factors included in the study (age, gender, marital status, and specialization), perceived vulnerability to disease (PVD), self-efficacy, and employee resilience. Zero-order correlations reflect the bivariate relationships between variables, without controlling for other factors.

Participants had a mean age of 31.38 years (SD = 10.43). The average scores for PVD indicated moderate levels of perceived infectability (M = 16.11, SD = 3.91) and germ aversion (M = 20.13, SD = 4.37), with an overall PVD mean of 36.21 (SD = 6.23). Mean self-efficacy was 22.50 (SD = 3.80), while employee resilience averaged 20.47 (SD = 3.99), suggesting moderate levels of both psychological resources within the sample.

Table 1: Summary Showing Correlations among the Study Variables.

		1	2	3	4	5	6	7	8	9
1	Age	-								
2	Marital Status	.695**	-							
3	Gender	-0.021	-0.014	-						
4	Specialization	-0.035	-0.073	-0.063	-					
5	PVD(Infect.)	-.292**	-.243**	-0.07	0.03	-				
6	PVD (Germ)	-.133**	-.120**	-0.024	-0.017	.200**	-			
7	PVD	-.273**	-.231**	-0.055	0.007	.741**	.800**	-		
8	SE	0.02	0.005	-0.046	0.026	.290**	.091*	.246**	-	
9	ER	-0.023	0.037	-0.030	0.039	.253**	.097*	.231**	.408**	-
	Mean	31.38	1.760	0.574	2.060	16.106	20.130	36.210	22.500	20.47
	Std. D.	10.427	0.575	0.495	0.818	3.914	4.369	6.234	3.801	3.997
** Correlation is significant at the 0.01 level (2-tailed). PVD = Perceived Vulnerability to Disease										
* Correlation is significant at the 0.05 level (2-tailed). PVD (Infect.) = PVD-Perceived Infectability										
PVD (Germ) = PVD- germ SE = Self-efficacy ER = Employee resilience										

The zero-order correlation analysis revealed that demographic factors, including age ($r = -0.023$, $p > .05$), marital status ($r = .037$, $p > .05$), gender ($r = -0.03$, $p > .05$), and job specialization ($r = .039$, $p > .05$), were not significantly correlated with employee resilience. This finding suggests that these demographic characteristics do not substantially contribute to healthcare workers' employee resilience during communicable disease outbreaks. Therefore, hypothesis 1, which stated that demographic factors (age, gender, marital status, and professional specialization) would be significantly associated with employee resilience, was not supported.

Perceived infectability was positively correlated with germ aversion ($r = .200$, $p < .01$), and both dimensions were strongly associated with overall PVD ($r = .741$ and $r = .800$, respectively; $p < .01$), confirming the internal coherence of the PVD construct. In contrast to the demographic factors, significant associations were observed among the

psychological variables. The dimensions of perceived vulnerability to disease, perceived infectability ($r = .253$, $p < .01$), and germ aversion ($r = .097$, $p < .05$), as well as overall PVD ($r = .231$, $p < .01$), showed significant positive correlation with employee resilience. Similarly, perceived infectability ($r = .290$, $p < .01$) and germ aversion ($r = .091$, $p < .05$), as well as overall PVD ($r = .226$, $p < .01$), showed significant positive correlation with self-efficacy, suggesting that heightened awareness of disease risk may be associated with increased perceived capability to engage in protective and adaptive behaviours. Self-efficacy also showed a moderate, positive correlation with employee resilience ($r = .408$, $p < .01$), indicating that healthcare workers with greater confidence in their ability to manage work-related demands during communicable disease outbreaks demonstrated greater employee resilience.

Overall, the pattern of zero-order correlations provides preliminary empirical support for the

hypothesised relationships among perceived vulnerability to disease, its constituent dimensions, self-efficacy, and employee resilience. These findings establish the necessary conditions for mediation and

therefore justify the subsequent analyses examining the indirect effect of perceived vulnerability to disease on employee resilience through self-efficacy.

Table 2: Summary Showing Mediation Role of Self-Efficacy in the relationship between Overall PVD and Employee Resilience.

Regression Equation (N=477)		Fitting Index			Coefficient Significance		
Outcome	Predictor	R	R ²	F(df)	β	LLCI	ULCI
Self-efficacy	PVD	0.247	0.061	16.6870(1)*	0.150	0.0780	0.2226
Employee resilience	PVD	0.231	0.053	7.4963(1)*	0.148	0.0418	0.2451
Employee resilience	PVD	0.430	0.185	16.2380(2)*	0.089	0.0014	0.1763
	Self-efficacy				0.393	0.2495	0.5374
Indirect effect (a*b)					0.059	0.049	0.0991

Table 2 presents the results of a mediation analysis examining whether self-efficacy mediates the relationship between overall perceived vulnerability to disease (PVD) and employee resilience among healthcare workers.

The first regression model showed that overall PVD significantly predicted self-efficacy ($R = .247$, $R^2 = .061$, $F(1, 475) = 16.69$, $p < .05$). PVD had a positive and significant effect on self-efficacy ($\beta = .150$, 95% CI [.0780, .2226]), indicating that higher perceived vulnerability to disease was associated with higher levels of self-efficacy. In the second model, overall PVD significantly predicted employee resilience ($R = .231$, $R^2 = .053$, $F(1, 475) = 7.50$, $p < .05$). The positive regression coefficient ($\beta = .148$, 95% CI [.0418, .2451]) suggests that healthcare workers who perceived themselves as more vulnerable to disease also reported higher employee resilience. Therefore, hypothesis 2 was supported.

When both PVD and self-efficacy were entered simultaneously into the regression model predicting employee resilience, the overall model was significant ($R = .430$, $R^2 = .185$, $F(2, 474) = 16.24$, $p < .05$), explaining 18.5% of the variance in employee resilience. In this model, self-efficacy emerged as a strong and significant predictor of employee

resilience ($\beta = .393$, 95% CI [.2495, .5374]), thus, confirming hypothesis 3. Meanwhile, the direct effect of PVD on employee resilience was reduced but remained statistically significant ($\beta = .089$, 95% CI [.0014, .1763]). The reduction in the magnitude of the PVD coefficient, alongside the continued significance of self-efficacy, indicates partial mediation. The indirect effect of PVD on employee resilience through self-efficacy was significant ($\beta = .059$, 95% CI [.049, .0991]). Because the confidence interval did not include zero, this provides robust evidence that self-efficacy significantly mediates the relationship between perceived vulnerability to disease and employee resilience. Therefore, hypothesis 4 was confirmed.

In summary, hypothesis 2 was supported, as overall perceived vulnerability to disease significantly predicted employee resilience among healthcare workers during communicable disease outbreaks. Hypothesis 3 was also supported, with self-efficacy emerging as a significant predictor of employee resilience. Findings further supported hypothesis 4, indicating that self-efficacy significantly mediated the relationship between overall perceived vulnerability to disease and employee resilience.

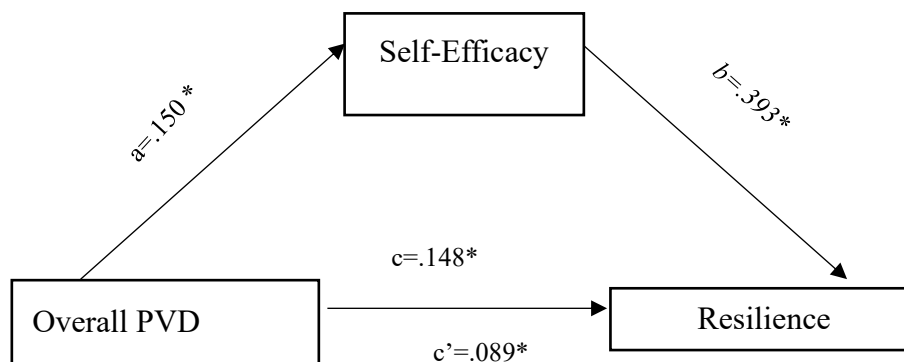


Figure 1: Showing The Mediating Role of Self-Efficacy in the Relationship Between Overall PVD And Employee Resilience.

Table 3: Summary of Mediation Models of Self-Efficacy in the relationship between PVD-Perceived Infectability And PVD-Germ Aversion, and Employee Resilience.

Path-Analyses	Model 1					Model 2				
	PVD (Perceived Infectability)					PVD (Germ Aversion)				
	β	Effect	p	LLCI	ULCI	β	Effect	p	LLCI	ULCI
a path	0.281	0.610	4.603*	0.1612	0.4013	0.079	0.052	1.543	-0.0217	0.1805
b path	0.385	0.075	5.106*	0.2365	0.5325	0.424	0.076	5.612*	0.2753	0.5719
c (Total Effect)	0.258	0.078	3.328*	0.1059	0.4110	0.088	0.062	1.423	-0.0337	0.2105
c' (Direct effect)	0.150	0.065	2.3140*	0.0227	0.2779	0.055	0.051	1.084	-0.0445	0.15541

a*b (indirect effect)	0.108	0.034	0.049	0.1788	0.034	0.023	-0.0085	0.0822
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The path analysis in Table 3 examined whether self-efficacy mediates the relationship between the two dimensions of perceived vulnerability to disease; perceived infectability, germ aversion, and employee resilience among healthcare workers. In Model 1 of the table, results indicated a significant a-path from perceived infectability to self-efficacy ($\beta = 0.281$, $p < .05$, 95% CI [0.1612, 0.4013]), suggesting that healthcare workers who perceived themselves as more susceptible to infectious diseases reported higher levels of self-efficacy. The b-path from self-efficacy to employee resilience was also significant ($\beta = 0.385$, $p < .05$, 95% CI [0.2365, 0.5325]), indicating that greater self-efficacy was associated with higher employee resilience. The total effect (c) of perceived infectability on employee resilience was significant ($\beta = 0.258$, $p < .05$, 95% CI [0.1059, 0.4110]), indicating that perceived infectability was positively associated with employee resilience before accounting for the mediator. When self-efficacy was included in the model, the direct effect (c') remained significant but was reduced in magnitude ($\beta = 0.150$, $p < .05$, 95% CI [0.0227, 0.2779]).

Importantly, the indirect effect ($a \times b$) of perceived infectability on employee resilience through self-efficacy was significant (effect = 0.108, 95% CI [0.0490, 0.1788]), as the confidence interval did not include zero. This finding indicates partial

mediation, suggesting that self-efficacy partially explains how perceived infectability translates into greater employee resilience. Therefore, hypothesis 5 was supported.

In Model 2 of the table, the a-path from germ aversion to self-efficacy was not statistically significant ($\beta = 0.079$, $p > .05$, 95% CI [-0.0217, 0.1805]), indicating that germ aversion did not meaningfully predict self-efficacy. Although the b-path from self-efficacy to employee resilience was significant ($\beta = 0.424$, $p < .05$, 95% CI [0.2753, 0.5719]), the total effect (c) of germ aversion on employee resilience was not significant ($\beta = 0.088$, $p > .05$, 95% CI [-0.0337, 0.2105]). Similarly, the direct effect (c') remained non-significant ($\beta = 0.055$, $p > .05$, 95% CI [-0.0445, 0.1554]).

Consistent with these findings, the indirect effect of germ aversion on employee resilience through self-efficacy was also non-significant (effect = 0.034, 95% CI [-0.0085, 0.0822]), as the confidence interval included zero. This suggests that self-efficacy does not mediate the relationship between germ aversion and employee resilience. Therefore, hypothesis 6 was not supported.

In summary, with respect to the dimensions of PVD, hypothesis 5 was supported, as self-efficacy partially mediated the relationship between perceived infectability and employee resilience. However, hypothesis 6 was not supported, as self-efficacy did not significantly mediate the relationship between germ aversion and employee resilience.

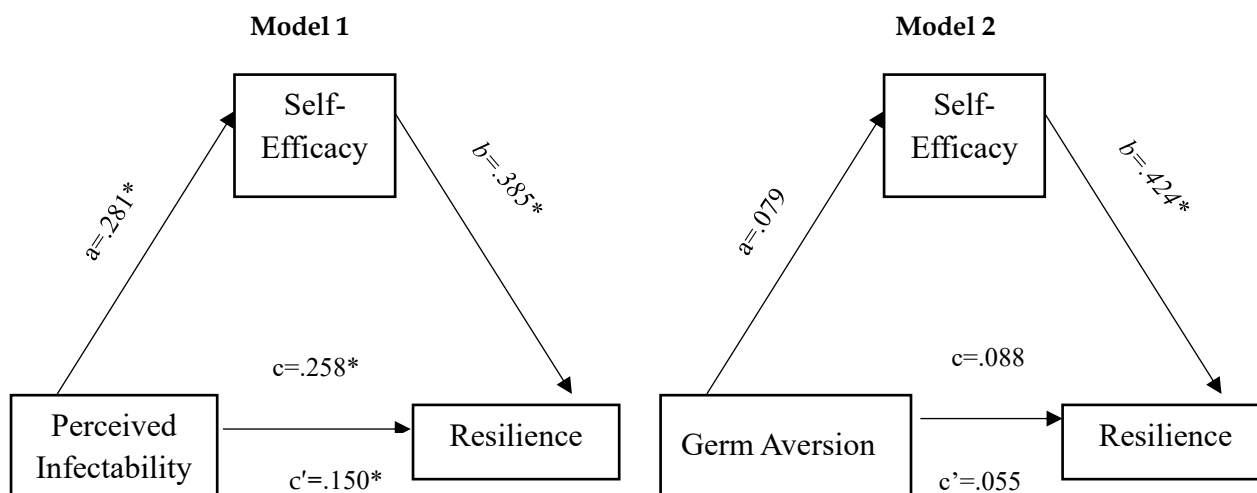


Figure 2: Showing the Mediating Role of Self-Efficacy in the relationship between Dimensions Of PVD (Model 1- Perceived Infectability and Model 2- Germ Aversion) and Employee Resilience.

6. DISCUSSION

This study examined the relationship between perceived vulnerability to disease (PVD), self-efficacy, and employee resilience among healthcare workers, with a particular focus on the mediating role of self-efficacy. The study also examined the role of demographic factors (age, gender, marital status, and healthcare worker specialization) on employee resilience. The findings exposed important insights into how healthcare workers psychologically adapt to disease-related threats during communicable disease outbreaks.

This study found no association between demographic factors and employee resilience. This reinforces the idea that employee resilience in healthcare settings is driven more by psychological resources, such as self-efficacy, than by fixed personal characteristics, such as age or gender. Thus, supports employee resilience models that emphasise modifiable cognitive and behavioural resources over static demographic attributes (Gifford & Young, 2021). Taken together, these findings suggest that while demographic factors may shape how disease risk is perceived, adaptive outcomes such as employee resilience depend more strongly on internal psychological capacities than on demographic background.

The findings of this study offer an important shift in how PVD is understood within occupational health literature. Rather than functioning solely as a source of psychological strain (Alhalaiqa et al., 2021), our finding suggests that for healthcare workers, especially during communicable disease outbreaks,

heightened PVD is a function of perceived infectability that has developed over time as a motivational signal rather than a purely incapacitating factor, and that germ aversion has no effect. This implies that HCWs who perceived vulnerability to diseases due to perceived high infectability exhibited higher employee resilience. After working for over 1 year in communicable disease centres and wards, HCWs perceive vulnerability to disease as part of their professional identity, supported by adaptive belief systems. In high-risk settings, such as during communicable disease outbreaks, recognising one's vulnerability may prompt increased alertness, preparedness, and adaptive coping, ultimately strengthening employee resilience. This result aligns with previous evidence showing that PVD can encourage protective behaviours and psychological adjustment when individuals feel equipped and capable to manage the threat (Stangier et al., 2022; Saleem et al., 2020). Outside the health industry, a positive relationship between PVD and employee resilience was also recorded (Padmanabhanunni & Pretorius, 2023; Dalgic et al., 2023). Also, Chiesi et al. (2022) confirmed, in a psychometric investigation of PVD and constructs that showed significant associations and are theoretically aligned with employee resilience, such as stress-adaptation and psychological coping variables, supporting a positive relationship under specific conditions. In contrast to our findings of a positive relationship between PVD and employee resilience, most studies reported a negative relationship among HCWs (Zavuga et al., 2025; Son et al., 2019).

An important conceptual consideration in interpreting these findings relates to how employee resilience is defined. Southwick et al. (2014) questioned whether individuals who continue to function at a high level despite experiencing chronic stress or trauma-related symptoms should be classified as resilient. In line with their position, the present study adopts a functional view of employee resilience, emphasising adaptive capacity rather than symptom absence. Within the context of communicable disease outbreaks, healthcare workers perceive high vulnerability to infection yet remain resilient by maintaining effective work performance through the mobilisation of key psychological resources, such as self-efficacy. This perspective helps explain why perceived vulnerability to disease did not uniformly undermine employee resilience in the present study. Thus, the answer to Southwick et al.'s (2014) question is yes: an individual, in this case, is resilient despite high vulnerability to disease.

This study further revealed that healthcare workers who perceived themselves as more vulnerable also reported stronger beliefs in their ability to cope with work demands, thereby reflecting the reality of healthcare practice, where repeated exposure to health threats fosters experiential learning, skill mastery, and confidence over time. Within the framework of Social Cognitive Theory, such experiences enhance self-efficacy by reinforcing beliefs in personal capability under challenging conditions (Bandura, 1997). This finding echoes studies conducted during the COVID-19 pandemic and other epidemics, which show that healthcare workers often develop stronger self-belief as they actively manage risk in their roles (Cabrera-Aguilar et al., 2023; Ghasempour et al., 2024).

Most importantly, the mediating role of self-efficacy in the relationship between perceived vulnerability to disease and employee resilience indicates that vulnerability alone does not automatically translate into employee resilience; rather, it is the confidence in one's ability to cope that allows healthcare workers to convert perceived vulnerability into adaptive functioning. When healthcare workers believe they can manage infection-related demands, vulnerability becomes less threatening and more manageable, thereby strengthening employee resilience. This suggests that healthcare workers who recognise their susceptibility to infectious diseases may simultaneously engage internal coping resources that enhance their resilience. This finding aligns with the existing literature, which identifies self-efficacy as a central

psychological resource that sustains employee resilience in high-stress healthcare environments (Zhang et al., 2022; Mendoza Bernal et al., 2023).

These findings highlight self-efficacy as a key mechanism through which healthcare workers adapt to disease-related threats and suggest that perceiving vulnerability to disease does not inherently weaken employee resilience; rather, its impact depends mainly on the psychological resources available to them, particularly self-efficacy. It also further aligns with broader perspective that emphasise the constructive role of cognitive appraisals in shaping employee behaviour under conditions of uncertainty and risk. This study reframes PVD from a purely threat-based construct to one that can, under certain psychological conditions, contribute to resilience. This has important implications for intervention strategies, suggesting that efforts to strengthen self-efficacy can enable HCWs to better navigate the psychological demands of communicable disease environments.

7. CONCLUSION

This study examined the mediating role of self-efficacy in the relationship between perceived vulnerability to disease and employee resilience among healthcare workers during communicable disease outbreaks. The findings demonstrate that while healthcare workers perceive themselves as highly vulnerable to infectious diseases, this perception does not inevitably weaken employee resilience. Instead, self-efficacy emerges as a key psychological mechanism through which vulnerability is managed and transformed into adaptive functioning. By highlighting self-efficacy as an adaptable resource, the study contributes to a more comprehensive understanding of employee resilience in high-risk healthcare environments. Strengthening healthcare workers' self-efficacy, therefore, becomes critical for sustaining psychological employee resilience and effective functioning in the face of ongoing and future public health threats.

8. RECOMMENDATIONS

Based on the findings of this study, which highlight the mediating role of self-efficacy in the relationship between perceived vulnerability to disease and employee resilience among healthcare workers, targeted psychological and organisational strategies are necessary to strengthen adaptive functioning during disease outbreaks and other high-risk work conditions.

- Healthcare organisations should implement

self-efficacy enhancing interventions, such as skills-based training, simulation exercises, and continuous professional development programmes that improve healthcare workers' confidence in managing clinical demands during infectious disease outbreaks.

- Hospital management should also integrate employee resilience and self-efficacy building strategies into occupational health policies, for healthcare workers who may perceive higher vulnerability to disease.
- Policy frameworks for emergency preparedness should integrate psychological capacity-building, ensuring that self-efficacy and employee resilience training are included as core components of occupational health and

safety programmes for healthcare workers.

9. LIMITATIONS

This study used a cross-sectional design that limits causal inferences regarding the relationships among perceived vulnerability to disease, self-efficacy, and employee resilience. Longitudinal designs help clarify the directionality of these relationships over time. Also, reliance on self-report measures may introduce response bias, including social desirability bias and standard-method variance. Considering the study focused on healthcare workers within a specific context, which may limit the generalisability of the findings to other healthcare systems or cultural settings, the findings should be generalised with caution.

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