



An Evaluation of Tourists' Compliance with Guidelines for Snorkeling in Haad Chao Mai Marine National Park

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ABSTRACT

This study aimed to examine factors affecting tourists' compliance with the snorkeling guidelines of Haad Chao Mai Marine National Park, Thailand. The sample comprised 397 participants who were travelling to the park during January to February 2020. The data were collected using a questionnaire based on demographic information, participants' awareness of the guidelines, awareness of legislation related to coral, and compliance with the guidelines. Univariate and multiple linear regression were done at 0.05 level of significance and 95% confidence interval to find the determinants of compliance with the guidelines. The results of univariate analysis between determinant and outcome showed that age, numbers of snorkeling completed, prior snorkeling experience at the park, and awareness of the guidelines were significantly associated with their compliance with the guidelines independently. However, the results from multiple regression analysis showed that only awareness of the guidelines was related to participants' compliance with the guidelines. These results implied that having awareness of the guidelines contribute to positive behavior of the tourists toward tourist destination.

1. INTRODUCTION

Main purposes of Marine National Park in several tropical countries are to protect rare ecosystems and conserve biodiversity. It is also used as a site for recreational purpose [1]–[4]. Recreational activities, especially snorkeling, in Marine National Park have been considered a popular activity over the past few decades [5]. However, marine recreational activities, such as snorkeling and SCUBA diving, have a doubtful advantage.

Despite the recreational activities lead to significant economic benefits for many coastal communities, there is a possibility that these activities are the threat to coral reef and other natural resources. They contributed to degradation of ecosystem, particular in coral reef communities [6]. The degradation might occur from several reasons including stepping on or touching corals, tourists or diving equipment physical contact [2], [7]–[12], wave forces from diving impact [7], sedimentation on corals [2], [13], coral disease in heavily used diving areas [10], collecting coral or dead coral for souvenirs [9], [13], and fish feeding [9], [14].

To continue recreational activities in sustainable manner, one management strategy that helps reduce tourism impacts on coral reefs is to empower tour operators to provide tourists with detailed pre-dive or pre-snorkeling

briefings and encourage them to follow the code of conduct. This targeted to mitigate the effects of pressure factors to reefs and associated ecosystems [13], [15].

Pre-dive or pre-snorkel briefings session is a part of tour operators' standard procedure. The briefing provided knowledge about marine ecosystems (biological features, threats, and conservation status) and why divers or snorkeling tourists need to follow the code of conduct that provided guidelines on acceptable behaviors [3], [7], [15]. Some studies indicated that snorkeling tourists who received training and pre-snorkel briefing caused significantly less damage to environment [7]–[9], [15]. However, in reality, pre-snorkel training was not provided, so tourists were not instructed on ecological appropriate behavior [7]. This implies that there is a lack of attention in ecological impact from tour operators and/or tour guides. Previous studies suggested that the monitoring system for pre-snorkel briefing should be established and implemented [9].

Haad Chao Mai Marine National Park is one of destination that local authorities are striving to address collaboration with tour operators in an attempt to preserve natural environment and enhance sustainable tourism activities in the area [16].

Although the park is endowed with valuable natural

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resources of shallow coral reefs which provide a great potential for snorkeling, the coral reef ecosystem is yet to be degraded. This might be because the code of conduct for snorkeling has been promoted widely to tourists through government and non-government flyers, posters and websites which are readily accessible. Snorkeling guideline posters are displayed at the pier and the tour operator offices. The tour operators also provide the guideline during their pre-snorkeling briefing.

A considerable amount of studies focused on the direct observation of tourists' behavior on snorkeling and/or underwater reef damage and they were used as an indicator of the effectiveness of snorkeling management [7]–[9]. However, there is no information concerning factors affecting snorkeling tourists' compliance with the guidelines.

As such, the aims of this study were to: (1) provide a preliminary understanding of snorkeling tourist characteristics, (2) assess snorkeling tourists' awareness of the guidelines, legislation related to coral and their compliance with the guidelines, and (3) examine factors affecting snorkeling tourists' compliance with the guidelines. The study area is in Haad Chao Mai Marine National Park, Thailand.

2. LITERATURE REVIEW

2.1 Sustainable tourism and ecotourism

According to the UNEP & UNWTO (2005), sustainable tourism development was equally required the development in environmental, economic and socio-cultural dimensions in order to guarantee their long-term sustainability. Sustainable tourism must retain a high level of tourist fulfilment, leading to a greater awareness and promoting sustainable tourism practices right between them [17].

Ecotourism is a sub-component of sustainable tourism that takes account for same three dimensions as sustainable tourism development. However, the environment is much more concerns than other dimensions in this concept [18]. A study of sustainability in marine national parks in Malaysia revealed that environmental responsible behaviours were an essential step towards ecotourism development. Tourist's environmental knowledge and attitudes were outstanding in protecting ecotourism resources in marine national park [19].

2.2 Code of conduct for snorkeling

In 2004, the United Nations Environment Programme (UNEP) launched the Green Fins project and introduced the project to four countries which were Indonesia, Malaysia, the Philippines and Thailand. The project was initiated as an endeavor to improve public awareness of appropriate coral reef conservation and to minimize unsustainable tourism management. This was done by encouraging diving and snorkeling tour operators to adopt

a code of conduct that was designed to tackle effects of diving and snorkeling activities on the habitat in which they operated. They were encouraged to provide SCUBA divers and snorkeling tourists with an explanation of guidelines in pre-briefing and provide information on local marine protected areas, rules, regulations, and so on [15].

In the Andaman coast of Thailand, Reef Guardian Club is one of private, non-profit company that is responsible for promoting best practices in marine conservation by supporting activities for natural resources protection through local tourism operators and snorkeling tour guides [20]. Many local tourism operators adjacent to the coast including Haad Chao Mai Marine National Park, Trang Province, have been engaged in this program.

2.3 Legislation related to coral

According to Wildlife Conservation and Protection Act B.E. 2562, Section 4 [21], the following terms have been defined.

Protected wildlife means wildlife that plays important role in ecosystem or decreasing trend in wildlife population may affect ecosystem which are specified in this act.

Hunt means to collect, trap, catch, shoot, kill or to harm with any other means to unowned and living-free wildlife. This includes to chase, drive, call, lure, or other means for the mentioned purposes.

Wildlife carcass means body and part of body of wildlife including horn, skin, skeleton, skull, teeth, ivory, tusk, hair, scale, nail, shell, blood, lymph, semen, or any part separated from the wildlife body whether it is alive or not.

Under Section 89 of the penalty clause, it is stated that anyone who hunt or harm the protected wildlife, the carcass protected wildlife or the product from carcass protected wildlife must be imprisonment for no more than ten years or be fined no more than a million Baht or both. Section 92 also indicates that anyone who have in their possession the protected wildlife or the carcass must be imprisonment for no more than five years or be fined no more than five hundred thousand Baht or both.

Additionally, Ministerial Regulation Prescribing Some Wild Animal Species to Become Wildlife Protection B.E. 2546 has determined that marine invertebrates such as hard corals, sea fans, sea anemones, giant clams, or other rare species of marine animals are protected wildlife [22].

2.4 Compliance with guidelines

Many wildlife tourism destinations were lack of information or guidelines that helped protect animals [19]. This can cause the incident of tourists' misbehavior that harms environment and/or natural creatures. Some studies on SCUBA divers indicated that those who listened to pre-dive briefing (e.g., diving guidelines) caused less environmental impacts [1]–[3], [10], [12]–[13], [15], [24]–[26]. These findings imply that compliance with the guidelines provides positive consequence to the environment.

Previous studies employed compliance with guidelines as an indicator of the effectiveness of codes of conduct, rules and regulations [27]–[28]. Research conducted by [27] within the grey nurse shark diving context in Australia revealed that SCUBA divers were compliant with the stipulations of the code of conduct and the legislation. Total compliance was achieved for 77.8% on the code of conduct and for 87.5% on the legislation. Only some divers were reported with noncompliant behaviors which included physical contact, provision of food item, and active pursuit of the shark with the intent of lessening the distance between the diver and the shark. [28] assessed characteristics of divers that influence compliance to the guidelines at four sites along the Australian east coast. The results revealed that the proportions of divers with differing certification levels (e.g., recreational or professional) and the divers with differing numbers of dives completed differed significantly among sites. Based on this study, it showed that some characteristics variables of participants have predicted compliance to the guidelines.

3. MATERIALS AND METHODS

3.1 Study site

Trang Province has been designated as an ecotourism destination by the Office of Strategy Management for Southern Province Cluster (OSM Andaman), a local authority which is responsible for supporting and promoting tourism development [29]. Thus, Haad Chao Mai Marine National Park, largest marine protected area in Trang Province, has been become ecotourism destinations in Trang.

Haad Chao Mai Marine National Park is located along the coast of Andaman Sea in the south of Thailand has approximately 230.87 sq. kms., with a long sandy beach of over 20 kms, covers the districts of Sikao and Kan Tang. It was officially established in 1981 under the marine national park category [30]. The marine national park was designated in order to preserve natural environments and offer recreation activities; however, hunting or any actions that harm wildlife (e.g., coral) are not allowed.

Coral reefs in Haad Chao Mai Marine National Park are crowded and spread along islands mainly at shallower depths of 10 m. Based on coral reef surveys in 2016, it indicated that the condition of corals in Haad Chao Mai Marine National Park was classified as healthy and large amount of diversity [31].

Haad Chao Mai Marine National Park is renowned for beautiful shallow coral reefs and snorkeling destination. The location of famous islands is shown in Fig. 1. One of the most typical activities in the park is a day trip to several islands, i.e., Koh Mook (Emerald Cave), Koh Cheuk, Koh Waen and Koh Kradan.

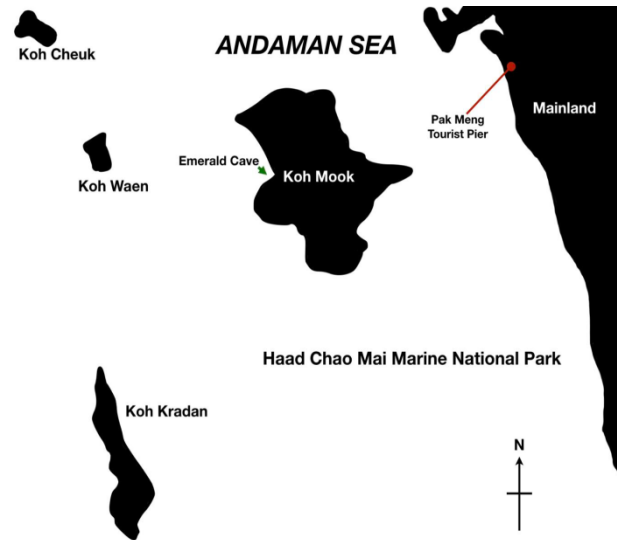


Fig.1. Map of the study site.

Table 1. Snorkeling guidelines for tourists

Item	Guidelines	Presence	
		DNPWPC	RGT
1	Refuse to anchor on coral reef / Support for the use of mooring buoys.	✓	✓
2	Use coral safe sunscreen.	✓	✗
3	Do not litter.	✓	✓
4	Keep distance with coral.	✓	✗
5	Do not step on or touch coral.	✓	✓
6	Do not stir up sediment.	✓	✗
7	Do not feed fish.	✓	✓
8	Do not touch or chase marine wildlife.	✓	✓
9	Do not collect/buy corals or any other marine souvenirs.	✓	✓
10	Do not eat parrot fish.	✗	✓

To keep sustainable snorkeling activities, some suggested mitigation measures to date include the implementation of mandatory (laws carrying legal penalties) and voluntary (guideline) management strategies in Haad Chao Mai Marine National Park to mitigate potential adverse impacts of snorkeling activity upon shallow coral reefs. As such, Department of National Parks, Wildlife and Plant Conservation (DNPWPC) and Reef Guardian Thailand (RGT) have provided guideline pertaining to tourists’ snorkeling behaviour to mitigate potential adverse environmental impacts as displayed in Table 1.

3.2 Questionnaire survey

The study was conducted at Pak Meng Tourist Pier between January and February 2020. Each participant was asked to complete a questionnaire after finishing snorkeling and the participation was voluntary. The questionnaire contained three sections. Section 1 consisted of single-answer multiple choice questions regarding demographic information on gender, age, nationality, numbers of snorkeling completed and prior snorkeling experience at Haad Chao Mai Marine National Park. Section 2 and 3 contained dichotomous questions which asked the participants whether they were aware or unaware of the guidelines and the legislation related to coral, and, complied or ignored with the guidelines, respectively. The questionnaire was available in Thai and English to help reduce language comprehension bias. Convenience random sampling technique was employed in the study.

Sample size was determined based on proportion of Thai and foreign tourists in 2017 due to the availability of the data during the collection period. According to the number of tourists visiting the park in 2017, there were 60,796 tourists consisting of 51,740 Thai tourists and 9,056 foreign tourists. Then, the samples were 338 Thai tourists and 59 foreign tourists; the total sample size of this study was 397 participants.

3.3 Data analysis

Descriptive analysis (frequencies, percentages, mean and standard deviation) was used to analyse demographics information, awareness of the guidelines, awareness of the legislation, and compliance with the guidelines. For inferential analysis, this study examined the frequency distributions of the independent variables and assessed their univariate associations with the outcome using one-way analysis of variance. The acceptable threshold of tourists' awareness of the guidelines and tourists' compliance with the guidelines were set at 100% (10 items from Table 1).

Multiple linear regressions also used to investigate the relationship between the independent variables and tourists' compliance with the guidelines. For the dependent variable, the number of guideline items that individuals complied with towards 10 items was converted to continuous data by aggregating. Thus, the dependent variable was matched with multiple linear regression analysis.

Weighted sum contrasts were used instead of treatment contrasts for constructing the confidence intervals that enabled comparing the tourists' compliance with the guidelines for each independent variable against the overall mean. Weighted sum contrasts are able to categorize levels of the independent variable into three groups, i.e., the interval exceeds, crosses, or fall below the overall mean [32].

All statistical were done with 0.05 significance level to

check for any association between independent and dependent variables.

4. RESULTS AND DISCUSSIONS

4.1 Tourists' characteristics

Tourists' demographic profile was analyzed and presented in Fig.2.

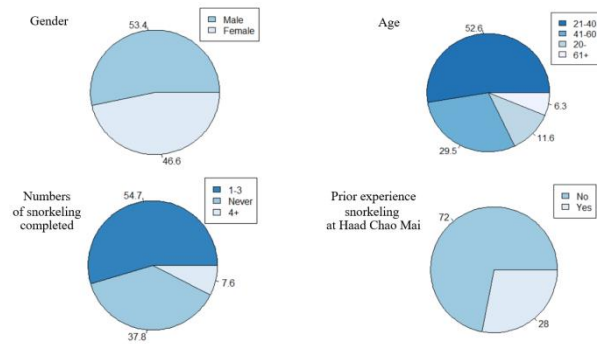


Fig.2. Participants' demographics

Table 2. Tourists' awareness and their compliance to the guidelines

Guidelines	Awareness		Compliance	
	(percentage)		(percentage)	
	Yes	No	Yes	No
Refuse to anchor on coral reef / Support for the use of mooring buoys.	85.6	14.4	91.7	8.3
Use coral safe sunscreen.	83.1	16.9	92.2	7.8
Do not litter.	89.7	10.3	96	4
Keep distance with coral.	88.2	11.8	93.7	6.3
Do not step on or touch coral.	88.7	11.3	94.5	5.5
Do not stir up sediment.	86.9	13.1	94	6
Do not feed fish.	87.7	12.3	95	5
Do not touch or chase marine wildlife.	87.9	12.1	94.7	5.3
Do not collect/buy corals or any other marine souvenirs.	86.4	13.6	92.4	7.6
Do not eat parrot fish.	84.1	15.9	91.9	8.1

A total of 53.4% were male and 46.6% were female. Age range of the participants was from 16 years old to 66 years old. Aged between 21-40 years old made up 52.6 % while 61 years of age or older recorded the lowest percentage with 6.3 %of the total participants. The remaining is aged between 41-60 with 29.5 %, and 20 years of age or

younger with 11.6%. With regards to numbers of snorkeling completed, approximately 54.7 % had completed snorkeling for one to three times, 37.8 % were first-timer, and 7.6 % had completed four times or more. 72% of the participants snorkeled at the park for the first time while 28 % of them had prior snorkeling experiences here.

4.2 Tourists' awareness and their compliance

As shown in Table 2, majority of tourists were aware of the snorkeling guidelines for at least 83 % and their compliance with the guidelines was relatively high with more than 91 % for all items.

On the other hand, not more than 3% of the tourists were aware of the legislation (see Table 3). This finding was in accordance with Suan Dusit Poll [33] which reported that most Thai people were unaware of laws.

Table 3. Tourists' awareness to the legislation related to coral

Legislation related to coral	Awareness	
	(percentage)	
	Yes	No
Marine invertebrates such as hard corals, sea fans, sea anemones, giant clams, or other rare species of marine animals are considered protected wildlife.	3	97
Possession the protected wildlife or their carcasses (e.g., hard corals, sea fans, sea anemones, giant clams) shall be imprisonment for no more than five years or be fined no more than five hundred thousand Baht or both.	1	99
Hunt the protected wildlife (e.g., hard corals, sea fans, sea anemones, giant clams) shall be imprisonment for no more than ten years or be fined no more than a million Baht or both.	1.5	98.5

4.3 Univariate analysis

Table 4 showed the distributions of the predictor variables with the average of tourists' compliance with the guidelines obtained by subgroup and the p-values from one-way analysis of variance tests. The results indicated that there was a significant relationship between numbers of snorkeling completed and tourists' compliance with the guidelines ($p > 0.05$). This result was consistent with [24]'s study that participants who had higher numbers of diving completed were more likely to comply with the guidelines. The result also revealed that age, prior snorkeling experience at Haad Chao Mai Marine National Park, and awareness of the guidelines were significantly associated with their compliance with the guidelines ($p > 0.05$) independently. Tourists are older age tourists who were aware of the guidelines and tourists who had prior snorkeling experience tended to comply more with the

guidelines. However, these results was in contradiction to [28]'s study that focused on SCUBA divers' compliance with the guidelines. This is probably due to the difference between participants' activity of the studies. Most of the SCUBA diving certification agencies (e.g., Professional Association of Diver Instructor: PADI, The National Association of Underwater Instructor: NAUI, Scuba Schools International: SSI) provided education on marine ecosystems and codes of conduct in their own certification courses [34]. While, in case of snorkeling, these knowledge are typically provided by tour guides during pre-snorkel briefing session.

Table 4. Univariate analysis between demographic information and tourists' compliance with the guidelines

Variable	Mean	SD	Test	P-value
Nationality			t-test (395 df) = 0.27	0.789
Thai	9.4	1.8		
Other	9.4	1.6		
Gender			t-test (395 df) = 1.56	0.121
Male	9.2	1.9		
Female	9.5	1.6		
Age			ANOVA (3,393 df) = 3.21	0.023*
20-	8.8	2.2		
21-40	9.3	1.8		
41-60	9.5	1.6		
61+	10	0		
Completed			ANOVA (2,394 df) = 42.11	< 0.001*
Never	8.4	2.5		
1-3	9.9	0.6		
4+	10	0		
Experience			t-test (395 df) = 4.18	< 0.001*
No	9.1	2		
Yes	9.9	0.5		
Guidelines			t-test (395 df) = 12.62	< 0.001*
0-9	7.9	2.7		
10	10	0.1		
Legislation			t-test (395 df) = 1.27	0.205
0	9.3	1.8		
1-3	10	0		

4.4 Multiple linear regression analysis

Multiple linear regression analysis was used to test the association between the tourists' compliance with the guidelines and all independent variables. The outcomes

were shown in Fig.3 (For more detailed results, see Table 5 in Appendix). The horizontal red line indicated overall mean at 9.4. The r-squared value was of 0.2784. This means that 27.84 % of the data fit the regression model.

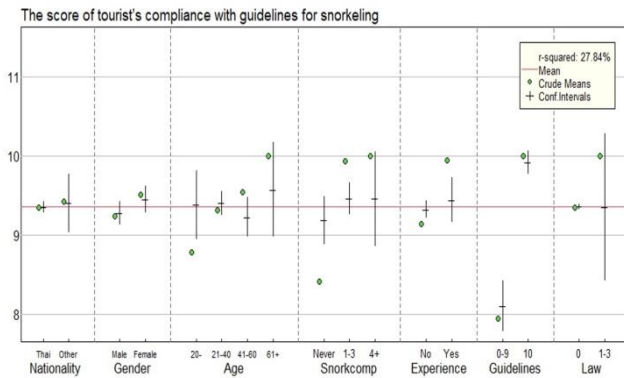


Fig.3. Multiple linear regression model with sum contrasts.

According to Figure 3, the multiple linear regression analysis revealed different results from the univariate analysis. It indicated that only tourists' awareness of the guidelines was significantly ($p > 0.05$) related to their compliance with the guidelines. Although the crude mean results shown in Figure 3 implied that tourists in older age, tourists who had higher numbers of snorkeling completed, and tourists who had prior experience snorkeling at the park tended to comply more with the guidelines, they did not reach statistical significance ($p > 0.05$).

5. CONCLUSIONS AND RECOMMENDATIONS

Understanding of the factors influencing tourists' compliance with guidelines for snorkeling would assist relevant agencies including OSM Andaman and Haad Chao Mai Marine National Park authority to develop useful strategies for ecotourism destinations.

In present study, snorkeling tourists' awareness of the guidelines was the most significant variable affecting their compliance with the guidelines. The result of this study showed that tourists who had 100% of awareness of the guidelines were likely to comply with the guidelines. In contrast, the tourists who had less than 100% of the awareness seem to disobey to the guidelines. These results implied that tourists who had environmental knowledge tended to have positive environmental behavior which was similar to the finding of [19].

Therefore, any management strategies for snorkeling tourism should focus on how to better manage tourists' awareness of the guidelines in order to facilitate sustainable tourism. Possible strategy is to provide training for tour guides and tour operators regarding good pre-snorkel briefing session practice. Additionally, for more effective result of briefing, multimedia, such as multilingual handouts, posters and videos, can be applied to support the briefing session [15].

According to the above, tour guide is a key person on providing snorkeling guidelines to the tourists, future research then should investigate tour guides' behavior on pre-snorkel briefing or evaluate tourists' compliance with guidelines for snorkeling in other destinations.

In addition, an outbreak of Covid-19 is continuing around the world. Not only ecotourism development paradigm but also safety and hygiene should be highlighted during and post Covid-19 pandemic in tourism context. To ensure tourists' confidence in travelling, snorkeling tour operator business should adopt Amazing Thailand Safety & Health Administration (SHA)'s safety standard by providing basic proactive measures such as setting up health checkpoints, providing hand sanitizer with at least 70% alcohol, keeping the middle seat empty, and so on [35].

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Table 5. Multiple linear regression model with sum contrasts

Variable	Coef.	SE	P-value
Intercept	9.360	0.076	< 0.001*
Nationality			
Thai	-0.008	0.033	0.797
Other	0.048	0.185	0.797
Gender			
Male	-0.082	0.072	0.255
Female	0.094	0.082	0.255
Age			
20-	0.023	0.217	0.915
21-40	0.044	0.074	0.553
41-60	-0.133	0.123	0.280
61+	0.216	0.302	0.475
Completed			
Never	-0.173	0.153	0.258
1-3	0.106	0.099	0.285
4+	0.099	0.299	0.742
Experience			
No	-0.033	0.055	0.550
Yes	0.084	0.141	0.550
Guidelines			
0-9	-1.257	0.160	< 0.001*
10	0.564	0.072	< 0.001*
Legislation			
0	0.0002	0.015	0.988
1-3	-0.007	0.472	0.988

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APPENDIX

The multiple linear regression models with sum contrasts are given in Table 5.