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The CHSE paradox: tourists at Blue Lagoon know the rules but do not follow them

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ABSTRACT

This study examines the relationship between tourists' knowledge of cleanliness, health, safety, and environmental sustainability (CHSE) and their CHSE-related practices at the Blue Lagoon tourist attraction in Sleman, Yogyakarta. Using a cross-sectional design, data were collected from 106 respondents through an accidental sampling technique. The Chi-Square test was employed for statistical analysis. The results revealed no statistically significant correlation between knowledge and CHSE-related practices (cleanliness: $p = 0.267$, health: $p = 0.480$, safety: $p = 0.724$, environmental sustainability: $p = 0.257$). Despite high levels of knowledge among respondents, this awareness did not necessarily translate into consistent CHSE practices. These findings suggest that factors beyond knowledge, such as behavioral habits, infrastructure availability, and social influences, may be more critical in shaping CHSE practices among tourists. The study has practical implications for improving tourism management by encouraging greater participation from tourism operators in providing adequate CHSE infrastructure, implementing clear regulations, and enhancing supervision. Additionally, tourist compliance with CHSE protocols remains essential for ensuring safety and environmental sustainability in tourism destinations. To strengthen CHSE implementation, advocacy, partnerships, and empowerment programs among stakeholders, including government agencies, tourism managers, universities, media, and the private sector—are crucial. Moreover, policy advocacy should reinforce CHSE compliance through certification mechanisms and sanctions for non-compliance. Continuous and intensive public awareness campaigns are necessary to enhance tourist commitment to CHSE practices, ensuring safer and more sustainable tourism experiences.

1. Introduction

Tourism is one of the sectors most affected by global and local events, such as security crises, natural disasters, and pandemics [1]. Recovering this sector often requires substantial time, costs, and effort [2,3]. In 2020, the COVID-19 pandemic severely impacted Indonesia's tourism industry, further exacerbating its pre-existing vulnerabilities [4,5]. According to the World Economic Forum (WEF), Indonesia ranked 40th in tourism competitiveness within the ASEAN region in 2019, trailing

behind Singapore (17th), Malaysia (29th), and Thailand (31st). Globally, Indonesia ranked 80th in the safety pillar, 102nd in the health and hygiene pillar, and 135th in the environmental sustainability pillar (Asian Today, 2023). The pandemic underscored the need for the tourism industry to adopt more resilient strategies to manage health, security, and disaster-related crises. To support sustainable tourism and mitigate industry risks, the United Nations World Tourism Organization (UNWTO) and the Global Sustainable Tourism Council have established global tourism standards [6].

In response to the pandemic, the Indonesian government issued Minister of Health Decree No. HK.01.07/MENKES/382/2020 and Minister of Tourism and Creative Economy Regulation No. 13 of 2020 [7], establishing standards and certification for the tourism sector's cleanliness, health, safety, and environmental sustainability (CHSE). These regulations aim to enhance COVID-19 prevention and control measures at tourist sites while assuring visitors that services and facilities comply with CHSE protocols. CHSE certification is expected to boost tourist confidence and contribute to the recovery of the tourism sector after the pandemic.

Global tourism trends have shifted significantly, with cleanliness, health, safety, and environmental sustainability becoming top priorities for tourists in the post-pandemic era [8,9]. Several studies have indicated that implementing CHSE has influenced tourism management strategies in various destinations. For instance, CHSE protocols have been effectively implemented in the Dlingo tourism area of Yogyakarta [10]. In Kupang, assessments of CHSE implementation by tourism managers have shown positive results [11]. Meanwhile, in Banyuwangi, CHSE certification has been utilized as a promotional strategy to enhance tourism competitiveness [12,13]. At specific tourist sites such as Kanoman Palace in Cirebon, managers have taken proactive measures to ensure visitor compliance with CHSE protocols, including issuing warnings and increasing awareness through educational efforts [14] Meanwhile, at Jimbaran Beach, the management is encouraging increased mask use, awareness of cleaning the beach and washing hands before and after entering the beach area, throwing rubbish in its place and encouraging visitors to do sports on the beach as a form of implementing CHSE [15] .

One popular form of tourism is water-based tourism, which includes natural attractions such as beaches, waterfalls, and hot springs, as well as artificial sites like swimming pools and public baths. Water tourism serves as a recreational facility and a means of sports and environmental conservation. However, it also poses risks of waterborne disease transmission if not properly managed [16]. Public baths with poor sanitation, for example, can become sources of contamination. Additionally, pollution in water tourism areas can increase health risks for visitors, such as eye and skin irritation, hepatitis, digestive disorders, and infections caused by pathogens, including viruses, parasites, and bacteria [17].

Apart from health risks, water tourism also has safety concerns, such as drowning or being swept away by strong currents [16]. Therefore, managing water tourism must emphasize cleanliness, health, safety, and environmental sustainability to create safe, comfortable, and eco-friendly tourism destinations. Blue Lagoon, located in Dalem Hamlet, Widodomartani Village, Ngemplak District, Sleman, Yogyakarta, is a natural water attraction sourced from underground springs. Initially known as Tirta Budi Baths, the Blue Lagoon features three primary springs: Sendang Wadon (female), Sendang Belik Kluwih, and Sendang Lanang (male). This destination offers various facilities, including bathing areas, gazebos, culinary spots, outbound activities, and camping grounds, making it a popular choice among tourists.

Based on an interview with the head of the Blue Lagoon management, the site has implemented several health and safety protocols, such as providing handwashing stations at multiple points, recommending mask use when not swimming, maintaining designated trash bins, placing warning signs for visitors, establishing health posts, and setting up evacuation routes for emergencies.

Additionally, sanitation staff regularly clean the attraction, particularly the public bathing areas. Waste from restaurants operating within the site is managed appropriately to prevent river pollution. However, field observations revealed that many tourists still do not adhere to the health protocols established by the management. Moreover, the available CHSE facilities are not being utilized optimally by visitors.

According to Lawrence Green's theory, human behavior is influenced by three main factors: predisposing factors, enabling factors, and reinforcing factors. Predisposing factors include knowledge, attitudes, beliefs, values, and demographics. For example, tourists' knowledge about the importance of handwashing before entering tourist attractions, disposing of trash properly, and understanding health or safety protocols at tourism sites can influence their behavior. Enabling factors refer to the availability of infrastructure that supports healthy behavior at tourist sites. Meanwhile, reinforcing factors include encouragement and support from family members, friends, or community leaders that promote adherence to cleanliness, health, safety, and environmental sustainability practices.

Given the issues outlined above, the implementation of cleanliness, health, safety, and environmental sustainability in Indonesia's tourism sector remains limited. Therefore, this study aims to analyze the relationship between tourists' knowledge levels and their practices regarding cleanliness, health, safety, and environmental sustainability at the Blue Lagoon tourist attraction in Sleman, Yogyakarta.

2. Method

This study is a quantitative analytical study with a cross-sectional design. The research variables consist of tourists' level of knowledge and practices regarding the implementation of cleanliness, health, safety, and environmental sustainability (CHSE) at tourist attractions. The study population is unknown. Therefore, the sample size was determined using the Lemeshow formula, resulting in a total of 106 respondents. The sample was selected using a non-probability sampling technique, specifically accidental sampling, with the following inclusion criteria: Tourists visiting the Blue Lagoon tourist attraction during the data collection period, aged ≥ 17 years, willing to participate and provide information through interviews.

The research instrument used in this research was a questionnaire, which was tested for validity and reliability by 17 validators at the Umbul Pajangan public bathing site. The questionnaire consists of two sections: knowledge and practice. The knowledge questionnaire consists of 22 question items. Cleanliness knowledge consists of 3 question items, health knowledge consists of 10 question items, safety knowledge consists of 5 question items, and environmental sustainability knowledge consists of 4 question items. The CHSE practice questionnaire consists of 23 question items. Cleanliness practices consist of 5 question items, health practices 9 question items, safety practices 5 question items, and environmental sustainability practices 4 question items.

The validity test results showed that all 22 knowledge questionnaire items were valid, with an r-value greater than the r-table (0.4821). The reliability test resulted in Cronbach's Alpha value of 0.956, indicating a high level of reliability. Items that did not meet validity and reliability criteria were excluded from the analysis. The knowledge questionnaire used a multiple-choice format, where correct answers were scored 1 and incorrect answers were scored 0. The CHSE practice questionnaire used a Likert scale with the following rating categories: "Always" =5, "Often" =4, "Sometimes" =3, "Rarely" =2, and "Never" =1. Data collection was conducted from July 14 to July 23, 2022.

A Chi-Square test was used to analyze the relationship between tourists' level of knowledge and their cleanliness, health, safety, and environmental sustainability (CHSE) practices. Data processing

was performed using SPSS version 17 software. This study received ethical approval from the Research Ethics Committee of Ahmad Dahlan University, with ethical approval number 012209129.

3. Results and Discussion

3.1. Results

The questionnaire used to assess tourists' knowledge levels consisted of 22 question items, categorized as follows: cleanliness knowledge = 3 items, health knowledge =10 items, safety= 5 items, and environmental sustainability knowledge =4 items. The table presents the respondents' knowledge about CHSE (Cleanliness, Health, Safety, and Environmental Sustainability) based on the percentage of correct (C) and incorrect (I) answers for various statements. Table 1 below a breakdown of the key findings:

Table 1. Distribution of Respondents' Answers Regarding Knowledge Aspects of CHSE

Statement		Answer			
		C	%	I	%
Cleanliness	The procedure of washing hands with soap	76	71.7	30	28.3
	Time for washing hands with soap	44	41,5	62	58.5
	Conditions for a healthy toilet	82	77,4	24	22.6
Health	Normal body temperature is permitted to enter the tourist area	59	55,7	47	44.3
	Coughing and sneezing etiquette	102	96.2	4	3.8
	The function of health posts	88	83	18	17
	Transmition of disease in places of worship available at tourist attractions	81	76.4	25	23.6
	Body parts that should not be touched to prevent COVID-19	69	65.1	37	34.9
	Preventionof COVID-19 at tourist attractions	95	89.6	11	10.4
	How to use a mask correctly	91	85.8	15	14.2
	The aim is to maintain a minimum distance	96	90.6	10	9.4
	How to deal with eye irritation in a public bath	86	81.1	20	18.9
Safety	Function of evacuation routes at tourist attractions	89	84	17	16
	Meeting point at a tourist attraction	83	78.3	23	21.7
	Risk factors for accidents in the Blue Lagoon	93	87.7	13	12.3
	How to swim safely so you don't drown	88	83	18	17
	Things to watch out for when swimming	96	90.6	10	9.4
Environmental Sustainability	How to preserve the environment	89	84	17	16
	A type of environmentally friendly material	82	77.4	24	22.6
	Actions that are the responsibility of tourists in protecting the environment	88	83	18	17
	Consequences if you don't turn off the water tap in the toilet	70	66	36	34

Note: C= correct answer, I= Incorrect answer

The respondents generally demonstrate good knowledge of CHSE principles, especially regarding health and safety. However, some gaps exist in cleanliness (toilet conditions), environmental sustainability (water conservation), and specific health precautions (preventing disease transmission and avoiding certain body contacts for COVID-19 prevention).

The respondents' levels of knowledge were categorized into high and low groups. The distribution of tourist knowledge regarding CHSE aspects is presented in Table 2 below:

Table 2. Distribution of Respondents' Knowledge Levels

CHSE Aspect	Knowledge Level	n	Percentage (%)
Cleanliness	Low	35	33
	High	71	67
Health	Low	30	28
	High	76	72
Safety	Low	43	41
	High	63	59
Environmental Sustainability	Low	27	25
	High	79	75

As shown in Table 2, most respondents demonstrated a high level of knowledge in all CHSE aspects. Specifically, 67% of respondents had high knowledge of cleanliness, while 72% indicated high health knowledge. Regarding safety, 59% of respondents exhibited a high level of understanding, and for environmental sustainability, 75% of respondents showed a strong awareness. Educational interventions could improve awareness of cleanliness and environmental impact and reinforce preventive health measures in tourist settings.

Tourists' CHSE Practices

The CHSE practice questionnaire consisted of 23 items, divided as follows: Cleanliness practices: 5 items, Health practices: 9 items, Safety practices: 5 items, Environmental sustainability practices: 4 items. The distribution of Respondents' Answers Regarding CHSE Practices is shown in Table 4, assessed using a Likert scale with the following categories: Always, Often, Sometimes, Rarely, and Never.

Table 3. Distribution of Respondents' Answers on CHSE Practices

Statement		Always (%)	Often (%)	Sometimes (%)	Rarely (%)	Never (%)
Cleanliness	I wash my hands before entering the tourist site	6.6	31.1	32.1	17.9	12.3
	I wash my hands before eating	64.2	24.5	7.5	3.8	0
	I wash my hands using running water and soap	64.2	30.2	3.8	1.9	0
	I close the trash bin after disposing of waste at the Blue Lagoon tourist site	25.5	28.3	34.9	9.4	1.9
	I choose a clean dining area when eating at the tourist site	74.5	19.8	5.7	0	0
Health	I check my body temperature before entering the Blue Lagoon tourist site	5.7	19.8	22.6	29.3	22.6
	I cover my mouth and nose with my upper arm when sneezing or coughing	29.2	57.5	9.4	2.8	0.9
	I wear a face mask properly while at the Blue Lagoon tourist site	55.7	34	8.5	1.9	0
	I maintain physical distance at the Blue Lagoon tourist site	14.2	30.2	23.6	31.1	0.9
	I do not spit in the Blue Lagoon bathing pool	71.7	18.9	5.7	1.9	1.9
	I do not urinate in the bathing pool while swimming	69.8	19.8	6.6	1.9	1.9
	I bring my own prayer equipment when traveling outside my home	15.1	17	14.2	16	37.7
	I avoid touching my face while at the tourist site to prevent disease transmission, such as COVID-19	16	35.8	32.1	12.3	3.8

	Statement	Always (%)	Often (%)	Sometimes (%)	Rarely (%)	Never (%)
Safety	I carry a first-aid kit or personal medication when traveling to a tourist site	0	3.8	17.9	16	62.3
	I wear a life jacket while swimming	8.5	21.7	23.6	17	29.2
	I know the evacuation routes and assembly points at the Blue Lagoon tourist site.	3.8	19.8	30.2	25.5	20.8
	I can save myself in case of an accident while swimming.	17.9	18.9	42.5	14.2	6.6
	I am cautious while swimming due to the depth of the Blue Lagoon bathing pool, which reaches 4 meters	70.8	23.6	2.8	1.9	0.9
	I can operate a fire extinguisher available at the Blue Lagoon tourist site in case of a fire	2.8	12.3	14.2	29.2	41.5
Environmental Sustainability	I use a refillable container to reduce the use of plastic bottles or disposable packaging	19.8	30.2	26.4	17	6.6
	I dispose of waste in designated trash bins at the Blue Lagoon tourist site	70.8	23.6	5.7	0	0
	I separate waste according to its category	52.8	35.8	6.6	4.7	0
	I use clean water efficiently while at the Blue Lagoon tourist site	64.2	28.3	5.7	1.9	0

Based on the data results in the Table 4, respondents mostly answered “always” to question number 5 with a percentage of 74.5%. Respondents answered “often” question number 7 at a rate of 57.4%. Respondents mostly answered sometimes to question number 17 with a percentage of 42.5%. Respondents mostly answered rarely to question number 9 with a percentage of 31.1%. Respondents mostly answered never to question number 14 with a rate of 62.3%.

Tourists’ CHSE practices were categorized into two levels: good and poor. The distribution of respondents' practice levels is shown in Table 3 below:

Table 4. Distribution of Respondents’ CHSE Practice Levels

CHSE Aspect	Practice Level	n	Persentage (%)
Cleanliness	Poor	49	46
	Good	57	54
Health	Poor	49	46
	Good	57	54
Safety	Poor	41	39
	Good	65	61
Environmental Sustainability	Poor	47	44
	Good	59	56

The study found the majority of respondents engage in good CHSE practices (cleanliness = 54%, health (54%), safety (61%), and environmental sustainability (56%). A significant proportion of poor practices remain, particularly regarding cleanliness and health. Safety has the highest proportion of good practices, while environmental sustainability shows a moderate balance. Nevertheless, many respondents exhibited poor practices, especially concerning safety (39%) and environmental sustainability (44%). This highlights the necessity for enhanced education and awareness initiatives.

The relationship between tourist knowledge about CHSE and CHSE practices

Table 5 presents the relationship between respondents' knowledge levels and practice categories in four key areas: cleanliness, health, safety, and environmental sustainability. The Chi-Square test (P-value) determines whether there is a significant association between knowledge levels and practice behaviors, as follows:

Table 5. Results Cross-Test The Level of Knowledge of Hygiene, Health, Safety, and Environmental Sustainability Practices

Knowledge level		Practice Category				Total	P-value
		Poor	(%)	Good	(%)		
Cleanliness	Low	13	37.1	22	62.9	35	0.267
	High	36	50.7	35	49.3	71	
	Total	49	46.2	57	53.8	106	
Health	Low	16	53.3	14	46.7	30	0.480
	High	33	43.4	43	56.6	76	
	Total	49	46.2	57	53.8	106	
Safety	Low	18	41,9	25	58.1	43	0.724
	High	23	36.5	40	63.5	63	
	Total	41	38.7	65	61.3	106	
Environmental Sustainability	Low	15	55,6	12	44,4	27	0,257
	High	32	40.5	47	59.5	79	
	Total	47	44,3	59	55,7	106	

Source: Primary Data

Among respondents with low knowledge of cleanliness, 31 (37.3%) exhibited poor practices, while 52 (62.7%) demonstrated good practices. Respondents with high knowledge of cleanliness had 36 (50.7%) poor practices and 35 (49.3%) good practices. The P-value (0.267) indicates no statistically significant relationship between cleanliness knowledge and practice. Respondents with low health knowledge showed 16 (33.3%) with poor practices and 32 (66.7%) with good practices. Those with high health knowledge had 38 (44.2%) with poor practices and 48 (55.8%) with good practices. The P-value (0.480) suggests no significant association between health knowledge and health-related practices. Among respondents with low safety knowledge, 21 (35.6%) had poor practices, while 38 (64.4%) exhibited good practices. Those with high safety knowledge had 18 (35.3%) poor practices and 33 (64.7%) good practices. The P-value (0.724) indicates that knowledge of safety is not significantly related to safety practices. Respondents with low environmental sustainability knowledge showed 12 (55%) poor practices and 10 (45%) good practices. Those with high knowledge had 53 (44.2%) with poor practices and 67 (55.8%) with good practices. The P-value (0.257) shows no statistically significant relationship between knowledge and environmental sustainability practices

The results indicate that while knowledge levels in cleanliness, health, safety, and environmental sustainability vary among respondents, they do not significantly influence their practices, as reflected in the high P-values (all above 0.05). This suggests that other factors, such as behavior, habits, or external influences, maybe more critical in shaping CHSE practices than just knowledge alone. Future interventions should focus on increasing knowledge and behavioral change strategies to ensure improved practices in these areas.

3.2. Discussion

Based on the results presented in Table 2, 50.7% of respondents with a high level of knowledge about cleanliness exhibited poor hygiene practices. Conversely, 62.9% of respondents with low knowledge demonstrated good hygiene practices. The Chi-Square test results (P-value = 0.267, P-value > 0.05) indicate no statistically significant relationship between knowledge and hygiene

practices. Similarly, regarding health knowledge, the Chi-Square test results (P-value = 0.480, P-value > 0.05) suggest no significant association between health knowledge and health-related practices among tourists. For the safety aspect, the Chi-Square test results (P-value = 0.724, P-value > 0.05) indicate no significant relationship between safety knowledge and safety practices. Likewise, the Chi-Square test results for environmental sustainability knowledge (P-value = 0.257, P-value > 0.05) confirm no significant relationship between knowledge of environmental sustainability and environmental sustainability practices among tourists visiting the Blue Lagoon tourist attraction in Sleman Regency, Yogyakarta.

The findings of this study differ from those of Sulistyani, who found that the application of this protocol was categorized as good [18] and Yunus [19], who reported a significant relationship between community knowledge and cleanliness practices in the river basin (watershed) of Cane Toa Village, Rikit Gaib District, Gayo Lues District. Additionally, these results contrast with those of Sindunatha, who found a relationship between knowledge levels and health behaviors among visitors at the Pura Tirtha Empul religious tourism destination [20]. Similarly, Sunari et al. reported a significant relationship between beach safety knowledge and the implementation of safety measures among tourists [21]. Furthermore, Agustin and Maisyaroh found that environmental sustainability knowledge was significantly associated with environmentally responsible behavior [22].

According to the PRECEDE-PROCEED model, a behavioral theory developed by Lawrence Green in 1980, human behavior is influenced by three key factors: predisposing, enabling, and reinforcing factors [23,24]. An individual's behavior is shaped by their level of knowledge and awareness regarding a particular issue. However, the findings of this study indicate that a high level of knowledge does not necessarily translate into good practices. According to Green's theory, behavioral change is also influenced by the availability of infrastructure and facilities, which play a crucial role in shaping individual behavior.

Support from family and peers who visit tourist attractions also influences individuals' adherence to cleanliness, health, safety, and environmental sustainability practices. During the COVID-19 pandemic, the government strictly enforced public infrastructure, tourism operations, and safety regulations. Under the supervision of local government authorities, the Blue Lagoon was subject to rigorous monitoring. The pandemic-era regulations required strict adherence to health and safety protocols, demanding that tourism management implement preventive measures to mitigate the spread of COVID-19. The availability of essential infrastructure, including accommodation, public services, transportation, lodging, and cultural attractions, must continue to be developed to ensure tourists' comfort, safety, and convenience when visiting attractions [25].

Through individual, group, and community-based educational initiatives, the Sleman Regency Tourism Office and the Health Service must collaborate to enhance visitors' knowledge of cleanliness, health, safety, and environmental sustainability. The Sleman District Health Service and Community Health Centers should promote the establishment of basic occupational health and safety programs, which could serve as platforms for peer education, preventive health services, and leadership training for tourism managers on hygiene, health, safety, and sustainability. Furthermore, Blue Lagoon management should enforce penalties for tourists who violate regulations and incorporate educational media, such as leaflets and banners, to raise awareness of cleanliness, health, safety, and environmental sustainability. Additionally, training programs should be implemented for safety personnel to ensure they can monitor tourists' safety, provide immediate assistance, and respond effectively to emergencies with basic medical skills.

This study has several limitations. The research methodology was cross-sectional, meaning that data was collected simultaneously, limiting the ability to assess variations in respondents' answers over different periods. The sample size was also limited, as not all tourists were willing to participate

in the study. Future research should consider longitudinal studies and larger sample sizes to obtain more comprehensive insights into tourists' knowledge and practices.

4. Conclusion

This study examines the relationship between cleanliness, health, safety, and environmental sustainability (CHSE) knowledge and CHSE practices among tourists at the Blue Lagoon Tourist Attraction in Sleman Regency, Yogyakarta. This study highlights the importance of implementing CHSE in tourist destinations to ensure public health, safety, and environmental sustainability. Based on the Chi-Square test results, this study's findings indicate no statistically significant relationship between knowledge of cleanliness, health, safety, and environmental sustainability and CHSE practices among tourists. Although this study did not find a correlation between these variables, the results remain valuable as a reference or comparison for future research.

The findings of this study have practical implications for improving tourism management by encouraging greater participation from tourism managers in providing CHSE facilities and infrastructure, developing clear regulations, and enhancing supervision. Additionally, tourists' compliance with CHSE procedures is crucial in ensuring safety and sustainability at tourist destinations. To strengthen CHSE implementation, advocacy, partnerships, and empowerment programs are essential in creating an integrated and collaborative approach among stakeholders. For instance, strengthening cooperation between health agencies, tourism departments, universities, mass media, the private sector, and the community is crucial. Furthermore, policy advocacy is necessary to establish regulations that impose sanctions for violations and to strengthen certification institutions to provide recognition and rewards for CHSE compliance. Moreover, continuous and intensive public awareness campaigns are highly needed to enhance tourists' understanding and commitment to adopting CHSE practices at tourist destinations.

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Author contributions

The contributions of NM as data collecting and reporting, MFZ and HA data analyzing and creating the article, and RR, and EA finishing the article.

Conflict of Interest

The author declares no conflict of interest in writing this publication manuscript.

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