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ASSESSING THE RELIABILITY AND VALIDITY OF KNOWLEDGE, ATTITUDE, AND PRACTICE (KAP) ASSESSMENTS ON COVID-19 TRANSMISSION KNOWLEDGE AND PREVENTIVE MEASURES AMONG ECOTOURISM OPERATORS

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Abstract

This cross-sectional study conducted in rural Pahang state, Malaysia, aimed to validate a questionnaire examining ecotourism operators' Knowledge, Attitude, and Practice (KAP) regarding COVID-19 transmission and preventive measures. Data collection utilised the snowball technique. The questionnaire, comprising 34 items covering knowledge, attitude, and practice constructs, underwent rigorous validation and piloting before the actual fieldwork. All factor loading scores (>0.65) and Cronbach's alpha ($\alpha \geq 0.69$) were greater than the reference value, relaying indicators of reliability and internal consistency of the measured latent variables. The findings revealed that the KAP model met the goodness-of-fit criteria (HTMT<.90, SRMR<0.08, NFI>0.90) and convergent validity was achieved (AVF≤0.50). The study confirms the meticulous instrument validation, ensuring the survey tool's effectiveness in gauging KAP among ecotourism operators. This study's novelty lies in its focus on the KAP spectrum vis-à-vis COVID-19 among operators engaged in these ecotourism domains. By bridging this gap, the research aspires to inform tailored interventions, ultimately fortifying resilience against future health crises in ecotourism communities.

Keywords: Reliability; Validity; Knowledge, Attitude, and Practice (KAP); COVID-19; Transmission Knowledge; Preventive Measures; Ecotourism Operators; Malaysia

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INTRODUCTION

Recent studies highlight the vulnerability of tourism sectors, including ecotourism, to the disruptions caused by the COVID-19 pandemic (Nordin et al., 2023; Salman et al., 2023). The pandemic has drastically affected the tourism industry worldwide, posing significant challenges to the livelihoods of ecotourism operators (Salman et al., 2023). Puspitasari et al. (2020), emphasised the importance of evaluating the knowledge, attitudes, and practices (KAP) of tourism operators to understand their preparedness and response to COVID-19 pandemic. However, the absence of targeted interventions tailored to the KAP of tourism operators impedes the optimisation of prevention strategies and undermines their efficacy in curtailing COVID-19 transmission (Bumyut et al., 2022). It is well acknowledged that KAP studies are scarcely employed in the tourism and health perspectives (Shrestha & Shrestha, 2021). The study also found issues and gaps in this context, which revolve around the shortage of comprehensive insights into the specific KAP patterns regarding COVID-19 among tourism operators.

Understanding ecotourism operators' KAP concerning COVID-19 transmission and prevention is critical, yet studies focusing on this specific demographic subset are scant (Duro et al., 2021). Notably, the lack of validated and context-specific assessment tools catering specifically to the ecotourism operator demographic hampers the accurate evaluation of their understanding, attitudes, and practices concerning COVID-19 (Abdullah et al., 2020). Without a comprehensive understanding of the KAP spectrum, there's a deficiency in actionable data that can inform the design and implementation of targeted educational programs or interventions tailored to address the specific needs and challenges faced by operators in ecotourism areas. The existing scarcity in understanding the intricacies of COVID-19 transmission within ecotourism areas also underscores the importance of this study. Prevailing data often lacks granularity in assessing the specific KAP dimensions of ecotourism suppliers operating in these unique settings (Dasan et al., 2022; Hosseini et al., 2021).

This study aspires to fill a crucial gap by examining the Knowledge, Attitudes, and Practices (KAP) regarding COVID-19 among ecotourism operators in Rural Pahang State, going beyond symptomatic awareness to understand their daily behaviours and attitudes. It seeks to identify areas for intervention and enhancement by exploring the KAP in this demographic subset rarely studied in COVID-19 research, offering insights that can inform tailored interventions and strengthen resilience against the pandemic. This research not only contributes to understanding specific KAP dynamics in ecotourism settings but also holds promise in developing KAP measurements for managing health crises, thereby amplifying the effectiveness of public health initiatives in these communities.

LITERATURE REVIEW

Knowledge, Attitude, and Practices Concept

The triumvirate of knowledge, attitude, and practices (KAP) within business operations constitutes a complex interplay essential for organisational success. Notably, the relationship between knowledge, attitude, and practices is symbiotic. Knowledge is the foundation upon which attitudes are built (Che Ibrahim & Belayutham, 2020). For instance, informed knowledge about market trends and consumer behaviour can shape positive attitudes towards innovative business strategies. Attitudes, in turn, influence the application of acquired knowledge into practices (Kwol et al., 2020). A positive attitude towards embracing technological advancements can lead to implementing new operational methods. This cyclical relationship forms the core framework of effective business operations.

Extensive research has delved into understanding the dynamics of KAP within business operations. Studies by Shezad et al. (2024) highlighted that organisation fostering a culture of continuous learning and knowledge sharing witnessed enhanced operational efficiency. Conversely, a lack of knowledge dissemination impeded innovation and growth. Furthermore, the study by Tran et al. (2018) emphasised the pivotal role of attitudes in managerial decision-making. It was found that leaders with a proactive and adaptable attitude were more inclined to implement transformative strategies, resulting in increased organisational resilience. However, critiques within the literature indicate a gap in understanding the interplay between these variables (Tran et al., 2018). While studies have highlighted the significance of each element independently, limited research exists on the intricate relationships and feedback loops among knowledge, attitudes, and practices.

Ecotourism Operators and COVID-19

Ecotourism, renowned for its commitment to sustainability, biodiversity conservation, and community involvement, represents a responsible and environmentally conscious travel approach (Azinuddin et al., 2022; Nordin et al., 2023; Salman et al., 2023). Ecotourism operators, as key service providers, play a crucial role in orchestrating experiences that connect travelers with natural environments while delicately balancing conservation and economic development (Fennell, 2020). The COVID-19 pandemic, however, posed unprecedented challenges, disrupting operations, altering consumer behavior, and jeopardizing the fragile ecosystems ecotourism aims to protect.

Past literature extensively examines crises' impact on tourism, shedding light on ecotourism operators' resilience and adaptive capacity (Gabriel-Campos et al., 2021). Diversified revenue sources and robust contingency plans are imperative for weathering external shocks (Gabriel-Campos et al., 2021). Technological integration, as emphasized by Nautival et al. (2022), is pivotal in

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mitigating pandemic effects, utilizing digital platforms for marketing, communication, and virtual experiences.

The pandemic, while initially disruptive, prompted reflection and transformation within the ecotourism sector. Enhanced cooperation among communities and stakeholders is crucial, emphasizing collaborative efforts to generate unified tourism products and services (Azinuddin et al., 2023). Research by Samdin et al. (2022) advocates for ecotourism operators to pivot towards regenerative tourism practices, fostering stronger community partnerships and enhancing conservation efforts during the recovery phase. These findings underscore the importance of collaborative efforts and adaptive approaches in both community-tourism stakeholder relationships and broader ecotourism management.

Knowledge, Attitude, and Practices of Ecotourism Operators

The effective management of COVID-19 transmission and ensuring business continuity have become critical aspects for ecotourism operator's post-pandemic (Salman et al., 2023). This necessitates a comprehensive understanding of three primary facets: knowledge, attitude, and practices (KAP) among ecotourism operators. The interconnectedness of knowledge, attitude, and practices among ecotourism operators forms the cornerstone of effective pandemic management and business resilience (Kwol et al., 2020). Knowledge is foundational, empowering operators with information about the virus, transmission dynamics, and mitigation strategies. However, knowledge alone is insufficient without a congruent attitude towards implementing necessary measures (Islam et al., 2021). The attitude of ecotourism operators shapes their perception of risks, willingness to adapt, and commitment to stringent health protocols. This, in turn, influences the practices adopted within their establishments or services. This is evident as effective practices, informed by knowledge and a positive attitude, manifest in comprehensive COVID-19 management protocols, ensuring visitor safety and operational sustainability (Koščak & O'Rourke, 2021).

METHODOLOGY

This cross-sectional study in rural Pahang, Malaysia, aimed to validate an ecotourism operator's Knowledge, Attitude, and Practice (KAP) questionnaire on COVID-19 transmission and preventive measures. The 34-item questionnaire covered knowledge, attitude, and practice, adapted from existing literature (Alqahtani et al., 2021; Robina-Ramírez et al., 2021; Teng et al., 2021). Ethical clearance was obtained from the IIUM Research Ethics Committee (IIUM/504/14/11/2/ IREC 2023-199).

Sections A, B, and C assessed demographic information, COVID-19 knowledge, and attitudes, drawing from prior studies (Bonfanti et al., 2021; Li et

al., 2022). Section D gauged respondents' practices, referencing established works (Bonfanti et al., 2021; El-Said et al., 2023; Li et al., 2022). The survey was translated into Malay, validated through backward and forward translation, face validity by experts, and pilot tested with 30 respondents.

Data collection utilized the snowball technique (Sarker and Al-Muaalemi, 2022). The study adhered to a minimum sample size (N>127) for generalizability, emphasizing participant consent and confidentiality in the introductory statement. The KAP model was then examined via the Partial-least Square–Structural Equation Modelling (PLS-SEM) with the help of SmartPLS 4.0 software. PLS-SEM is a simultaneous modelling technique capable of analysing latent variables, indicators, and measurement errors in real-time. PLS-SEM can be used with a few samples and applied to all data scales (Hair et al., 2019).

ANALYSIS AND FINDINGS

Study Demographics

Trained enumerators ensured questionnaire completeness onsite, resulting in a 100 percent response rate, with each questionnaire taking approximately 15 minutes to complete. Notably, 60.1 percent (n=119) of respondents were male, and 39.9 percent (n=79) were female. At least 18.7 percent (n=37) of the respondents were holders of a diploma. In comparison, 10.6 percent (n=21) of the respondents were holders of a degree and a majority (52.5 percent: n=104) of the respondents were secondary school graduates. Among the respondents, 31 (15.7 percent) were employers and the rest, 167 (84.3 percent) were employers of the premise. Regarding the number of minimum working hours, approximately 60.1 percent (n=119) of the respondents had been working for more than 25 hours a week. Moreover, for the monthly income, approximately 24.7 percent (n=49) of the respondents were paid less than RM1000 per month and the number of respondents who were paid more than MYR1000 per month was 75.3 percent (n=149).

Descriptive Analysis

Table 1 encapsulates the comprehensive descriptive analysis findings obtained from the study to evaluate ecotourism operators' COVID-19-related knowledge, attitudes, and practices within a specific premise.

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Table 1: Survey Items Mean Score and Standard Deviation (SD)

Code	Items	Mean Score	S.D.
	Knowledge		
KQ2	An infected person may show symptoms within 2-14 days after exposure to COVID-19.	4.10	1.14
KQ3	An infected person may have symptoms ranging from mild e.g. fever to severe e.g. pneumonia, depending on their body immunity.	4.14	1.09
KQ4	The COVID-19 virus spreads via respiratory droplets and can be transmitted from person to person.	4.10	1.14
KQ5	Severity of COVID-19 increases for people with other chronic diseases such as diabetes, hypertension, and heart diseases.	3.92	1.25
KQ6	Quarantine is an effective way to reduce the spread of COVID-19.	4.29	0.87
KQ7	Alcohol-based hand sanitiser is an important disinfectant to reduce the virus from spreading.	4.22	1.06
KQ8	All disinfectant solutions should be covered and cannot be exposed to direct sunlight.	3.78	1.41
KQ9	The minimum recommended personal protective equipment when disinfecting in non-healthcare settings is rubber gloves, waterproof aprons, and closed shoes.	3.94	1.33
KQ10	The MySejahtera application introduced by the government is very helpful in dealing with the spread of the COVID-19 virus.	4.24	1.10
	Attitude		
AQ1	I believe that vaccination will prompt the immune system to fight against the virus.	3.76	1.12
AQ2	I believe that the implementation of online check-in systems can reduce the probability of the virus spreading.	3.80	1.06
AQ3	I believe our team is well-equipped with knowledge to contain the COVID-19 outbreak.	3.87	1.01
AQ4	I believe effective communication with guests, employees, travellers, the local community, and other organisations can help manage the outbreak.	3.93	0.94
AQ5	I am not worried about COVID-19 spreading on my premises.	3.13	1.13
AQ6	I believe preventive measures such as hand hygiene and cough etiquette can reduce the spreading of the virus.	3.93	0.92
AQ7	I believe the implementation of early warning systems by the Ministry of Health such as forecasting and public announcement is crucial for crisis management strategies.	3.94	0.92
AQ8	I believe this premise is financially stable to effectively respond to any health crises in the future.	3.55	1.27

Code	Items	Mean Score	S.D.
AQ9	I am ready to adapt to the ecotourism industry revolution such as embracing contactless technology to sustain the ecotourism industry.	3.77	1.07
AQ10	I believe data analysis from previous outbreaks can be helpful in handling any potential health crisis in the future.	3.91	0.94
	Practice		
PQ1	This premise cleans common facilities such as doors, handrails, toilets and lobby using disinfectants minimum three times daily for every 8 hours of operations.	4.30	1.05
PQ2	This premise carries out periodic thorough cleaning and disinfecting of fittings such as air conditioning and ventilation systems, carpets, and other fabric-based items.	4.38	0.88
PQ3	This premise provides guests with hand sanitiser as an amenity.	4.39	0.84
PQ4	This premise plans standard operating procedure (SOP) and provides personal hygiene guidelines.	4.48	0.80
PQ5	This premise provides informative signage about preventive actions that can amplify the key messages among guests and staff.	4.29	0.98
PQ6	This premise conducts staff training on the implementation of cleaning the common areas and frequently touched objects such as door knobs and switches.	4.39	0.85
PQ7	This premise has updated its social media by publishing hygiene and protection measures to reassure guests on the safety of the premise.	4.30	1.05
PQ8	This premise encourages the staff to clean their hands regularly to reduce the chance of virus transmission.	4.50	0.73
PQ9	This premise tracks and documents actions performed during the outbreak which will improve the standard operating procedure (SOP).	4.34	1.06
PQ10	This premise stays in contact with the local public health authorities to obtain updated information on COVID-19 or any future outbreaks with similar scale as COVID-19.	4.33	1.10

N=198

The descriptive analysis of the survey results on knowledge, attitude, and practice regarding COVID-19 presents a comprehensive overview of perceptions and actions related to the pandemic. These findings reflect the ecotourism operators' understanding, beliefs, and implemented measures. For knowledge, participants exhibited a high level of awareness regarding the importance of quarantine (KQ6), scoring 4.29 (SD = 0.87). Regarding attitudes, participants displayed a moderately positive outlook, with the highest belief in

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the implementation of early warning systems by the Ministry of Health (AQ7), scoring an average of 3.94 (SD = 0.92). In terms of practices, the premise displayed the highest score on the staff to clean their hands regularly to reduce the chance of virus transmission (PQ8) with a mean score of 4.50 (SD = 0.73).

Instruments Validity Assessment

In crafting the questionnaire, content validity was established through a process rooted in social cognitive theory, delineating concepts, and their associated items. This framework incorporated elements such as knowledge, attitude and practices. Three experts' opinions were sought to assess content validity, and the questionnaire underwent face validity checks through interviewer training. These meticulous steps were undertaken to enhance the questionnaire's validity and practicability (Bolarinwa, 2015).

Instruments Reliability Assessment

The outcomes concerning item-total correlations and Cronbach's alpha coefficients across the knowledge, attitude, and practice domains related to the study setting. Cronbach's alpha coefficients were employed to gauge internal consistency within each domain. The knowledge subscale consisted of 14 items ($\alpha = .762$), the attitude subscale consisted of 10 items ($\alpha = .856$), and the practices subscale consisted of 10 items ($\alpha = .646$) (Nunnally & Bernstein, 1994).

PLS-SEM Measurement Model Assessment

The confirmatory factor analysis's first step is to examine and refine the measurement model's adequacy (Figure 1), followed by examining the model fit. Table 2 presents the outer loading scores, composite reliability, convergent reliability, and Cronbach's alpha for reflective measurement model assessment.

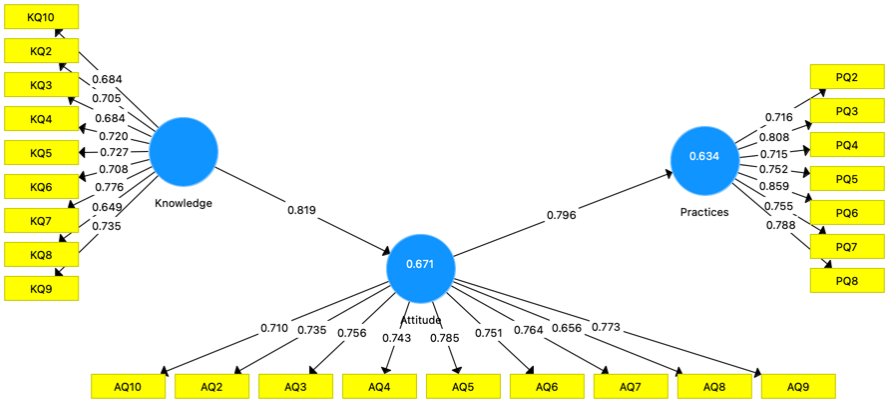

Figure 1: Measurement model assessment

Table 2: Measurement Model Assessment

Latent Variable	Code	VIF	Outer Loading	Cronbach Alpha	Composite Reliability	AVE
Knowledge	KQ2	1.785	0.705	0.877	0.902	0.505
	KQ3	1.662	0.684			
	KQ4	1.673	0.720			
	KQ5	1.874	0.727			
	KQ6	1.671	0.708			
	KQ7	2.036	0.776			
	KQ8	1.482	0.649			
	KQ9	1.889	0.735			
	KQ10	1.750	0.684			
Attitude	AQ2	1.820	0.735	0.898	0.917	0.551
**AQ1*	AQ3	1.899	0.756			
	AQ4	2.176	0.743			
	AQ5	2.387	0.785			
	AQ6	1.907	0.751			
	AQ7	2.039	0.764			
	AQ8	1.642	0.656			
	AQ9	2.140	0.773			
	AQ10	1.862	0.710			
Practices	PQ2	1.808	0.716	0.886	0.911	0.596
**PQ1, PQ9 & PQ10*	PQ3	2.181	0.808			

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Latent Variable	Code	VIF	Outer Loading	Cronbach Alpha	Composite Reliability	AVE
	PQ4	1.757	0.715			
	PQ5	1.855	0.752			
	PQ6	2.697	0.859			
	PQ7	1.942	0.755			
	PQ8	1.954	0.788			

**Removed*

The study's initial phase involves evaluating collinearity in PLS-SEM by examining the Variance Inflation Factor (VIF) (Hair et al., 2019). Common guidelines propose a VIF of 5 or higher may signal collinearity issues; however, in this study, all items exhibit VIF values below three, indicating no substantial collinearity concerns within the framework.

To assess the reflective measurement model, following Hair et al. (2019) guidelines, emphasis is placed on scrutinizing indicator loads. They advocate for loadings surpassing 0.65 for reliable indicator performance, and the model in this study meets this criterion, with loadings ranging from 0.656 to 0.859. Items with loadings below 0.65, such as AQ1, PQ1, PQ9, and PQ10, were excluded.

Distinguishing between composite reliability and Cronbach's alpha, as highlighted by Hair et al. (2019), reveals that composite reliability offers greater precision. Values above 0.70 signify reliable measures, and this research discloses values ranging from 0.866 to 0.967 across the nine constructs, exceeding the 0.70 benchmarks. Both Cronbach's alpha and composite reliability affirm the internal consistency of items within each construct.

Convergent validity, assessed through Average Variance Extracted (AVE), determines if constructs explain at least 50 percent of item variance (Hair et al., 2019). AVE values in this study range from 0.505 to 0.596, surpassing the 0.50 threshold, indicating satisfactory convergent validity.

Discriminant validity, crucial for ensuring constructs remain distinct within the structural model, is evaluated using Heterotrait-Monotrait Ratio of Correlations (HTMT) analysis (Henseler et al., 2016). The findings reveal no collinearity concerns among latent constructs, displaying values below 0.90 and significantly differing from 1.00 (Hair et al., 2011). These outcomes strongly support the model's discriminant validity.

The SRMR serves as an index gauging the standardized residuals' average between observed and expected covariance matrices, providing an estimated assessment of model adequacy. In this particular estimation, an SRMR of 0.066 denotes a strong fit, complemented by a chi-square value of 631.329 and

an NFI of 0.990, both considered satisfactory for factor models (Cheung et al., 2023). Additionally, the geodesic (dG) inconsistency at 0.628 suggests the model's superior suitability for this investigation (Schuberth et al., 2023).

DISCUSSION AND IMPLICATION

The study rigorously established the validity and reliability of the questionnaire. Content validity was ensured by expert evaluation and face validity checks. The reliability analysis, employing Cronbach's alpha coefficients, revealed satisfactory internal consistency across knowledge, attitude, and practice domains, confirming the reliability of the items. Moreover, the PLS-SEM measurement model assessment validated the reflective measurement model, showcasing adequate convergent validity and reliability. The discriminant validity analysis further affirmed the distinctness of constructs within the structural model. The confirmatory factor analysis affirmed the robustness of the model fit, as indicated by satisfactory SRMR, chi-square, and NFI values. Collinearity issues were absent, and the model demonstrated consistency, emphasising its suitability for the study. These findings underscore the model's robustness in explicating the relationships between latent variables, further supporting the validity and reliability of the instrument used.

This study has several notable implications. In term of theoretical implications, the study's focus on the knowledge, attitudes, and practices (KAP) of ecotourism operators during the COVID-19 pandemic offers targeted insights. This fills a gap in understanding the unique challenges, risks, and opportunities faced by these operators. Understanding their KAP spectrum helps tailor interventions and strategies specific to their needs. Besides, by examining KAP, the study offers a unique perspective on pandemic preparedness within ecotourism areas. It underscores the importance of having information (knowledge), positive attitudes, and effective practices to manage a crisis like COVID-19 effectively. On the other hand, the meticulous validation process of the questionnaire and the analysis of the Partial Least Square-Structural Equation Modelling (PLS-SEM) showcases the robustness of the research framework. This adds credibility to this specific study and sets a methodological standard for future research in similar domains.

Looking at the practical implications, the findings suggest a need for customised educational programs targeting ecotourism operators. Crafting specialised interventions based on the KAP identified in this study can greatly enhance the effectiveness of preventive strategies. These interventions could encompass targeted training sessions, educational campaigns, or workshops specifically addressing the gaps and areas for improvement identified among the operators. Besides, the insights from this study can contribute significantly to the design and implementation of more effective health campaigns, guidelines, or

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policies specifically tailored to the unique challenges faced by operators in ecotourism settings.

CONCLUSION

The study addresses a critical gap in understanding COVID-19's impact on ecotourism operators, emphasizing the interconnectedness between ecotourism, conservation, and local community livelihoods. By examining Knowledge, Attitudes, and Practices (KAP) dynamics, the study highlights the importance of preventive measures within ecotourism operations to safeguard ecosystems and support indigenous communities reliant on tourism. Insights gained can inform long-term planning for health crises, advocating for measures like communication channels and updated Standard Operating Procedures (SOPs) to enhance preparedness. Despite its contributions, the study has limitations, including its regional focus and sampling technique, which may limit generalizability. Future research should consider longitudinal studies, diverse geographic locations, and qualitative methods to offer a more comprehensive understanding of KAP concerning COVID-19 among ecotourism operators globally.

ETHICAL STATEMENT

This research maintains strict adherence to ethical standards to safeguard participant rights and research integrity. Informed consent was obtained, ensuring participants understood the study's purpose, procedures, and data usage. Compliance with the Malaysian Personal Data Protection Act 2010 was ensured. Approval from the International Islamic University research ethics committee was obtained prior to data collection. Rigorous citation practices were followed, and risks to participants were minimized. This study upholds the highest standards of ethical conduct and respects participant autonomy and well-being.

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