Research Article

Situation Awareness of Beach Tourism Managers in Emergency Conditions

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Article Information	ABSTRACT
  Correspondence* Phone: (+62) 81219154046 E-mail: aisyah21006@mail.unpad.ac.id **Website** https://journal.umtas.ac.id/index.php/healtcare/index **Doi** https://doi.org/10.35568/healthcare.v7i2.6733 	*Tourism activities at the beach often triggered emergency conditions, such as drifting or drowning, which required a quick response from beach tourism managers such as Balawista. Situation awareness in tourism managers could influence the decision-making process so that first aid could be given properly and minimize cases of more serious emergencies. However, there hasd been no research related to the description of situation awareness identified in tourism managers. Purpose To determine the situation awareness of tourism managers in emergency conditions that required first aid at Pangandaran Beach. Methods this study was a quantitative descriptive study. The population used in this study was the Pangandaran Regency Balawista Team of 52 people with sampling techniques using total sampling. This research instrument used a modified Situation Awareness Rating Technique (SART). The data analyzed is univariate which is presented using descriptive statistical tables. This study showed that the average value of situation awareness of tourism managers was 25.9 with an average demand dimension of 13.05, supply dimension of 22.17, and understanding dimension of 16.78. Conclusion: Situation awareness of tourism managers tended to be high with individual capacity and good understanding of the emergency conditions faced.*

INTRODUCTION

Pangandaran Beach is one of the places that is often visited by tourists because of the attractiveness of its bay-shaped coast that provides advantages in utilizing the beach as a marine tourism area (Taofiqurohman &

Ismail, 2020). The number of tourist visits to tourist attractions in Pangandaran in 2019 was 3,227,296 people, including domestic and foreign tourists (BPS, 2019). In 2022, there were a total of 4,113,221 tourist visits (Disparbud West Java, 2022). Tourists often visit beaches, especially during the holiday season, with the aim of swimming, playing, surfing, boating, or diving (Dikara, Taofiqurohman, & Iskandar, 2022).

Activities carried out by tourists are inseparable from potential hazards such as accidents, as evidenced by the number of marine accidents recorded by the Tirta Tourism Center (Balawista), which is the lifeguard that oversees the beach tourism area, with a total of 284 cases of accidents dominated by cases of drifting and drowning in 2021-2023 in the Pangandaran Beach, Karapyak Beach, and Batukaras Beach areas (Balawista, 2023). Factors that influence the incidence of accidents in coastal areas include physical factors, such as the presence of rip currents, waves, steep depths, and tides; facility factors, such as the absence of danger signs, lack of basic safety facilities (lifejackets, buoys, first aid kits), and operational support facilities (boats, monitoring towers); and human factors, such as public knowledge and the readiness of tourism managers, such as balawista and beach tourism vehicle operators (Taofiqurohman, 2021).

Drowning cases that often occur to tourists in the beach area are one of the emergency conditions due to the immersion of all or part of the body into water, causing fluid aspiration into the airway which causes victims to experience cardiac arrest and respiratory arrest (Ni putu & Sanjana, 2023). An emergency is a condition that is life threatening and requires immediate treatment to eliminate the threat to prevent disability or death (Hutabarat & Putra, 2016). Providing first aid for emergencies can be done by those who are close to the scene, including trained lay people who have knowledge or skills related to first aid, such as lifeguards or Balawista who serve as first aiders in providing assistance to emergencies that occur in the waters (Yusniawati, Rahmawati, & Mahaputra, 2022). In this study, emergency conditions that need to be understood by tourism managers are conditions that may occur in the beach tourism area, such as drifting and drowning.

Emergency conditions can be minimized when a person has good situation awareness because situation awareness is related to the individual's decision-making process (Ardhiani, Kumala, & Perdana, 2019). Situation awareness (SA) is the knowledge, cognition, and anticipation of various factors and variables that affect the safe, timely, and effective execution of a mission (Taylor et al., 1995a). Situation awareness is one of the important factors that can influence a person in making decisions (Endsley, 2000). According to Endsley (1995), someone who does not have good situation awareness will make the wrong decision, and vice versa. This is due to a lack of training on good first aid-related procedures, inappropriate first aid delivery strategies, or poor performance due to the inability to carry out the necessary actions in providing first aid (Endsley, 1995). Several factors affect a person's situation awareness, including the environment, workload, expectations and goals, as well as personal factors including ability, experience, and training that has been followed (Endsley, 2000).

Based on an initial study conducted in October 2024 with the Head of Balawista Pangandaran, there are 52 active Balawista members divided into four working areas, namely Batukaras, Batuhiu, Pangandaran, and Karapyak. There is training for Balawista members that is scheduled annually to increase the capacity and human resources of Balawista members and the public who work in the water tourism area, and is mandatory for members who do not have basic or rescue training. Even though there has been training, researchers still found that there were 284 cases of marine accidents including emergency conditions during 2021-

2023, which were dominated by cases of drifting and drowning.

Previous research conducted by Kumalasari (2021) stated that situation awareness is something that contributes to the application of the community in wearing masks, washing hands, and applying physical distancing (Kumalasari, 2021). Another study was conducted in 2024 on analyzing the effect of team situation awareness on Patient Safety Incidents (PSI) using teamwork as the variable involved, the result of which was that the Situation Awareness team indirectly influenced PSI through Teamwork (Paramita, Wijaya, Chalidyanto, & Asih, 2024). Meanwhile, Nurhawani, et al. (2024) in their research stated that the lack of situation awareness level in ATC (Air Traffic Controller) towards the danger posed by wildlife can cause problems that can interfere with the smooth running of air traffic services. The application of situation awareness in tourism managers who discuss the provision of first aid in emergencies in the beach area has not been specifically found by researchers. Based on Endsley's theory of situation awareness is an important foundation that influences decision making, especially when applied to tourism managers as first aiders who will provide first aid when an emergency occurs. The limited number of Balawista members to the high number of visits to the Pangandaran Beach area is inseparable from the emergency conditions experienced by tourists, besides that, research has never been conducted on situation awareness to tourism managers, especially Balawista in the Pangandaran Beach area. Therefore, the purpose of this study was to determine the situation awareness of tourism managers in emergency conditions.

METHOD

This research design uses a quantitative descriptive method. The population used in this study were tourism managers in the Pangandaran Beach area consisting of the Pangandaran Regency Balawista Team with a total of 52 people, the research sample was taken using the total sampling technique. This study used the SART (Situation Awareness Rating Technique) instrument compiled by Taylor (1990) then the researcher adjusted the contents of the instrument sentences by adjusting the needs according to the research objectives. The instrument consists of 10 statement items grouped into 3 main aspects, namely demand, supply, and understanding. The assessment of answers to this questionnaire uses 7 assessment scales with a score interpretation of 1 being low and 7 being high. The results of the interpretation of the SART instrument assessment use the SA Total formula = Understanding - (Demands - Supply). The researcher has conducted a validity test and a re-reliability test on the instrument and the results show that the instrument is valid and reliable. Data were collected through questionnaires distributed directly to respondents. The data analysis used in this study was univariate analysis with a classification of numerical data presented in the form of a descriptive statistical table.

RESULTS

Demographic Participants

The demographic profile of the research participants is presented in Table 1, which is described in terms of frequency and percentage.

Table 1. Demographic Characteristics

Category	Frequency	(%)
Age		
Late adolescence	6	11,5
Early adulthood	26	50
Late adulthood	11	21,2
Early elderly	8	15,4
Late elderly	1	1,9
Gender		
Male	51	98,1
Female	1	1,9
Education		
Elementary School	10	19,2
Junior High School	9	17,3
High School	30	57,7

Category	Frequency	(%)
Bachelor's Degree	3	5,8
Length of Service		
1 – 4 years	18	34,6
5 – 10 years	13	25,0
> 10 years	21	40,4
Training History		
Never	1	1,9
Attended 1 time	44	84,6
Attended >1 time	7	13,5
History of Dealing with Emergency Conditions		
Never	0	0
Ever	52	100
History of Helping Emergency Cases		
Never	2	3,8
Helps 1 case	25	48,1
Helps >1 case	25	48,1
Total	**52**	**100,0**

Table 1 shows that the majority of respondents involved in this study were male (98.1%) and dominated by the group included in early adulthood with an age range of 26-35 years (50%). Most of the respondents' education was high school or equivalent (57.7%). The majority of respondents who worked as balawista had attended training (98.1%), such as ISLA (International Surf Lifesaving Association), ILS (International Lifesaving Federation), JQR (Jabar Quick Response), BTCLS (Basic Trauma Cardiac Life Support), BLS (Basic Life Support), ToT (Training of Trainers), and BNSP (*Badan Nasional Sertifikasi Profesi*). All respondents had faced emergency conditions on the beach (100%), such as cases of drowning and being swept away by currents or waves.

Overview of Situation Awareness
In this study, an analysis was conducted on the aspects contained in situation awareness by looking at the dimensions of each aspect. These aspects consist of demand, supply, and understanding, which are then used to calculate the total situation awareness score. The description can be seen in table 2.

Table 2. SART Questionnaire Results

Dimension	Min	Max	Mean	SD
Demand	6	21	**13,05**	**3,95**
*Instability of situation*a	1	7	3,92	2,04
*Complexity of situation*a	1	7	4,13	1,81
	2	7	5	1,38
Variability of situation	**12**	**28**	**22,17**	**3,16**
Supply	4	7	6,40	0,63
*Arousal*a	2	7	6,15	1,19
*Concentration of attention*a	2	7	4,59	1,37
	2	7	5,01	1,33
*Division of attention*a	**9**	**21**	**25,9**	**5,39**
Spare mental capacity	2	7	5,28	1,31
Understandinga	2	7	5,82	1,09
*Information quantity*a	1	7	5,67	1,29
*Information quality*a				
*Familiarity with situation*a				
Situation Awareness Total	12	38	25,9	5,39

Table 2 shows data related to the minimum value, maximum value, average value, range of minimum and maximum values, and standard deviation of each dimension in the SART questionnaire. The results showed that the demand aspect obtained an average value of 13.05 with a standard deviation of 3.95, and a range of values between 6 and 21, which means that the level of challenge and complexity of the situation felt by tourism managers tends to be in the moderate category, with a fairly large level of variability between individuals. Meanwhile, the supply aspect obtained an average value of 22.17 with a standard deviation of 3.13, and a range of values between 12 and 28, which means that the capacity of tourism managers in dealing with emergency conditions tends to be high with a relatively uniform standard deviation. In the understanding aspect, an average value of 16.79 was obtained with a standard deviation of 2.73, and a range of

values between 9 and 21, which means that tourism managers can understand the emergency conditions that occur around them well as a whole, with a relatively uniform standard deviation. Overall, the Situation Awareness Total calculated using the formula SA Total = Understanding - (Demand - Supply) produces an average value of 25.90 with a standard deviation of 5.34, and a range of values between 12 and 38, which means that the situation awareness of tourism managers in general tends to be high even though there is quite a large variation between individuals regarding readiness and understanding in dealing with emergency conditions on the beach.

DISCUSSION

The discussion is organized based on the description of the dimensions in the Situation Awareness Rating Technique (SART) instrument, namely demand, supply, and understanding (Taylor, 1990). Each of these dimensions is analyzed based on the average score obtained, then described in descriptive form.

Demand Dimension of Situation Awareness

The demand aspect describes the level of challenge and complexity of the situation faced by tourism managers in handling emergency conditions on the beach, which consists of the dimensions of instability of situation (D1), complexity of situation (D2), and variability of situation (D3). In dimension D1 regarding the instability of the situation, tourism managers consider the emergency situation faced to be in the medium category, or it can be stable but can also be unstable. This is in line with the research of Jainurakhma et al. (2022) that dynamic conditions are related to emergency conditions which are conditions that occur unexpectedly so that they require fast and appropriate first aid. In these situations, qualified knowledge and skills are needed as a first aid provider, or in the context of this study, namely the tourism manager as a first aider, to avoid more severe victim disability

(Ramadhina et al., 2025). Knowledge and skills can be obtained through training or simulation, in line with the results of this study that the majority of tourism managers have participated in training on emergencies so that they can handle cases such as drowning and being dragged by currents or waves properly. This is supported by research conducted by Ratna & Wijayaningsih (2022) which states that training for health cadres on first aid can increase knowledge and skills towards handling emergency cases.

In dimension D2 regarding the complexity of the situation, tourism managers assess that the complexity of the emergency situation faced is in the moderate or neutral category, meaning that the situation faced is not complex but also not simple. According to Prayogo & Anis (2024), the complexity of the situation is related to the high workload that results in work fatigue and has an impact on situation awareness. Complex situations are related to the difficulty to focus on one attention so that it can reduce the level of situation awareness (Park et al., 2022). The study illustrates that the high complexity of the situation or the greater the number of visual scenes in the simulation displayed, the more difficult it will be to detect all objects correctly so that the lower the situation awareness score (Park et al., 2022). Complex and dynamic situations can also cause information overload, as a result individuals can experience mental and physical fatigue, which has an impact on the decision-making process (Magfirah & Risambessy, 2023).

In dimension D3 regarding the variability of the situation, tourism managers assess that there are quite a lot of factors that must be considered when providing first aid on the beach. According to Taofiqurohman (2021), there are three main factors that need to be considered when an accident or emergency condition occurs in coastal areas, including physical factors of the beach, such as the presence of rip currents, waves, steep depths, and tides; facility factors, such as the absence of danger signs, lack of basic safety facilities (lifejackets, buoys, first aid kits), and

operational support facilities (boats, monitoring towers); and human factors, such as public knowledge and the readiness of tourism managers, such as balawista and beach tourism vehicle operators. In dealing with varied situations, individual perceptions will be related to how much energy can be expended to perceive something (Hakim et al., 2021). According to Witkin & Goodenough (1977, in Endsley & Bolstad, 1994), independence of thought is needed for decision making in varied situations because it relates to the individual's ability to organize existing information into more structured ones.

Overall, the demand aspect shows that tourism managers feel that the level of challenge and complexity of the situation faced when dealing with emergency conditions on the beach tends to be in the moderate category. Based on the results of the study, these challenges mostly come from the dimensions of the variability of the situation faced, such as weather conditions, types of accidents or emergencies, and victim reactions. Considerable variability in situations can burden mental capacity or attention to situations that are constantly changing so that tourism managers are advised to improve readiness through simulations and team training (Chen et al., 2023). Prayogo & Anis (2024) also proposed several efforts to maintain situation awareness in this dimension, namely adding members of the tourism management team so that the division of tasks can be more optimal, and conducting training to improve abilities when facing various complex emergency conditions. In addition, methods such as tabletop exercises and full-scale exercises can also be used to maintain situation awareness in emergency conditions because the methods are in the form of simulations that can hone critical thinking skills, rapid problem solving, and train general awareness and effective responses to emergency events (Smith et al., 2016).

Supply Dimension of Situation Awareness

The supply aspect describes an individual's capacity to deal with emergency situations, which consists of the dimensions of arousal (S1), concentration of attention (S2), division of attention (S3), spare mental capacity (S4). In the S1 dimension regarding readiness, tour managers assessed that they were physically and mentally ready to deal with emergency situations immediately. Readiness according to Slameto (2003, in Rizki, 2013) is a state that makes individuals feel ready to act or respond to situations in a certain way. In this study, the majority of tourism managers have participated in emergency training, thus contributing to their readiness to deal with emergency conditions. In line with research by Mulyana et al. (2024) which showed that training on emergencies can improve individual readiness in dealing with emergency conditions.

In dimension S2 regarding concentration of attention, tourism managers assess that they have a high concentration of attention on emergency conditions when providing first aid on the beach. According to Slameto (2010, in Riinawati, 2021), concentration means focusing on one thing and leaving all other things unrelated. Concentration of attention is one of the important factors in first aid because it must be given quickly and precisely so as to reduce the severity of emergency victims (Ramadhina et al., 2025). Efforts to increase concentration in tourism managers can be done with simulation-based training methods, which are proven by the results of research by Mazur et al. (2020) that there was an increase in subscores related to concentration after being given the intervention.

In dimension S3 regarding division of attention, tour managers consider it quite easy to divide attention on several things at once, such as the condition of the victim, the environment, and tools when providing first aid in emergency situations. Division of attention can be related to excessive mind load due to doing a lot of work at once, causing the brain to process more distractor information from the surrounding

environment, resulting in increased susceptibility to distraction (Nadira & Khairunnisa, 2020). In Ariana & Hastjarjo's research (2018), it is emphasized that divided attention can be a factor that can reduce situation awareness because the speed in detecting important information will slow down in situations that require multitasking. This is in line with Endsley & Bolstad's (1994) statement that situation awareness is related to individual cognitive functions, such as working memory capacity and long-term memory, which help in searching and collecting information obtained to be applied to situation awareness levels 2 and 3, namely individual understanding and projection of the situation.

In dimension S4 regarding remaining energy capacity, tourism managers consider that there is a lot of mental capacity or energy left to think about the next step or consider other possible events in the emergency situation. According to Marleni et al. (2024), in maintaining situation awareness individuals need to show resilience and have the ability to manage stress well. The presence of stressors can affect an individual's situation awareness because it can reduce the capacity of working memory depending on long-term memory as resources that individuals have, such as experience and knowledge about the situation at hand (Endsley, 1999). Previous research shows that work fatigue, mental workload, and stress levels that tend to be high can reduce working memory capacity so that it has an impact on situation awareness (Sneddon et al., 2013; Zadehgholam et al., 2015). However, another study conducted by Rizki et al. (2024) stated that mental workload is in line with the level of situation awareness, while stress and job fatigue are not in line with the level of situation awareness.

Overall, the supply aspect shows that the capacity of individual tourism managers in dealing with emergency conditions on the beach tends to be in the high category. This can be attributed to the age and education level of tour operators, most of whom are in the early adult age range with a high school education or equivalent. In addition, the majority of tour managers have also been provided with training on emergencies and are all experienced in dealing with emergency conditions on the beach, such as drifting and drowning. In maintaining the supply dimension, it can pay attention to situation awareness through teamwork which has been shown to indirectly reduce patient safety incidents (Paramita et al., 2024). Teamwork consists of a group of people doing something together to achieve the same goal (Fitri et al., 2022). There are several aspects related to the dynamics in teamwork to achieve goals optimally, namely effective communication, interdependence, clear responsibilities through equal distribution of tasks, and trust in each other (Feriandy & Wahyu, 2023). Effective communication is essential in teamwork because it allows team members to share information easily, minimizing confusion about the situation at hand (Setyawan & Arifin, 2018 in Zaky, 2023). In emergency conditions that require readiness and concentration of attention, team effectiveness is needed when providing first aid, this can be obtained from good team management such as a clear division of tasks because it can contribute to team performance (Zaky, 2023).

Understanding Dimension of Situation Awareness

The understanding aspect describes how well individuals understand the situation that occurs around them as a whole, which consists of the dimensions of information quantity (U1), information quality (U2), familiarity with situation (U3). In dimension U1 regarding the quantity of information, tour managers assessed that there was enough information about the emergency situation at hand, such as the location of the accident, the cause, or environmental conditions. In making decisions, the availability of information is one of the

contributing factors because the complete information obtained can be a consideration in making the right decision (Pasolong, 2023). This information is related to individual cognitive capacity because situation awareness involves the active role of working memory capacity that allows individuals to integrate existing information, then compare the information with goals, and plan or predict scenarios based on known situation dynamics (Endsley & Bolstad, 1994).

In dimension U2 regarding the quality of information, tour managers assessed that there is clear information about the emergency situation being faced. In emergencies, clarity of information means that the information conveyed uses simple language so that it is easy to understand and unambiguous, this can help medical staff and others who handle the case to take appropriate action so that the risk of severity can be minimized (Seroja, 2017). Quality information can also help in communicating and coordinating with other teams in handling emergencies (Kemenkes RI, 2024).

In dimension U3 regarding situation familiarity, tour managers feel familiar with similar emergency situations so that they are familiar and understand the steps to handle them. According to Chen et al. (2023), a person's experience can affect familiarity with the situation. This is in line with the results of this study that most tour managers have experience working as a balawista for more than 5 to 10 years. In their research, Chen et al. (2023) worked on strategies to improve situation awareness in this dimension, namely through simulations, video modules, and structured shadowing.

Overall, the understanding aspect shows that tourism managers have a fairly good level of overall understanding of the emergency conditions that occur on the beach. A good understanding will be related to the decision-making process related to the real picture of the situation (Endsley, 2001). There are several efforts that can be made to improve tourism managers' understanding of situation awareness, such as providing education and training (Rahmawati & Puspitasari, 2023). The study showed that education and training were able to increase knowledge and skills towards providing basic life support (BHD) actions for adult, child and infant victims. An approach through experiential learning can also be done because it contributes to increasing individual understanding of solving a problem (Hakima & Hidayati, 2020). In addition, an approach with a problem-based learning model through the case study method applied in the research of Putra et al. (2024) was proven to increase individual awareness, it can also be applied in this study to increase the situation awareness of tourism managers in dealing with emergency conditions.

CONCLUSIONS AND RECOMMENDATION

Overall, the main aspects of SART that describe the situation awareness of tourism managers towards emergency conditions on the beach show that tourism managers face dynamic demands and complexity of the situation (demand), but this can be balanced with good physical and mental capacity (supply) and an adequate level of understanding (understanding) to maintain situation awareness. It can be concluded that the results of this study show that situation awareness of tourism managers tends to be high with individual capacity and good understanding of the emergency conditions faced. Suggestions for future research can examine the factors that influence the situation awareness of tourism managers towards emergency conditions that require first aid to understand situation awareness in emergency conditions more comprehensively.

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