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The Mediating Effect of Work Engagement on the Relationship Between Work Environment and Employee Quality Service Delivery in Rural Public Health Facilities

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ABSTRACT

Purpose: This study investigates the mediating effect of work engagement in the relationship between the work environment and employee quality service delivery in rural public health facilities in Tanzania. It specifically examines how factors such as equipment availability, workplace safety, staff housing, workspace, and manageable workloads influence service delivery through employee engagement.

Methodology: This study adopted a positivist research philosophy with a deductive approach to test hypothesized relationships. A cross-sectional survey design was employed, using self-administered structured questionnaires to collect data from 285 healthcare professionals across 63 health centers and dispensaries in the Mtwara region. Respondents were selected through multistage sampling techniques. Data were analyzed using IBM SPSS version 25 and Partial Least Squares Structural Equation Modeling (PLS-SEM) via SmartPLS 3.

Findings: The results show that the work environment has a significant positive effect on both work engagement and employee service quality. Additionally, work engagement significantly mediates the relationship between work environment and service quality. This suggests that when healthcare workers experience better work conditions, they are more engaged and subsequently deliver higher quality services

Unique Contribution to Theory, Policy and Practice: The study offers theoretical insights by applying the Job Demands-Resources (JD-R) theory, Social Exchange Theory (SET) and SERVQUAL model in a rural healthcare context. It provides practical recommendations for policymakers and health administrators to improve rural healthcare service delivery by investing in supportive work environments and engagement strategies. These findings are relevant for other underserved regions aiming to enhance public sector performance through human resource interventions.

Keywords: *Work Environment, Work Engagement, Quality Service Delivery, Rural Public Health Facilities.*

JEL Classification: *I18, J24, J81*

INTRODUCTION

Background of the study

Access to quality healthcare remains a global priority and is central to achieving the United Nations Sustainable Development Goal 3 (Good Health and Well-being) and the WHO's vision of universal health coverage by 2030 (WHO, 2023). However, rural regions in low- and middle-income countries (LMICs), particularly Sub-Saharan Africa, continue to experience disparities in service delivery due to workforce shortages, inadequate infrastructure, and systemic inefficiencies. Over 56% of the rural population in Sub-Saharan Africa lacks access to basic healthcare (World Bank, 2022). In Tanzania, where around 70% of the population resides in rural areas, these challenges are even more pressing. According to the Ministry of Health (2023), only 40% of rural health facilities meet national staffing norms, leading to inconsistent care quality and high patient dissatisfaction.

The supportive work environment, encompassing work equipment, workplace safety, residential houses, work space and manageable workload is a key driver of healthcare quality. Studies across LMICs shown that poor work environments contribute to burnout, absenteeism, and diminished patient outcomes (Mbindyo et al., 2020; Abiodun et al., 2021). In Tanzania, factors such as overcrowded facilities and unreliable drug supplies discourage healthcare workers, reducing their adherence to care standards (Kuwawenaruwa et al., 2022).

While the direct effects of environmental conditions are well-documented, less attention has been given to the psychological mechanisms, such as work engagement, through which these conditions influence service delivery. Quality service delivery in this study is guided by the SERVQUAL framework, which includes reliability, responsiveness, assurance, empathy, and tangibles (Parasuraman et al., 1988). In rural facilities, issues like drug stock-outs, long wait times, and impersonal care reflect deficits in these areas (Andaleeb, 2021). While infrastructure improvements may address tangibles, they are insufficient without corresponding efforts to strengthen workforce engagement, which address the human drivers of quality (Gage et al., 2022).

Work engagement, defined as a positive, fulfilling, work-related state characterized by vigor, dedication, and absorption (Bakker & Demerouti, 2017), may be the critical link between work environment and service quality. Engaged healthcare workers deliver more reliable and empathetic care, thereby strengthening key SERVQUAL dimensions (Schaufeli et al., 2023). Job resources like workplace safety or supportive supervision have been shown to enhance engagement and performance (Madede et al., 2018). Yet, most studies on this relationship come from high-income or urban settings (Al-Hanawi et al., 2022). In rural Tanzania, healthcare providers face isolation and limited professional development opportunities, which reduce engagement (Mkoka et al., 2021; Bakari et al., 2023).

Despite growing recognition of the work environment's role in healthcare delivery, few studies explore how it influences service quality through work engagement particularly in rural, under-resourced settings (Heller et al., 2023). Addressing this gap is crucial for developing strategies that go beyond infrastructure to also foster workforce motivation. Aligned with Tanzania's Health Sector Strategic Plan (2023–2028), this study seeks to inform both infrastructural and human resource strategies to enhance equitable, high-quality healthcare in rural areas.

Statement of the Problem

Quality service delivery in public health facilities is a critical determinant of population health outcomes, particularly in rural areas where access to healthcare is limited (Kruk et al., 2018; World Bank, 2022; WHO, 2023). For rural public health facilities in Tanzania to deliver high-quality healthcare services, a supportive work environment is essential. This includes workplace safety, adequate infrastructure, sufficient equipment, appropriate housing, ample workspace, and manageable workloads (Chilipweli et al., 2023; Erney & Halpern, 2018). However, many rural health facilities struggle to meet these conditions, which negatively impact healthcare workers' motivation and engagement (Twineamatsiko et al., 2023). Work engagement plays a critical mediating role in enhancing employee performance and improving service quality outcomes (Mabena & Van der Walt, 2020; Škerlavaj and Dimovski, 2022).

Although several studies have examined the influence of the work environment on health worker outcomes in Tanzania, most have focused on urban settings or general performance indicators rather than rural service delivery. For example, Nnko et al. (2019) investigated how workload affects nurse performance in regional hospitals, while Masatu et al. (2020) analysed workplace conditions and clinical decision-making. Munga and Mbilinyi (2020) reviewed literature on health worker motivation, and Chilipweli et al. (2023) assessed working conditions and job satisfaction in Sengerema District. However, limited attention has been given to the mediating role of work engagement in the link between work environment and service delivery particularly in rural public health facilities. This study addresses that gap by examining the effect of the work environment on quality service delivery and the mediating role of work engagement in rural public health facilities in Mtwara, Tanzania. The findings aim to inform employee-cantered policies that enhance service delivery in underserved areas.

Research Objectives

The main objective of this study is to examine the effect of work environment on employee service delivery, with work engagement as a mediating factor in rural public health facilities.

Specific objectives

i. To determine the effect of the work environment on employee quality service delivery in rural public health facilities.
ii. To determine the effect of work environment on employee work engagement in rural public health facilities.

iii. To determine the effect of work engagement on employee quality service delivery in rural public health facilities.
iv. To examine the mediating role of work engagement in the relationship between work environment and employee service delivery in rural public health facilities.

Research Hypothesis

H_1. The work environment has a positive and significant effect on employee quality service delivery in rural public health facilities.

H_2. The work environment has a positive and significant effect on work engagement among healthcare workers in rural public health facilities.

H_3. Work engagement has a positive and significant effect on employee quality service delivery in rural public health facilities.

H_4. Work engagement mediates the relationship between the work environment and employee service delivery in rural public health facilities.

LITERATURE REVIEW

Theoretical Literature Review

To examine the relationship between work environment, work engagement, and employee service quality, this study is anchored in three key theoretical frameworks: job Demands–Resources (JD-R) Theory as the main guiding framework, along with Social Exchange Theory (SET) and the SERVQUAL model. Together, these theories provide a comprehensive lens for understanding how supportive work environments, availability of job resources, and service quality dimensions' influence employee engagement and enhance service delivery in rural healthcare settings.

Job Demands-Resources Theory

The Job Demands–Resources (JD-R) Theory, developed by Demerouti et al., (2001), categorizes work characteristics into job demands and job resources. Job demands, such as excessive workloads and emotional stress, deplete energy and may lead to burnout, while job resources like supervisory support, adequate equipment, and a safe work environment promote motivation and performance. In Tanzania's rural health facilities, job demands are often high and resources scarce, which undermines healthcare workers' engagement and service quality (MoHCDGEC, 2021). The JD-R model suggests that adequate resources can buffer the negative effects of high demands, fostering work engagement and improved service outcomes (Bakker & Demerouti, 2017). Despite criticisms of its broad scope and assumptions about managerial control (Shifrin & Michel, 2022), the theory remains useful for examining how contextual factors affect employee performance. This study applies the JD-R framework to explain how the rural work environment shapes healthcare workers' engagement and service delivery, with work engagement as a mediating factor.

Social Exchange Theory (SET)

Social Exchange Theory (SET), introduced by Blau (1964), explains how workplace relationships are formed through reciprocal exchanges. When employees perceive fairness, support, and access

to valued resources from their organization, they are more likely to reciprocate with commitment, engagement, and improved performance (Cropanzano et al., 2017; Eisenberger et al., 2020). In healthcare settings, SET is particularly relevant as it clarifies how employees' perceptions of a supportive work environment, including access to resources, recognition, and developmental opportunities, encourage reciprocal behaviours such as increased work engagement and enhanced service quality (Alshammari et al., 2022; Yang et al., 2022). Studies show that when healthcare workers feel trusted and believe that management fulfils its obligations, they respond with higher dedication and service quality even under difficult conditions (Nguyen et al., 2023; Karatepe & Karadas, 2021). SET, therefore, supports the mediating role of work engagement in the relationship between work environment and service quality, offering a behavioural foundation for the study's conceptual model (Jin & McDonald, 2023).

SERVQUAL Model

The SERVQUAL model, developed by Parasuraman et al., (1988), identifies five dimensions of service quality: reliability, responsiveness, assurance, empathy, and tangibles. Although traditionally used to assess patient perceptions, recent studies have adapted SERVQUAL to capture healthcare workers' views on the quality of care they deliver (Mystakidou et al., 2020; Uwimana et al., 2021). In this study, the model is used to assess how work environment factors such as availability of equipment or a safe workspace affect service quality from the providers' perspective. Tangibles influence reliability and responsiveness, while a supportive work environment enhances assurance and empathy by improving morale and professionalism (Andaleeb, 2021). Despite growing use, limited research in Tanzania applies SERVQUAL from the employee's viewpoint in rural facilities, and even fewer examine work engagement as a mediating factor. This study addresses these gaps by adapting SERVQUAL to understand how environmental conditions and work engagement jointly shape service quality outcomes in rural public health settings.

Empirical Literature Review

This section reviews previous empirical studies that have explored the relationship between work environment and service delivery, as well as the mediating role of work engagement. The review focuses on research conducted in both developed and developing countries, with a particular emphasis on the healthcare sector.

Work Environment and Employee Quality Service Delivery

The work environment encompasses the physical, psychological, and social conditions under which employees operate, including infrastructure, manageable workload, reasonable working hours, safety, ergonomic facilities, availability of essential tools and resources (Aslam et al., 2021; Khan et al., 2023; Mwita, 2021; Nnko et al., 2019; Theuri et al., 2020). A conducive work

environment is essential for enhancing employees' performance, reducing stress, and improving service quality (Bai et al., 2023).

Amin et al., (2021) conducted a systematic review to assess the influence of working conditions on healthcare service delivery across both developed and developing countries. The review integrated findings from quantitative and qualitative studies and revealed that poor working conditions including excessive workload, inadequate infrastructure, and weak organizational support significantly undermined healthcare worker performance and service quality. The authors recommended prioritizing supportive work environments as a central component of health sector reforms. In the Middle East, Al-Hanawi et al., (2022) used a quantitative cross-sectional design to assess how workplace environment impacts healthcare service quality in public hospitals. Based on responses from 312 healthcare workers, the study found that enabling environments characterized by proper equipment, effective leadership, and reasonable workloads were strongly associated with improved reliability and responsiveness in healthcare delivery.

Sibonde and Dassah (2023) examined the impact of work environment and managerial support on employee motivation and service quality in a South African municipality using a cross-sectional survey design. Data were collected from municipal employees through structured questionnaires, and analysis was performed using regression methods. The study found that supportive work environments and effective managerial support significantly enhanced employee motivation, which in turn improved service delivery quality. The authors concluded that providing adequate resources and support is critical for boosting employee performance and service outcomes. Also, Theuri, (2020) examined how the work environment affects service delivery in public hospitals in Nyeri County, Kenya, using the person environment fit theory. Based on data from 141 healthcare professionals collected through a descriptive cross-sectional design, the study found that a positive work environment significantly enhanced service delivery. However, issues such as drug shortages, long working hours, and poorly maintained medical equipment hindered service quality.

Also in Tanzania, Swai and Tieng'o, (2022) examined the relationship between workplace factors and employee performance in Bahi District Council, Tanzania. Using a descriptive quantitative design and SPSS analysis of data from 68 respondents, the study found that factors like ventilation, safe workspace, communication, and transport access had significant positive effects on employee output. The study emphasized the need for government investment in improving work environments to boost healthcare service delivery in rural areas. Nnko et al., (2019) investigated the influence of workload on nurse performance in regional hospitals in Tanzania using a cross-sectional survey design. Data were collected from nurses using structured questionnaires, and analysis was conducted through regression techniques. The study revealed that job rotation and job sharing had a positive effect on nurse performance, while part-time working arrangements showed no significant impact. The authors concluded that proper workload management strategies are essential for improving healthcare delivery.

The Mediating Role of Work Engagement

Work engagement serves as a key psychological mechanism that mediates the relationship between work environment and employee performance outcomes, particularly in high-demand sectors like healthcare (Bakker & Demerouti, 2017). It reflects employees' energy, commitment, and immersion in their work, and is widely recognized as a driver of both individual productivity and service quality. Although the mediating role of work engagement has been investigated in various global contexts, there remains a notable scarcity of empirical research examining this relationship within rural public health facilities in Tanzania, often characterized by resource constraints and challenging working condition.

Li et al., (2020) examined the relationship between the work practice environment and turnover intention among community health nurses. Their SEM-based analysis revealed that a positive environment was associated with higher work engagement and lower turnover intention, with work engagement partially mediating this relationship. Similarly, Liu et al., (2020) applied the JD-R model in healthcare settings to assess how organizational support, workload, and resource availability influenced engagement and performance. Their findings confirmed a mediating role of work engagement, though the effect was weaker in high-pressure, resource-constrained environments.

Škerlavaj and Dimovski, (2022) explored the role of work engagement among healthcare professionals in Slovenian primary healthcare settings. Using a cross-sectional survey of 310 workers, they found that greater engagement was significantly associated with higher job satisfaction, better employee performance, and improved patient care quality. Similarly, Kumar and Bansal, (2021) studying Indian public hospitals, demonstrated that a supportive work environment marked by adequate resources and strong leadership positively influenced work engagement, which in turn enhanced service quality outcomes. Likewise, Shahzad et al., (2018) in Pakistan found that work engagement significantly mediated the relationship between the work environment and both employee performance and patient satisfaction.

In Ghana, Takyi et al., (2024) reported a strong positive effect of employee engagement on job performance among nurses and midwives. Their study also found that perceived organizational support moderated this relationship, emphasizing the importance of a supportive environment. Additionally, Mabena and Van der Walt, (2020) in South Africa investigated the mediating effect of work engagement on the relationship between the psychosocial work environment and quality of nursing care. Their cross-sectional study revealed that engagement partially mediated this relationship, further highlighting its critical role in enhancing service delivery.

Endale et al., (2023) examined the relationship between work environment and work engagement among health professionals in public health institutions in Ethiopia, using the JD-R theory. The study employed a cross-sectional design and collected data from 391 healthcare providers. Findings revealed that co-worker support, role clarity, recognition, and manageable workload

significantly predicted higher levels of work engagement. The study concluded that creating a supportive work environment enhances employee motivation and psychological connection to work. However, the study did not assess how engagement influences service delivery outcomes.

Chilipweli et al., (2023) assessed the working environment and job satisfaction among healthcare workers in public health facilities in Sengerema District, Tanzania, using a descriptive cross-sectional approach. Data were collected from 356 health workers across different cadres. The study found that inadequate medical equipment, unsafe workspaces, and excessive workloads negatively affected job satisfaction. The results indicated that tangible work environment factors play a crucial role in shaping employee morale. Nevertheless, the study did not examine the link between job satisfaction and actual service quality or engagement levels

These studies demonstrate that across various healthcare contexts, work engagement plays a significant mediating role between the work environment and service performance. However, this relationship has not yet been empirically tested in rural public health facilities in Tanzania. This study addresses this gap by examining these relationships in the Mtwara region.

Conceptual Framework

The conceptual framework illustrates the hypothesized relationships among the key variables of the study. As shown in Figure 1, the model suggests that the work environment has both a direct effect on quality service delivery and an indirect effect through work engagement as a mediating factor.

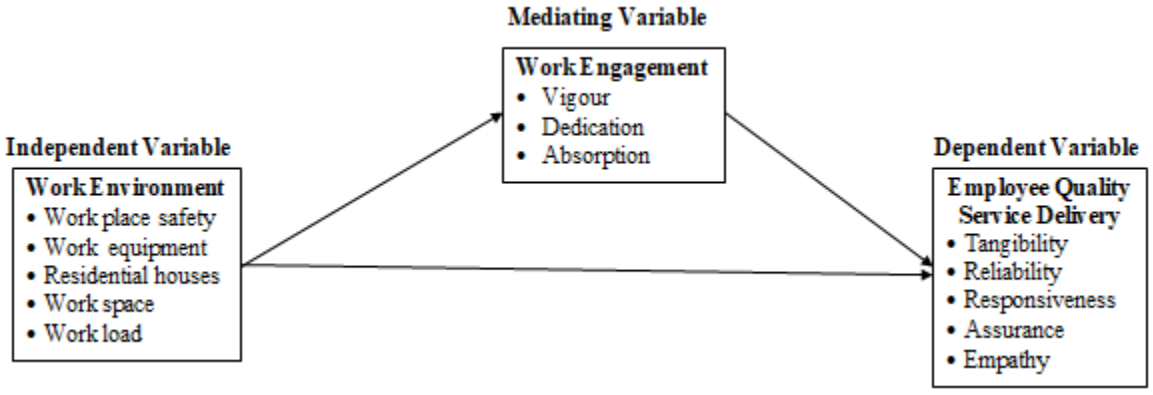

Figure 1: Conceptual Framework

RESEARCH METHODOLOGY

This study was conducted in the Mtwara region, Tanzania, targeting rural public health facilities. The study was guided by a positivist research philosophy and adopted a deductive approach, testing hypotheses derived from the theories (Park et al., 2021). A cross-sectional survey design was employed to assess the mediating effect of work engagement in the relationship between work environment and employee service quality (Thomas et al., 2022). The target population consisted

of 992 healthcare professionals, including medical doctors, nurses, clinical officers, health attendants, pharmacists, and laboratory personnel working in public health centers and dispensaries, as per the 2024-2025 Regional Medical Officer's records.

To determine the sample size, Yamane's (1967) formula was used with a 5% level of precision, yielding a minimum sample size of 285 healthcare workers. A multistage sampling technique was applied. First, all five rural district councils in Mtwara were included. Then, 63 rural public health facilities (dispensaries and health centres) were randomly selected using a 10% margin of error. Finally, simple random sampling was applied to select healthcare personnel from these facilities, ensuring representation across professional categories and districts.

Data collection was conducted through self-administered structured questionnaires designed to align with the study's objectives. The instrument consisted of four sections: demographic information; work environment (adapted from prior studies) (Sikawa et al., 2020; Theuri et al., 2020); work engagement (measured using the Utrecht Work Engagement Scale – UWES) (Schaufeli et al., 2002); and employee service quality (assessed using modified SERVQUAL model items) (Parasuraman et al., 1988). All questionnaire items were rated on a 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5) to enable effective quantitative analysis (Fink, 2015). The reliability of the instrument was assessed using Cronbach's alpha and Composite Reliability, based on a pilot study with 40 respondents (approximately 10% of the sample) outside the main sample. Construct, content, and face validity were established through expert review and pre-testing to ensure clarity, relevance, and alignment with research objectives.

Data analysis was performed using IBM SPSS Version 25 and SmartPLS Version 3.2.9. Descriptive statistics (frequencies, means, percentages, and standard deviations) were used to summarize demographic and background information. Partial Least Squares Structural Equation Modelling (PLS-SEM) was used to test both the direct and indirect relationships of mediating relationships the study variables. Diagnostic tests such as multicollinearity (VIF), model fit and reliability and validity tests were conducted to ensure data quality and model integrity.
The results were presented in the form of tables, capturing both descriptive and inferential statistics. The study adhered strictly to ethical research standards: participation was voluntary, and confidentiality and anonymity were assured. Ethical approval was granted by the Open University of Tanzania (2023/2024 academic year).

RESEARCH FINDINGS & DISCUSSION

Response Rate

Out of 285 distributed questionnaires, 281 were completed and returned, resulting in a high response rate of 98.6%. This exceeds the commonly accepted threshold of 67% in health sciences (Wilson et al., 2023), minimizing non-response bias and enhancing the reliability of the findings.

Table 1: Response Rate

Description	Frequency (n)	Percentage (%)
Questionnaires distributed	285	100.0
Questionnaires returned	281	98.6
Not returned	4	1.4

Demographic Information of the Respondents

This section outlines the demographic profile of the respondents, covering gender, age, marital status, education level, job experience, and job title.

Table 2: Demographic Information of the Respondents

Variable	Category	Frequency (n)	Percentage
Gender Distribution	Male	153	54.4
	Female	128	45.6
Age Group (Years)	18–24	14	5.0
	25–34	172	61.2
	35–44	64	22.8
	45–54	19	6.8
	55+	12	4.3
Marital Status	Single	86	30.6
	Married	162	57.7
	Divorced	9	3.2
	Widowed	7	2.5
	Living with partner	17	6.0
Education Level	Certificate	93	33.1
	Diploma	162	57.7

	Bachelor's degree	21	7.5
	Master's degree	4	1.4
	Others	1	0.4
Job Experience (Years)	Less than 2 years	79	28.1
	3–10 years	165	58.7
	11–20 years	30	10.7
	21–30 years	2	0.7
	Over 31 years	5	1.8
Job Title	Medical officer	25	8.9
	Clinical officer	62	22.1
	Nurse	109	38.8
	Health attendant	54	19.2
	Pharmacist	11	3.9
	Lab technician	20	7.1

As shown in Table 2, the sample primarily comprised healthcare professionals aged 25–34 years (61.2%), indicating a young workforce. Males represented 54.4% and females 45.6%. A majority were married (57.7%) and most held diplomas (57.7%), followed by certificates (33.1%), with only 8.9% holding university degrees. In terms of experience, 58.7% had 3–10 years of service, and 28.1% had less than 2 years, reflecting a largely early- to mid-career workforce. Professionally, the sample included mainly nurses (38.8%), followed by clinical officers (22.1%) and health attendants (19.2%). These demographics reflect a youthful, moderately experienced workforce at the frontline of rural public healthcare in Mtwara.

Analysis of Measurement Model

Before conducting the structural model analysis, the measurement model was evaluated to assess the reliability and validity of the latent constructs. This step ensures that the constructs accurately represent the underlying theoretical concepts and that the indicators effectively measure the intended variables. Figure 2 illustrates the measurement model diagram generated using Partial

Least Squares Structural Equation Modeling (PLS-SEM) in SmartPLS 3. The diagram displays the relationships between the latent constructs and their corresponding observed indicators, providing a visual representation of the model's measurement structure.

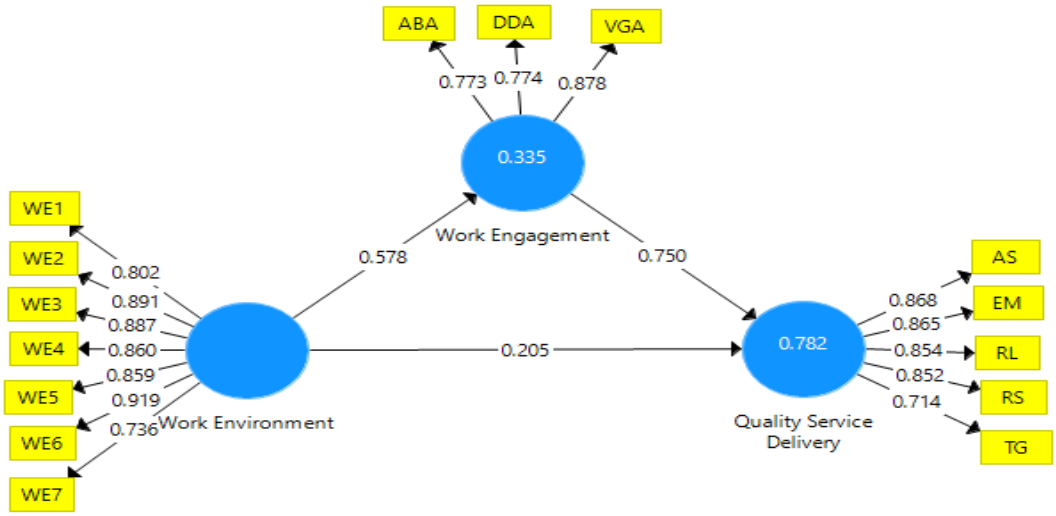

Figure 2: PS-SEM Measurement Model

The model shows how each construct such as Work Environment, Work Engagement, and Quality Service Delivery is measured through multiple reflective indicators. This assessment confirms the construct validity and the overall measurement model structure prior to proceeding with the structural model analysis.

Construct Reliability and Convergent Validity

Internal consistency reliability was examined using Cronbach's Alpha (CA) and Composite Reliability (CR), with all values exceeding the recommended threshold of 0.70 (Hair et al., 2019), indicating strong internal consistency among the measurement items. Convergent validity was assessed using the Average Variance Extracted (AVE). All constructs demonstrated AVE values above the accepted cut-off of 0.50, confirming that a substantial proportion of the variance in the observed indicators is accounted for by their respective latent constructs (Hair et al., 2022).

Table 3: Construct Reliability and Convergent Validity

Construct	CA	CR	AVE
Quality Service Delivery	0.888	0.918	0.693
Work Engagement	0.788	0.850	0.655
Work Environment	0.936	0.949	0.727

All constructs exceeded the minimum thresholds (CA and CR > 0.70; AVE > 0.50), indicating strong internal consistency and adequate convergent validity. These results confirm that the constructs are both reliable and valid for use in the structural model.

Discriminant Validity

Discriminant validity was evaluated using the Heterotrait-Monotrait Ratio (HTMT), which is considered a more robust technique than the Fornell-Larcker criterion (Henseler et al., 2015). An HTMT value below 0.90 is generally acceptable, with more conservative thresholds set at 0.85 (Hair et al., 2022; Kline, 2023).

Table 4: Discriminant Validity – Heterotrait-Monotrait Ratio (HTMT)

Constructs	Quality Service Delivery	Work Engagement	Work Environment
Quality Service Delivery	-	-	-
Work Engagement	0.851	-	-
Work Environment	0.698	0.569	-

As shown in Table 4, all HTMT values fall below the 0.90 threshold, indicating that the constructs are empirically distinct. This supports satisfactory discriminant validity and confirms the uniqueness of each construct within the measurement model.

Analysis of Structural Model

After confirming the reliability and validity of the measurement model, the structural model was assessed to evaluate the strength and significance of the hypothesized relationships. Key evaluation criteria included collinearity diagnostics (Variance Inflation Factor, VIF), path coefficients (β), coefficient of determination (R^2), effect size (f^2), and predictive relevance (Q^2). Figure 3 depicts the PLS-SEM structural model, illustrating the pathways between Work Environment, Work Engagement, and Quality Service Delivery. The figure presents both direct and indirect relationships tested within the model.

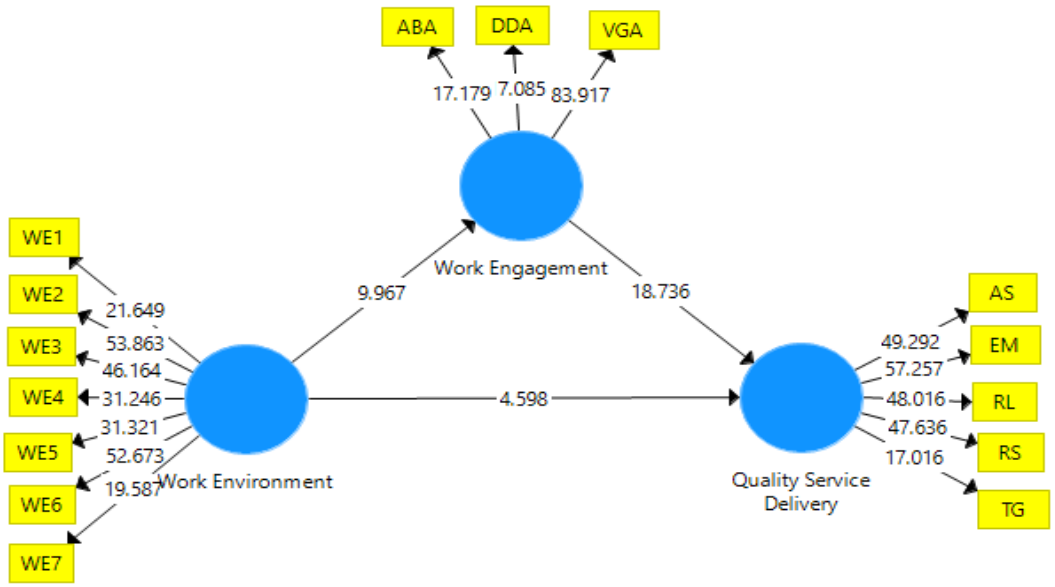

Figure 3: PLS-SEM Structural Model

Collinearity Assessment

Collinearity among predictor constructs was evaluated using the Variance Inflation Factor (VIF). According to Hair et al., (2017), VIF values below 5.0 suggest that multicollinearity is not a concern.

Table 5: Collinearity

Constructs	Variance Inflation Factor (VIF)
Absorption	3.616
Assurance	2.646
Dedication	3.613
Empathy	3.357
Reliability	2.667
Responsiveness	3.065
Tangibility	1.737
Vigour	1.216

Work Environment_1	2.586
Work Environment_2	3.964
Work Environment_3	3.466
Work Environment_4	3.149
Work Environment_5	3.044
Work Environment_6	4.826
Work Environment_7	1.805

All VIF values are below the recommended threshold of 5.0, indicating that multicollinearity is not a concern in this model. Although Work Environment_6 has the highest VIF (4.826), it remains within acceptable limits and may be monitored in future analyses.

Coefficient of Determination (R^2) Assessment

The coefficient of determination (R^2) indicates the proportion of variance in each endogenous construct explained by its exogenous variables. Based on Hair et al., (2019), values of 0.75, 0.50, and 0.25 denote substantial, moderate, and weak explanatory power, respectively.

Table 6: Coefficient of Determination (R^2)

Constructs	R^2	R^2 Adjusted	Interpretation
Quality service delivery	0.782	0.781	Substantial explanatory power
Work Engagement	0.335	0.332	Moderate explanatory power

As shown in Table 5, Quality Service Delivery has an R^2 of 0.782, indicating substantial explanatory power, while Work Engagement has an R^2 of 0.335, reflecting a moderate level of explanation.

Effect Size (f^2) Assessment

Effect size (f^2) measures the impact of each exogenous construct on the R^2 value of an endogenous construct by assessing the change in R^2 when the predictor is excluded. Cohen (1988) recommends that f^2 values of 0.02, 0.15, and 0.35 represent small, medium, and large effects, respectively.

Table 6: **Effect Size (f^2)**

Constructs	Quality service delivery	Work Engagement
Work Engagement	1.719	-
Work Environment	0.128	0.503

Work Environment has a small to moderate effect ($f^2 = 0.128$) on Quality Service Delivery, and a large effect ($f^2 = 0.503$) on Work Engagement. Notably, Work Engagement has a very large effect ($f^2 = 1.719$) on Quality Service Delivery, underscoring its key mediating role.

Predictive Relevance (Q^2) Assessment

Predictive relevance (Q^2) assesses the model's ability to predict endogenous constructs using the blindfolding procedure. According to Hair et al., (2017), Q^2 values greater than zero indicate predictive relevance.

Table 7: Predictive Relevance (Q^2)

Constructs	SSO	SSE	Q^2 (=1-SSE/SSO)
Quality service delivery	1405.000	651.640	0.536
Work Engagement	843.000	697.641	0.172
Work Environment	1967.000	1967.000	-

As shown in Table 7, Quality Service Delivery demonstrates strong predictive relevance ($Q^2 = 0.536$), while Work Engagement shows moderate predictive relevance ($Q^2 = 0.172$). Q^2 was not computed for Work Environment, as it is an exogenous construct.

Path Coefficient (β) and Hypothesis Testing

Path coefficients (β) indicate the strength and direction of the relationships between constructs, with values closer to 1.0 reflecting stronger effects. A relationship is considered statistically significant when the t-value > 1.96 and p-value < 0.05 (Hair et al., 2017; 2019).

Table 8: Path Coefficient (β) (Direct Effect)

Hypothesis	Direct Path	Original Sample (*β*)	T Statistics	P Values	Supported?
H1	Work Environment -> Quality service delivery	0.205	4.598	0.000	Yes
H2	Work Environment -> Work Engagement	0.578	9.967	0.000	Yes
H3	Work Engagement -> Quality service delivery	0.750	18.736	0.000	Yes

All direct hypotheses were supported and statistically significant at $p < 0.001$. The Work Environment had a moderate positive effect on Quality Service Delivery ($\beta = 0.205$) and a stronger effect on Work Engagement ($\beta = 0.578$). The strongest path was observed from Work Engagement to Quality Service Delivery ($\beta = 0.750$), highlighting the vital contribution of employee engagement to high-quality healthcare delivery.

Mediation Analysis

To test the mediating role of Work Engagement in the relationship between Work Environment and Quality Service Delivery, a bootstrapping procedure with 5,000 resamples was used. Mediation is confirmed when $t > 1.96$ and $p < 0.05$ (Hair et al., 2017).

Table 9: Mediation Analysis (Indirect Effect)

Hypothesis	Indirect Path	Original Sample (β)	T Statistics	P Values	Supported?
H4	Work Environment -> Work Engagement -> Quality service delivery	0.434	16.587	0.000	Yes

The indirect path was statistically significant ($\beta = 0.434$, $t = 16.587$, $p < 0.001$), confirming that Work Engagement significantly mediates the relationship between Work Environment and Quality Service Delivery. This finding emphasizes that creating a supportive work environment improves service outcomes both directly and indirectly by enhancing employee engagement.

Discussion

The first hypothesis revealed a positive and significant relationship between work environment and quality service delivery ($\beta = 0.205$, $t = 4.598$, $p < 0.001$), suggesting that improvements in the work environment contribute meaningfully to better healthcare outcomes. This aligns with the SERVQUAL model (Parasuraman et al., 1988), which emphasizes that both tangible elements (such as equipment, cleanliness, and physical infrastructure) and intangible factors (like safety and interpersonal support) influence key service quality dimensions including responsiveness, assurance, and empathy. Additionally, the finding is supported by SET (Blau, 1964), which posits that when employees perceive organizational support such as a safe and resource-equipped workplace, they feel obligated to reciprocate through enhanced performance and service commitment. This dynamic is particularly critical in rural healthcare settings, where resource limitations are common. Empirical studies support this relationship; for example, Sibonde and Dassah (2023) in South Africa and Theuri (2020) in Kenya both found that a supportive work environment significantly improved service delivery in the public sector. Similarly, Swai and Tieng'o, (2022) observed a significant and positive link between workplace environment factors and employee output. These findings collectively suggest that targeted improvements in workplace conditions, even in constrained environments, can significantly strengthen service delivery systems.

The second hypothesis demonstrated a strong and positive effect of work environment on work engagement ($\beta = 0.578$, $t = 9.967$, $p < 0.001$). This finding supports the JD-R theory (Bakker & Demerouti, 2007), which posits that job resources such as support, autonomy, and sufficient tools are key to sustaining employee engagement. In rural health settings, where professionals often face high demands and limited resources, a positive work environment is essential for promoting motivation, energy, and commitment. This result is consistent with Li et al., (2020), who found that supportive work environments improved work engagement among community nurses in China. Consistently, Endale et al., (2023) reported in Ethiopia that co-worker support, clear roles, recognition, and moderate workloads were strong predictors of higher work engagement among primary care professionals. Mabena and Van der Walt, (2020) also found that a psychosocially supportive work environment enhanced nurses' engagement in South Africa. These results highlight the importance of investing in workplace conditions to foster engagement among healthcare workers, especially in underserved areas. Additionally, Chilipweli et al., (2023) found that shortages in essential equipment, unsafe workspaces, and heavy workloads significantly reduced job satisfaction among rural healthcare staff in Tanzania's Sengerema District, highlighting how tangible work environment factors affect engagement

The third hypothesis examined the effect of work engagement on quality service delivery and revealed a strong, positive relationship ($\beta = 0.750$, $t = 18.736$, $p < 0.001$). This suggests those healthcare workers who are highly engaged; those exhibiting vigour, dedication, and absorption are significantly more likely to deliver high-quality services. This supports the JD-R theory, which

posits that engaged employees demonstrate higher productivity, resilience, and job performance. It also aligns with the SERVQUAL model, as engaged employees are more likely to meet essential service quality dimensions such as reliability, responsiveness, and empathy. This finding is reinforced by empirical evidence: for example, Škerlavaj and Dimovski, (2022) reported that engaged Slovenian healthcare workers achieved better performance outcomes, while Kumar and Bansal, (2021) observed similar patterns among Indian nurses. In Ghana, Takyi et al., (2024) found that engaged midwives demonstrated stronger job performance. These results collectively affirm that fostering engagement among healthcare professionals is critical to achieving consistent, high-quality service delivery particularly in rural Tanzanian health facilities, where challenges are often acute.

The fourth hypothesis tested the mediating role of work engagement in the relationship between work environment and quality service delivery. The analysis showed that this indirect path was statistically significant ($\beta = 0.434$, $t = 16.587$, $p < 0.001$), indicating that a supportive work environment enhances service delivery primarily by increasing employees' engagement. This supports the JD-R theory's assertion that job resources lead to engagement, which then drives performance (Bakker & Demerouti, 2017). It also aligns with the SERVQUAL model, as engaged employees are more likely to deliver service with empathy, assurance, and reliability. This mediating relationship has been documented in other contexts as well. Mabena and Van der Walt (2020) found a similar mediation effect among nurses in South Africa, while Liu et al. (2020) in China showed that work engagement mediated the link between work environment and turnover intention. In the present study, the mediating role of engagement offers critical insight: even when structural challenges persist, strategies that enhance engagement such as manageable workloads, workplace safety, residential housing, adequate workspace, and access to essential tools can bridge the gap between limited resources and excellent service delivery.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

This study aimed to examine the mediating effect of work engagement in the relationship between work environment and employee service quality in rural public health facilities in Mtwara region, Tanzania. The findings confirmed that a supportive work environment characterized by adequate equipment, safety, staff housing, manageable workloads, and clean workspaces significantly enhances employees' ability and willingness to deliver quality healthcare, while poor conditions hinder service delivery. Better working conditions were also found to positively influence work engagement, with employees showing greater vigour, dedication, and absorption, which in turn strongly improved service quality through increased responsiveness, empathy, and reliability. Mediation analysis further confirmed that work engagement plays a significant intermediary role, meaning a conducive environment boosts service delivery both directly and indirectly by enhancing employee engagement.

Recommendations

To improve healthcare service delivery in rural public health facilities, health administrators should prioritize enhancing the work environment by upgrading infrastructure, ensuring equipment availability, providing staff housing, and improving workplace safety. Human resource strategies must focus on fostering work engagement through regular training, recognition, constructive feedback, and inclusive decision-making. Leadership should adopt participatory approaches that build trust and open communication, enabling employees to voice concerns and contribute to improvements. Additionally, district and regional health authorities should institutionalize policies for continuous monitoring of work conditions, incorporating routine assessments and timely interventions to sustain employee well-being and high-quality service delivery.

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