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Bridging the knowledge-readiness gap in basic occupational health services: A mixed-methods study of informal tourism workers

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ABSTRACT

Background: Basic occupational health services (BOHS) promote workplace health through participatory approaches that integrate informal workers into primary care-based occupational health systems. However, participation remains low, and limited research explains why engagement readiness does not necessarily improve despite increased knowledge.

Objective: This study examined the direct and indirect effects of BOHS-based health promotion on informal tourism workers' readiness to participate, assessed the mediating role of knowledge, and identified barriers to the transition from knowledge to preparedness.

Methods: A mixed-methods, sequential, explanatory design was used. The quantitative phase involved a survey of 222 informal tourism workers, analyzed using partial least squares structural equation modeling. The qualitative phase consisted of in-depth interviews and focus group discussions conducted to explain and contextualize the quantitative results.

Results: Health promotion significantly increased readiness to participate ($p < 0.05$; $f^2 = 0.480$) and knowledge ($p < 0.05$; $f^2 = 0.304$). However, knowledge did not mediate the relationship between health promotion and readiness ($p = 0.186$; $f^2 = 0.001$). Qualitative findings showed that income insecurity, irregular schedules, limited managerial and institutional support, and weak follow-up mechanisms constrained workers' ability to transform knowledge into readiness.

Conclusion: Health promotion influences readiness primarily through relational, motivational, and contextual mechanisms rather than cognitive acquisition alone. These findings highlight the need for adaptive and participatory BOHS strategies that address structural and social barriers. For effective implementation, BOHS implementers and primary health centers should incorporate flexible scheduling, continuous mentoring, and participatory leadership into routine practice. Embedding BOHS activities within workers' social and organizational environments can strengthen sustained participation and promote more equitable and resilient occupational health systems.

Keywords: basic occupational health services, health promotion, informal tourism workers, occupational health, participation readiness

INTRODUCTION

Efforts to improve occupational health services for informal workers have become a central agenda in global public health systems seeking to enhance equity and inclusivity. World Health Organization has emphasized integrating primary health care with community-based worker health services as a strategic approach to expand access for informal workers, who often face substantial health risks and structural exclusion (Siriruttanapruk & Praekunatham, 2022). Indonesia has responded by adopting the basic occupational health services (BOHS) model and formalizing it through regulations that require primary health care centers to provide occupational health services tailored to local worker needs (Adi et al., 2024). These initiatives reflect the urgent need to address health vulnerabilities among informal workers, who frequently encounter unsafe working environments (Thanapop et al., 2021), limited social protection, and restricted access to essential health services (Viramgami et al.,

2020). Beyond expanding service coverage, these efforts highlight the challenge of ensuring that informal workers are not only informed but also ready and willing to engage in occupational health programs. They also align with broader international commitments to sustainable development, particularly in promoting long-term occupational health resilience and reducing inequities in underserved worker populations (Boileau, 2016; Kavouras et al., 2022).

Within the tourism sector, occupational risks are compounded by fluctuating work conditions, variable work arrangements, and reliance on informal labor. Although structured risk management in tourism has proven effective in reducing hazards (Dioko & Harrill, 2019), occupational health and safety programs largely prioritize the formal sector, supported by institutional infrastructures such as hospitality management systems (Ciarlante et al., 2024) and health emergency frameworks (Han et al., 2021). The informal tourism workforce, despite its significant contribution to local economies, remains underserved in occupational health initiatives. Moreover, participation in the BOHS program remains low, influenced by limited awareness, weak management commitment, and insufficient readiness among workers to engage (Bumyut et al., 2022; Kinyanjui Njogu et al., 2019; Konijn et al., 2018). This persistently low participation rate highlights a recurring problem in occupational health promotion. Increased exposure to health information does not automatically translate into a willingness to participate in organized health services (Bensa & Širok, 2023).

Understanding readiness to participate is essential because participation in health programs does not emerge automatically. Participation is shaped by empowerment, health promotion, learning, and mobilization processes that develop workers' cognitive and motivational preparedness (Damen et al., 2023; Huang, 2020). Evidence shows that workers with higher readiness demonstrate lower resistance and greater engagement in health initiatives (Robertson et al., 2021). In this study, readiness to participate is conceptualized as a context-specific state reflecting workers' perceived feasibility, relevance, and willingness to engage in BOHS activities, rather than a simple intention or attitude. In addition, community participation has been shown to improve health outcomes when supported by strong organizational processes (Haldane et al., 2019). Drawing on diffusion of innovation theory, readiness is positioned within the persuasion and decision stages of the innovation-decision process, where knowledge acquisition alone is insufficient without enabling social and structural conditions. Collectively, these findings indicate that strengthening the mechanisms that convert knowledge into readiness is essential for improving participation. Such mechanisms are particularly critical in informal work settings, where economic insecurity, time constraints, and institutional gaps can constrain workers' capacity to act on health knowledge (Capasso et al., 2022; Dobbins et al., 2002; Naicker et al., 2021). This strengthening is also crucial for advancing sustainable development principles that emphasize empowerment, equity, and collaborative partnerships in health promotion (Spencer et al., 2019).

Several studies have provided important insights into the health vulnerabilities and service access challenges faced by informal workers across diverse contexts. For example, research by Celeste-Villalvir et al. (2022) shows that informal workers often experience severe health disadvantages, including mental health problems, substance abuse, and substantial barriers to care, necessitating targeted and multifaceted health promotion strategies. Research in Thailand demonstrates that integrating BOHS into primary health care is feasible and scalable, but contingent on strong policy support, sustained resource allocation, and continuous staff empowerment (Siriruttanapruk & Praekunatham, 2022). Broader analyses of primary health care systems in low- and middle-income countries highlight structural weaknesses, including insufficient funding for preventive services, under-resourced community health workers, high out-of-pocket expenditures, and weak engagement of informal workers (Langlois et al., 2020). Participatory research in Bolivia shows that informal worker communities can actively co-develop health promotion strategies when supported by structured facilitation and primary health care collaboration (Leyns et al., 2025). Furthermore, evidence from Pakistan indicates that health insurance and health-awareness programs can significantly improve health outcomes among female informal workers (Jafree et al., 2021). Collectively, these studies underscore the importance of tailored, community-oriented, and equity-driven health interventions for informal workers. However, they predominantly emphasize service provision and outcomes, rather than the underlying processes through which health knowledge is transformed into readiness to participate. They also highlight the need to embed sustainability principles into occupational health strategies to ensure that improvements in access and outcomes are sustained over time.

However, none of these studies analyzes the specific dynamics through which informal tourism workers interpret, internalize, and operate health information into readiness to participate. This study addresses this critical research gap and introduces novelty by examining the systemic barriers that shape the transition from knowledge to readiness, with a specific focus on informal tourism workers. This group is both economically significant and empirically underrepresented.

Despite the growing body of literature on informal worker health, existing research remains limited in explaining how informal workers transition from receiving health knowledge to developing readiness to participate in occupational health programs. The existing literature primarily focuses on health needs assessments, system integration models, and the outcomes of health interventions. Less attention has been paid to the non-linear, context-constrained pathways through which knowledge may fail to translate into readiness, particularly in informal employment settings. The five state-of-the-art studies collectively reveal gaps in areas such as access barriers (Celeste-Villalvir et al., 2022), sustainability of integrated occupational health services (Siriruttanapruk & Praekunatham, 2022), structural weaknesses in primary health care systems (Langlois et al., 2020), mechanisms of community engagement (Leyns et al., 2025), and the equity impacts of health interventions (Jafree et al., 2021). However, none of these studies analyzes the specific dynamics through which informal tourism workers interpret, internalize, and operate health information into readiness to participate. As a result, the observed gap between knowledge and participation is often

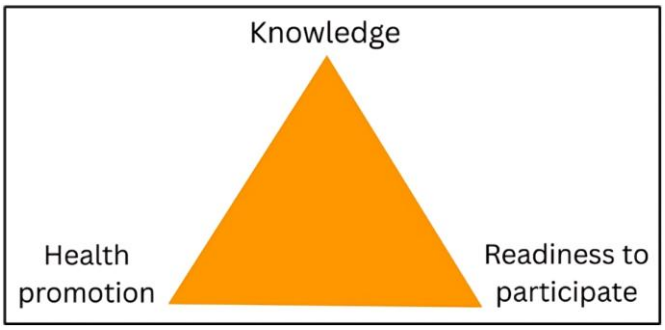

Figure 1. Conceptual framework of readiness to participation construct (Adapted from Murti, 2018; Rogers et al., 2014)

treated as an empirical limitation rather than as a theoretically meaningful phenomenon. This study addresses this critical research gap by examining the systemic and contextual barriers that shape the transition from knowledge to readiness, with a specific focus on informal tourism workers. This group is both economically significant and empirically underrepresented.

Based on these gaps, this study aims to examine the effect of BOHS-based health promotion on informal tourism workers' knowledge and readiness to participate in occupational health activities, while identifying systemic barriers that hinder this transition. Rather than assuming a linear mediating role of knowledge, the study explores whether knowledge operates as a necessary but insufficient condition for readiness under structural and motivational constraints. Using a mixed-methods design, the study evaluates the effectiveness of BOHS health promotion and clarifies the contextual factors limiting the translation of knowledge into readiness. The findings contribute to the discourse on occupational health promotion and sustainability by informing inclusive, context-sensitive BOHS strategies for informal tourism workers.

METHODOLOGY

Research Design

This study employed a mixed-methods approach using a sequential explanatory design. The quantitative phase was conducted first to test the hypothesized relationships among health promotion, knowledge, and readiness to participate. The subsequent qualitative phase was designed to explore contextual and process-related factors that could not be fully captured through statistical modeling. This design enabled a more comprehensive understanding of participation readiness within informal occupational settings.

The conceptual framework guiding the study is presented in **Figure 1**. The framework illustrates the proposed relationships among health promotion, knowledge, and readiness to participate in occupational health activities. Drawing on diffusion of innovation theory, health promotion is positioned as an external influence that shapes knowledge acquisition and readiness during the persuasion and decision stages of the innovation-decision process (Dobbins et al., 2002; Rogers et al., 2019). Knowledge is treated as a proximal outcome of health promotion and is hypothesized to influence readiness. In this study, knowledge refers to cognitive awareness and understanding of BOHS principles and procedures. In contrast, readiness denotes a contextual and motivational condition characterized by perceived feasibility, relevance, and willingness to engage.

The quantitative phase applied a cross-sectional survey design to assess relationships among the key constructs among informal tourism workers. The qualitative phase involved in-depth interviews and focus group discussions to examine relational, institutional, and structural factors shaping readiness. Findings from the qualitative inquiry were used to interpret and contextualize the quantitative results. To ensure methodological rigor and transparency, the study followed established reporting standards for observational research and the consolidated criteria for reporting qualitative research.

Participants and Procedures

This study was conducted in Bantul District, Indonesia, an area characterized by lowland, hilly, and coastal tourism zones. As a major tourism destination, Bantul hosts diverse informal occupations embedded in community-based economic activities. This context provided an appropriate setting for examining BOHS participation among informal tourism workers.

In the quantitative phase, participants were members of BOHS groups facilitated by community health centers. They represented three occupational categories: tourism site managers, culinary vendors, and artisans engaged in micro, small, and medium-sized enterprises supporting tourism activities. Because comprehensive worker registries are not available in the informal sector, proportional random sampling was implemented using a location-based approach.

Sampling frames were constructed from official BOHS group lists maintained by community health centers at each tourism site. The number of respondents selected from each occupational category was determined proportionally to the size of that group within the BOHS membership. To ensure randomness in the absence of a complete worker registry, data collectors applied a systematic selection rule at each site. After determining the required quota for each occupational group, workers were approached using an interval-based method (every n-th eligible member present during BOHS activities or listed in attendance records), with the starting point randomly determined at each location. If a selected individual declined participation or was unavailable, the next eligible member in sequence was invited to maintain proportional allocation. Using this procedure, 222 respondents were recruited.

Eligibility criteria required participants to be permanently engaged in tourism-related informal work and registered as members of BOHS groups coordinated by community health centers. Participants were also required to demonstrate the ability to communicate effectively in verbal and written Indonesian to ensure accurate data collection. These criteria ensured adequate exposure to BOHS activities and meaningful engagement with the survey instruments. All eligible participants received a clear explanation of the study's objectives and procedures prior to participation. Written informed consent was obtained before data collection commenced.

For the qualitative phase, informants were selected purposively based on their roles, experience, and involvement in BOHS implementation. The sample included eight BOHS cadres, nine business owners or tourism site managers, one head of destination management, ten BOHS program managers from community health centers, and one BOHS advisor at the district health office. Sampling continued until thematic saturation was achieved, defined as the point at which no substantively new themes emerged from additional interviews. Each informant was contacted individually, and interviews were arranged at mutually agreed-upon times and locations to ensure their comfort, confidentiality, and data accuracy.

Instruments and Data Analysis

The quantitative instrument consisted of a structured questionnaire assessing participatory health promotion, BOHS-related knowledge, and readiness to participate. Instrument development was guided by diffusion of innovation theory and included indicators reflecting awareness, persuasion, decision-making, and commitment to engagement. Content validity was evaluated through expert review involving public health academics and BOHS practitioners. The questionnaire was administered in Indonesian and pilot-tested to ensure clarity and contextual relevance.

Quantitative data were analyzed using partial least squares structural equation modeling (PLS-SEM) with SmartPLS version 4.0. PLS-SEM was selected because of its suitability for theory development, mediation testing, and modeling complex relationships under conditions of non-normal data distribution. Sample adequacy was assessed using the 10-times rule and statistical power considerations. The measurement model was evaluated through indicator reliability, internal consistency reliability, convergent validity, and discriminant validity using the Fornell-Larcker criterion and the Heterotrait-Monotrait (HTMT) ratio. Full collinearity variance inflation factors (VIFs) were examined to assess potential common method variance. Structural model evaluation included bootstrapping with 5,000 subsamples to test the significance of direct and indirect effects, and bias-corrected confidence intervals were used to assess mediation.

The qualitative phase aimed to identify structural, contextual, and motivational factors explaining why increased knowledge did not translate into readiness to participate. Data collection used semi-structured in-depth interviews and focus group discussions guided by an interview protocol developed from quantitative findings. Qualitative analysis followed a thematic coding process involving open coding, axial coding, and theme development. Two researchers independently coded the data, and discrepancies were resolved through discussion to reach analytical consensus. Trustworthiness was strengthened through source and method triangulation, reflexive memoing, and careful examination of deviant cases.

Ethical Consideration

Prior to data collection, informed consent was obtained from all participants, and their confidentiality was ensured throughout the study. Only individuals who voluntarily agreed to participate were included in the study. The study protocol received ethical approval from the Health Research Ethics Committee of Dr. Moewardi Regional General Hospital (approval number: 1.030/IV/HREC.2024).

RESULTS

Respondents Characteristic

The survey findings indicate that informal tourism workers in the study locations represent a heterogeneous demographic and occupational profile. The three predominant occupational categories were culinary traders (37.84%), tourism managers (36.04%), and craftsmen or artisans engaged in micro, small, and medium-sized tourism enterprises (26.13%). These proportions reflect the interdependence of service, managerial, and production roles within the informal tourism supply chain.

Gender representation characteristics were relatively balanced. Women comprised 52.70% of respondents, indicating that informal tourism work provides entry opportunities for both men and women. This composition highlights the need for occupational health programs that address gender-related differences in work patterns and risk exposure. Furthermore, their education levels are in the moderate category. Most respondents (62.61%) completed high school, 30.63% had junior high school education or less, and 6.76% had higher education. This distribution suggests that health promotion materials should use accessible language and practice-oriented approaches.

Respondents ranged in age from 17 to 75 years. Workers aged 30 years or younger accounted for 26.58% of the sample. Those aged 31-40 years represented 24.32%, those aged 41-50 years 25.68%, and those aged 50 years or older 23.42%. This broad age distribution indicates variation in work experience and health risk perception, which may influence readiness formation. Overall, the demographic diversity provides important context for interpreting participation patterns in BOHS programs.

Measurement Model Evaluation

The measurement model met established criteria for reliability and validity. Average variance extracted (AVE) values ranged from 0.506 to 0.780 at the construct level, while dimension-level AVE values ranged from 0.615 to 0.934. These results indicate adequate convergent validity. Composite Reliability values ranged from 0.825 to 0.972, confirming strong internal consistency.

All VIF values were below 5, indicating no multicollinearity concerns. Discriminant validity was assessed using the Fornell-Larcker criterion and the HTMT ratio. The results confirmed that each construct represented a distinct latent concept. Detailed statistics are presented in **Table 1**. Overall, the measurement model was suitable for structural analysis.

Structural Model Evaluation

The structural model analysis examined the hypothesized relationships among health promotion, knowledge, and readiness to participate using PLS-SEM. The analysis focused on the significance, direction, and practical magnitude of

Table 1. Internal consistency, reliability, and convergent validity

Constructs	Dimensions	Outer loading	AVE dimension	AVE variable	Composite reliability	Colinearity VIF
Readiness to participate	Introduction of innovation	0.545	0.664	0.557	0.887	1.513
	Persuasion	0.757	0.630		0.895	1.522
	Decision	0.838	0.615		0.825	2.160
	Confirmation	0.816	0.711		0.880	1.905
Health promotion	Communication	0.790	0.853	0.780	0.920	1.765
	Participative planning	0.918	0.920		0.972	3.846
	Implementing	0.897	0.841		0.914	3.037
	Monitoring	0.921	0.934		0.966	3.940
Knowledge	Awareness of innovation	0.805	0.717	0.506	0.835	1.171
	Technical knowledge	0.782	0.736		0.848	1.242
	Principle knowledge	0.509	0.707		0.828	1.078

Table 2. Hypothesis test and the level of influence between variables

Hypothesis	O	t-value (O/SD)	*p*	Decision	f^2	Level of influence
H1. Health promotion->readiness to participate	0.624	12.595	0.000	Significant	0.527	High
H2. Health promotion->knowledge	0.487	9.327	0.000	Significant	0.311	High
H3. Knowledge->readiness to participate	0.072	1.324	0.186	Not significant	0.007	Low
H4. Health promotion->knowledge->readiness to participate	0.045	1.283	0.199	Not significant	-	-

Note. O: Original sample & SD: Standard deviation

Table 3. Cross-validated predictive ability test

Variable	R^2	Adjusted R^2	Q^2 predict	PLS-SEM vs. indicator average			PLS-SEM vs. linear model		
				Average loss difference	t-value	p	Average loss difference	t-value	p
Readiness to participate	0.438	0.432	0.215	-0.209	4.314	0.000	0.019	1.180	0.239
Knowledge	0.237	0.234	0.113	-0.108	3.510	0.001	-0.014	1.168	0.244

direct and indirect effects to assess the explanatory power of the proposed model. Effect sizes (f^2), coefficient estimates, and significance levels were interpreted in combination to avoid overreliance on statistical significance alone.

Table 2 presents the results of hypothesis testing, including path coefficients, t-values, p-values, and f^2. **Table 2** shows that health promotion exerted a strong and statistically significant effect on readiness to participate ($O = 0.624, p < 0.05$), with a large f^2 (0.527), indicating substantial practical relevance. Health promotion also had a significant positive effect on knowledge ($O = 0.487, p < 0.05$), with a moderate-to-large f^2 (0.311), confirming its role in enhancing workers' understanding of BOHS-related issues. In contrast, the path from knowledge to readiness to participate was weak and not statistically significant ($O = 0.072, p = 0.186, f^2 = 0.007$), suggesting that knowledge contributed negligibly to readiness formation.

The mediation hypothesis was further assessed by examining the indirect effect of health promotion on readiness through knowledge. The indirect path was not statistically significant ($O = 0.045, p = 0.199$), indicating that knowledge did not mediate the model. Together, the results summarized in **Table 2** indicate that the influence of health promotion on readiness operates primarily through direct pathways rather than through cognitive mediation. This pattern supports the interpretation that factors beyond knowledge acquisition alone shape readiness to participate.

The explanatory power and predictive relevance of the structural model are reported in **Table 3**. The R^2 value for knowledge was 0.237, indicating that health promotion explained approximately 23.7% of the variance in knowledge. The R^2 value for readiness to participate was 0.438, suggesting that nearly 43.8% of the variance in readiness was explained by health promotion. Both constructs demonstrated positive Q^2 values, indicating acceptable predictive relevance and supporting the robustness of the structural model.

Taken together, the structural model results demonstrate that health promotion is effective in improving both knowledge and readiness to participate among informal tourism workers. However, the absence of a significant knowledge-to-readiness pathway indicates that cognitive gains alone are insufficient to translate into participation readiness. These findings provide a clear empirical basis for further qualitative exploration of contextual, motivational, and structural factors influencing readiness, which is addressed in the subsequent section.

Integrated Interpretation of Quantitative and Qualitative Findings

Interview findings indicate that, at the individual level, workers often express fear of discovering health problems through screening activities. This concern helps explain why increased knowledge did not translate into greater readiness to participate, as reflected in the non-significant relationship between knowledge and readiness observed in the quantitative analysis. Despite recognizing the benefits of BOHS participation, many workers perceived health screening as a source of anxiety rather than empowerment. One worker stated, *"I feel healthy, so I am afraid to get checked because I might find something wrong"*. Another explained, *"If I find out I am sick, I will worry and cannot work"*. Economic concerns further constrained readiness, as participation was viewed as a potential threat to daily income. A respondent noted, *"If I leave my kiosk to participate in activities, I lose customers and money"*.

Table 4. Barriers to the transition of knowledge to the readiness to participate phase

Meaning unit	Meaning of code	Categories/theme
Some workers resist health checks, fearing what their health conditions might reveal. Statements like "Oh, I'm healthy, I don't have any complaints" show low perceived susceptibility, which is a key barrier to active participation.	Fear and low risk perception	Individual barriers
Informal tourism jobs are diverse and lack fixed hours. This makes it difficult for health workers to reach contract workers, seasonal traders, and those with multiple jobs, as their work schedules don't align with BOHS activities. Contract workers, in particular, avoid participation because they believe BOHS activities disrupt their productivity and daily income potential.	Mismatch of time and work pattern/ opportunity	Structural barriers
Most tourism managers lack a structured BOHS institution, with no internal organization, infrastructure, or participatory management mechanisms. BOHS activities rely on the initiatives of primary health workers, without institutional support from tourism managers. Some leaders were willing to collaborate but felt they lacked the capacity or knowledge to establish an independent BOHS institution.	Lack of structure and participatory leadership	Institutional barriers
Appointed cadres are often seen as "authorities" by workers rather than as community facilitators, which creates social distance and hinders two-way communication. Individualistic attitudes and low solidarity among workers also make collective participation challenging.	Non-inclusive relations between cadres and workers	Social barriers
Despite training and outreach, there was no support for developing follow-up plans or monitoring by health workers. Tourism management leaders said that without this support, they did not know the next steps and tended to revert to their usual work routines. This shows that health promotion requires a continuous empowerment process, not just a one-time transfer of information.	Lack of post-training assistance	Implementation barriers

Structural constraints further shaped readiness by limiting participation. Informal tourism work is characterized by irregular schedules, seasonal demand, and overlapping job responsibilities, which often conflict with the timing of BOHS activities. Workers reported that health promotion sessions frequently coincided with peak business hours, making participation impractical. One worker explained, *"Activities are usually held when tourists arrive, which is our busiest time"*. These constraints clarify why improved knowledge alone failed to generate readiness and are consistent with the strong direct effect of health promotion on readiness identified in the structural model.

Institutional factors also influenced readiness. Tourism managers described the absence of structured BOHS organizations, limited infrastructure, and weak participatory leadership within tourism sites. Health promotion activities depended largely on external health workers rather than being embedded within organizational routines. One manager stated, *"We just wait for the health center to come. We do not have our own system or schedule"*. As summarized in **Table 4**, these institutional limitations reduced continuity and reinforcement, thereby weakening the capacity of knowledge to support sustained readiness.

Social dynamics further influenced participation readiness. Cadres were often perceived as authority figures rather than facilitators, hindering open communication and limiting opportunities for collaborative learning. A worker remarked, *"Sometimes we feel uncomfortable asking questions because the cadres feel like supervisors"*. Weak social cohesion and individualistic work arrangements further limited collective participation. These relational conditions suggest that readiness is more responsive to interpersonal trust and social support than to information provision alone.

Implementation-related barriers were evident in the lack of post-training follow-up and monitoring. Workers and managers reported that motivation declined once initial training activities ended due to limited reinforcement from health personnel. One manager noted, *"After the training, there was no follow-up. We did not know what to do next"*. This pattern, also reflected in **Table 4**, indicates that without sustained engagement, knowledge remains a short-term outcome rather than a driver of readiness.

Taken together, the integrated findings indicate that health promotion influences readiness to participate primarily through motivational, relational, and contextual mechanisms rather than through cognitive acquisition alone. The non-significant mediating role of knowledge therefore reflects a context-constrained readiness pathway rather than a limitation of the proposed model. In informal tourism work settings, readiness emerges from the alignment between health promotion activities and workers' economic realities, social relationships, institutional support, and implementation continuity. These findings underscore the importance of designing BOHS strategies that are participatory, adaptive, and sustained to strengthen readiness among informal tourism workers.

DISCUSSION

Worker Characteristics and Their Relevance to Participation Readiness

The demographic and occupational characteristics identified in this study provide an important contextual basis for interpreting readiness to participate in BOHS among informal tourism workers. Although respondents represented diverse occupational roles, including culinary vendors, artisans, and tourism site managers, the similarity of participation barriers across these groups suggests that readiness is primarily shaped by shared informal work conditions rather than by job-specific characteristics. This pattern is consistent with the quantitative and qualitative findings, which show that structural and contextual constraints limited readiness across occupational categories. Taken together, these findings suggest that occupational informality itself functions as a dominant contextual factor influencing participation readiness (Masanyiwa et al., 2020).

These findings are consistent with prior research indicating that informal-sector workers share common vulnerabilities, including limited access to occupational health services, income insecurity, and elevated health risks (Thanapop et al., 2021; Viramgami et al., 2020). Under such conditions, knowledge acquisition alone is unlikely to generate readiness when workers lack the practical capacity to act on health information. This interpretation aligns with the non-significant knowledge-readiness pathway observed in this study. Emerging evidence suggests that participation decisions among informal workers are influenced more by perceived feasibility and risk trade-offs than by cognitive awareness alone (Kansra & Gill, 2017). This study extends these findings by empirically demonstrating that feasibility constraints can weaken the behavioral implications of knowledge in informal tourism contexts.

The gender composition of the sample, with women comprising more than half of respondents, reflects the inclusive yet precarious nature of informal tourism employment. This observation is consistent with global evidence showing that informal tourism work offers flexible labor arrangements while often placing women in lower-paid and less-protected positions (Carlos et al., 2023; Padyala & Kiran, 2025). Gendered economic responsibilities and caregiving roles may shape readiness formation by influencing how health risks are prioritized. Strengthening women's engagement in BOHS activities is strategically important, as women frequently act as health communicators within households and communities (Emidi, 2025). This perspective aligns with sustainability frameworks that position gender equity as central to resilient community health systems (Kieny et al., 2017; Mansour et al., 2022).

The wide age range of respondents further highlights the need for differentiated health promotion approaches. Younger workers may respond more positively to interactive and peer-based learning formats. Older workers, by contrast, often require practical guidance related to ergonomics and chronic health management. These age-related differences help explain why standardized knowledge dissemination did not translate uniformly into readiness across the sample (Magnavita, 2018). Evidence indicates that younger workers benefit from participatory approaches addressing stress-related risks (Lucini et al., 2023), while older workers require tailored accommodations to maintain safety and functional capacity (Sanders, 2018). The coexistence of multiple age cohorts in informal tourism settings underscores the importance of BOHS strategies that integrate cognitive, motivational, and contextual elements rather than relying solely on information transfer.

Overall, diversity in worker characteristics reinforces the central conclusion of this study. Across gender, age, and occupation, readiness was shaped primarily by contextual feasibility and economic considerations rather than by knowledge levels alone. This finding clarifies why health promotion exerted a strong direct effect on readiness, whereas knowledge did not function as a mediator. BOHS interventions targeting informal tourism workers should therefore emphasize participatory and context-sensitive processes that address shared structural realities while remaining responsive to demographic diversity (Widiastini et al., 2024).

Effects of Health Promotion on Knowledge and Readiness to Participate

The results demonstrate that health promotion significantly increased both knowledge and readiness. However, the pathways linking these constructs differed. Health promotion influenced readiness directly, while knowledge did not significantly predict readiness. This distinction provides important insight into how BOHS interventions operate in informal settings. Consistent with previous studies, participatory communication and practical demonstrations were effective in enhancing awareness and engagement in occupational health initiatives (Indar et al., 2022; Tien et al., 2024). In informal contexts, learning often occurs through relational and experiential channels rather than formal instruction. The present findings extend this literature by showing that relational engagement may strengthen readiness even when cognitive gains alone do not. Such dynamics align with sustainability principles that emphasize empowerment and inclusive participation (Boileau, 2016; Spencer et al., 2019).

At the same time, the absence of a significant knowledge-readiness relationship indicates that cognitive understanding alone is insufficient to stimulate participation. Similar patterns have been reported in occupational safety research, where knowledge improvement did not consistently translate into behavioral change (Suryanto & Parmasari, 2020). Other studies suggest that emotional comfort and perceived feasibility exert stronger influence on participation decisions than informational factors (Stuart & D'Lima, 2022). The current findings are consistent with this evidence and suggest that readiness formation is mediated by contextual interpretation rather than by knowledge accumulation alone.

Comparative evidence highlights an important distinction between informal and formal employment settings. In regulated workplaces, improved knowledge is more likely to translate into active participation because organizational enforcement and stable schedules reduce contextual barriers (Dobbins et al., 2018). Positive associations between knowledge and occupational health engagement have been reported in formal settings (Friedrich et al., 2024; Greenberg et al., 2021). In contrast, this study indicates that such linear cognitive pathways may not operate similarly in informal tourism environments. This difference underscores the need for BOHS strategies that account for structural constraints specific to informal work.

The non-significant mediating role of knowledge in this study reinforces the conclusion that knowledge acquisition is a necessary but insufficient condition for readiness to participate. Although health promotion improved cognitive understanding, readiness was shaped more strongly by perceived relevance, emotional comfort, and practical feasibility, consistent with the strong direct effect identified in the structural model. Similar patterns have been observed among frontline health workers and in workplace well-being programs, where participation remained limited when personal relevance was low or operational barriers outweighed informational gains (Basu et al., 2022; Sherman et al., 2024). Extending this evidence, the present findings demonstrate that in informal tourism settings, contextual feasibility

conditions the behavioral implications of knowledge. These results underscore the need for BOHS interventions that integrate motivational and contextual strategies alongside information provision. Approaches that emphasize relevance-based communication, social support, and feasible participation arrangements are likely to strengthen readiness more effectively than knowledge dissemination alone. Such strategies are aligned with sustainability-oriented frameworks that prioritize empowerment, inclusivity, and structural responsiveness in occupational health systems (Kavouras et al., 2022; Spencer et al., 2019).

Contextual Determinants Limiting the Translation of Knowledge into Readiness

The findings indicate that several contextual conditions constrained the transformation of knowledge into readiness to participate. At the individual level, emotional responses were particularly influential. Fear of discovering illness and low perceived susceptibility discouraged preventive action despite adequate awareness. Expressions such as "*I am healthy, I feel nothing*" illustrate defensive optimism that weakens motivation. This pattern is consistent with prior research demonstrating that emotional appraisal and perceived vulnerability significantly influence workplace safety behavior (Lee et al., 2021; Miller et al., 2021). It also aligns with evidence showing that emotional barriers can diminish the practical impact of knowledge (Sherman et al., 2024).

Structural constraints further shaped readiness. Irregular working hours, seasonal tourism demand, and the absence of compensated time for participation limited workers' capacity to attend BOHS activities. Similar dynamics have been reported in other informal labor contexts, where livelihood pressures and time scarcity reduce engagement in occupational health programs (Betancourt-Sanchez & Cuenca, 2022; Naicker et al., 2021). When participation threatens daily income, workers prioritize immediate economic needs over long-term health considerations, even when knowledge is present (Capasso et al., 2022). These findings reinforce the argument that economic precarity restricts the behavioral translation of health information.

Institutional limitations also played a critical role. The absence of structured BOHS organizations within tourism sites and limited managerial involvement reduced opportunities for sustained participation. Activities were largely dependent on external health personnel, which weakened continuity. Comparable institutional challenges have been observed in community-based health initiatives, where weak organizational ownership undermines sustainability (Reindrawati, 2023). Evidence from BOHS implementation in Thailand similarly demonstrates that managerial commitment is essential for maintaining worker participation (Siriruttanapruk & Praekunatham, 2022). In contrast to more regulated employment settings, informal tourism environments lacked the institutional support needed to translate awareness into sustained readiness.

Relational and implementation factors compounded these constraints. Cadres were frequently perceived as authority figures rather than facilitators, limiting open dialogue and peer learning. Hierarchical interaction patterns have been shown to reduce trust and participatory engagement in similar contexts (Adi et al., 2024). In addition, limited post-training follow-up and weak monitoring reduced motivation over time. This observation is consistent with broader evidence that inconsistent reinforcement undermines community-based health programs (Langlois et al., 2020). Collectively, these contextual influences indicate that readiness is socially and institutionally embedded rather than determined solely by cognitive processes.

Relational and Contextual Pathways Linking Health Promotion to Readiness

The findings of this study indicate that readiness to participate is most strongly shaped by relational and experiential dimensions of health promotion rather than by knowledge transmission alone. Health promotion activities that foster trust, interpersonal interaction, and shared practical experiences were more effective at strengthening readiness, as reflected in the strong direct effect observed in the quantitative model. Relational mechanisms, such as participatory planning and peer interaction, enhance emotional engagement and social reinforcement, both of which are central to behavioral intention. Prior research highlights the importance of trust-based relationships in enabling individuals to adopt new health practices (Barbosa & Borges-Andrade, 2022; Teeters et al., 2021).

Contextual realities further condition how workers respond to health promotion initiatives. Economic vulnerability, unpredictable schedules, and weak job security reduce the feasibility of participation even when knowledge is adequate. Empirical studies have shown that workers in low-wage or precarious employment are significantly less likely to participate in workplace health programs because doing so competes with income-generating activities (Stiehl et al., 2018; Tsai et al., 2019). These findings corroborate those of Capasso et al. (2022), who found that perceived feasibility and immediate livelihood concern often outweigh cognitive understanding in shaping participation decisions. Such constraints reflect broader sustainability challenges related to inequity and limited access to preventive health services (Boileau, 2016; Kavouras et al., 2022).

Health promotion initiatives that directly engage workers' lived experiences are therefore more likely to enhance readiness. Participation increases when programs align with work routines, address concrete risks, and are delivered through familiar social settings. Evidence suggests that peer-supported and group-based approaches strengthen trust and relevance, thereby improving engagement (Lawlor et al., 2020; Rutherford et al., 2024). In contrast, interventions based primarily on information transfer tend to be less effective in precarious employment contexts, where autonomy and time flexibility are limited (Capasso et al., 2022; Trueba, 2017).

Strengthening readiness thus requires BOHS models that move beyond cognitive education to incorporate flexible scheduling, participatory facilitation, and sustained interpersonal support. Organizational readiness and leadership commitment are equally critical, as programs must adapt to local conditions and ensure meaningful worker involvement (Nobrega et al., 2021). Embedding BOHS activities within existing social networks through peer-driven communication and community-based mentoring aligns with

evidence that culturally and contextually grounded approaches enhance engagement (Lawlor et al., 2020). Such integration supports sustainable development objectives by promoting resilient, inclusive, and equitable occupational health systems (Jain et al., 2018).

Finding Implications

The findings of this study refine the diffusion of innovation theory when applied to informal labor contexts. The absence of a significant transition from knowledge to readiness indicates that innovation adoption does not follow a linear cognitive pathway in environments characterized by economic vulnerability and institutional instability. Instead, readiness appears to be activated primarily through experiential and relational cues rather than through cognitive input alone. This interpretation is consistent with studies showing that participation in workplace health promotion is strongly influenced by relational trust, perceived behavioral control, and social interaction patterns (Barbosa & Borges-Andrade, 2022; Röttger et al., 2017; Teeters et al., 2021). Informal workers also tend to rely on experiential validation and peer endorsement when deciding whether to participate in health-related initiatives (Baxter et al., 2023). These patterns suggest that diffusion processes in informal settings must explicitly incorporate sustainability-oriented dimensions such as social cohesion, equity, and participatory engagement.

The study further demonstrates that readiness among informal workers is shaped more by contextual feasibility than by knowledge acquisition alone. Unstable work schedules, income insecurity, and weak institutional support are central constraints in the innovation-decision process, limiting workers' ability to act on health information even when knowledge is adequate. Similar conditions have been shown to influence participation behavior among informal and precarious workers in other contexts (Damen et al., 2024; Fujishiro, 2019). These findings indicate that classical diffusion theory needs to be adapted for informal work environments, where adoption pathways are mediated by social determinants, workplace culture, and organizational readiness rather than by individual cognition alone. Accordingly, readiness emerges from the interaction between individual motivation, peer reinforcement, and systemic support structures. This implication underscores that sustainable behavior change depends on strengthening institutional capacity, reducing structural vulnerability, and creating enabling environments that support long-term participation among informal workers (Boileau, 2016; Kavouras et al., 2022).

CONCLUSIONS

This study examined the influence of BOHS-based health promotion on informal tourism workers' knowledge and readiness to participate in occupational health activities and identified barriers to this transition. The findings demonstrate that health promotion significantly increased both knowledge and readiness to participate. However, knowledge did not mediate the relationship between health promotion and readiness, indicating that cognitive understanding alone was insufficient to generate participation readiness. Instead, readiness was shaped primarily by relational, motivational, and contextual factors that operated independently of knowledge acquisition.

Qualitative findings explain why increased knowledge failed to translate into readiness. Workers encountered multiple, interrelated barriers at individual, structural, institutional, social, and implementation levels. These included fear of diagnosis, low perceived susceptibility, income insecurity, irregular work schedules, limited managerial involvement, hierarchical cadre-worker relations, and weak post-training follow-up. Together, these barriers constrained workers' capacity to act on health information despite improved knowledge. The findings indicate that health promotion strategies based solely on information dissemination are insufficient in informal work settings.

The study contributes to theory by refining the application of diffusion of innovation in informal labor contexts. The absence of a significant knowledge-to-readiness pathway challenges the linear assumptions of classical diffusion models. In contexts marked by economic precarity and institutional instability, readiness emerges through experiential relevance, relational trust, and contextual feasibility rather than solely through cognition. This positions readiness as a context-constrained process shaped by social and structural conditions, rather than as a purely individual cognitive outcome.

From a practical perspective, the findings highlight the importance of BOHS interventions that move beyond knowledge provision. Flexible scheduling, participatory facilitation, peer-driven communication, continuous follow-up, and meaningful managerial engagement are essential for strengthening sustained readiness. For BOHS implementers and primary health care centers, these findings suggest that program delivery should be integrated into workers' daily routines and supported by local leadership within tourism sites. Such efforts should also be reinforced through continuous mentoring and community-based facilitation to sustain participation. Embedding BOHS activities within workers' social networks and everyday work environments can further strengthen participation and contribute to more equitable and resilient occupational health systems for informal workers.

This study has limitations that should be considered when interpreting the findings. The cross-sectional quantitative design limits causal inference and does not capture changes in readiness over time. In addition, the qualitative component was conducted in a single district, which may affect transferability to other informal tourism contexts. Future research should employ longitudinal or experimental designs and include diverse settings to assess long-term readiness and sustainability outcomes across informal labor sectors.

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