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TANTANGAN YANG DIHADAPI OLEH PENYELAM PEMULA DALAM EMPAT PROGRAM SERTIFIKASI PENYELAM PERAIRAN TERBUKA

CHALLENGES ENCOUNTERED BY NOVICE DIVERS IN THEIR INITIAL FOUR OPEN WATER DIVES OF CERTIFICATION PROGRAMS

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Abstrak

Penelitian ini bertujuan untuk mengidentifikasi permasalahan spesifik yang muncul selama empat penyelaman perairan terbuka pertama dalam pelatihan dan sertifikasi Penyelam Perairan Terbuka. Sebanyak sepuluh peserta yang telah menjalani pelatihan sertifikasi OWD pada tanggal 2-5 September 2022 di perairan Karimunjawa dipilih untuk mengikuti penelitian. Pesertanya terdiri dari tiga penyelam laki-laki dan tujuh penyelam perempuan, berusia antara 19-23 tahun. Studi ini mengidentifikasi berbagai tantangan yang dialami oleh para peserta, termasuk lima masalah fisiologis, tujuh masalah teknis terkait peralatan, dan tiga belas masalah terkait penguasaan materi. Hampir semua peserta melaporkan mengalami beberapa kesulitan selama empat penyelaman perairan terbuka pertama mereka. Namun, tingkat keparahan masalah ini umumnya ringan, dan tidak menghambat proses penyelaman secara signifikan. Temuan penelitian ini menunjukkan bahwa penyelam pemula kemungkinan besar akan menghadapi kesulitan selama penyelaman awal di perairan terbuka. Namun permasalahan ini dapat diatasi melalui pengalaman dan pelatihan. Studi ini menyoroti pentingnya mengembangkan strategi dan intervensi yang bertujuan untuk mengurangi terjadinya masalah-masalah ini dan meningkatkan keselamatan dan efektivitas program sertifikasi penyelaman perairan terbuka secara keseluruhan.
Kata kunci: pemula, tantangan, menyelam, SCUBA

Abstract

The present study aims to identify the specific issues that arise during the first four open water dives in the training and certification of Open Water Divers. A total of ten participants who had undergone OWD certification training between September 2-5, 2022, in Karimunjawa waters, were selected to participate in the study. The participants consisted of three male and seven female divers, aged between 19-23 years old. The study identified a range of challenges experienced by the participants, including five physiological issues, seven equipment-related technical problems, and thirteen issues related to material mastery. Almost all participants reported encountering some form of difficulty during their first four open water dives. However, the severity of these issues was generally mild, and they did not significantly impede the diving process. The findings of this study suggest that novice divers are likely to encounter difficulties during their initial open water dives. Nevertheless, these issues can be addressed through experience and training. The study highlights the importance of developing strategies and interventions that aim to reduce the occurrence of these issues and enhance the overall safety and effectiveness of open water diving certification programs.
***Keywords**: Beginner, Challenges, Diving, SCUBA*

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INTRODUCTION

SCUBA diving is a popular outdoor sport, which is often categorized as an extreme sport (Cohen et al., 2018; Mitchell & Doolette, 2016), Due to the potentially life-threatening nature of SCUBA diving, even small technical mistakes related to breathing can be highly dangerous. When underwater, humans cannot breathe without the aid of a Self-Contained Underwater Breathing Apparatus (SCUBA) which is used during SCUBA diving. There is also another more extreme diving technique called Freediving, where divers rely on a single breath and do not use any breathing apparatus (Tetzlaff et al., 2021). In Freediving, divers heavily rely on their breath-holding abilities and body movement management to conserve oxygen and enable longer dives (Covington et al., 2019; Farrell, 2006; Seedhouse, 2011).

As it is an extreme sport, becoming a diver requires a diving license. The basic license required to legally dive in open water (ocean) is the Open Water Diver (OWD) license. For Freediving, a Freediving Level 1 license is required. A license can be a sign that someone has learned and practiced beforehand, passed all tests and exams, and is considered capable of diving in real conditions in open water. After obtaining this basic level license, divers are then allowed to learn advanced specializations, such as night diving, underwater photography and video, navigation, and deep diving. Currently, there are many professional diving institutions that provide diving training and certification, which are internationally recognized. These institutions have become a reference for recreational diving training and certification in the diving industry and tourism.

During a scuba diving certification program, trainees are typically required to complete several training sessions, including academic, pool, and open water sessions. The academic session aims to educate aspiring divers on the fundamental theories of diving and other essential concepts before engaging in practical activities (Abercrombie, 2012). During the pool session, aspiring divers are introduced to the underwater environment to evaluate their understanding of the theories learned during the academic session, as well as to be taught proper diving techniques. The instructor assesses the suitability and readiness of the candidate before allowing them to proceed to the open water session, so that any inappropriate actions can be corrected in the pool first. During the open water session, divers are exposed to real open water conditions, the actual underwater environment, and experience the real depth of the sea. While in the pool, candidates will only feel a maximum depth of 5 meters, but in the open water session they can experience up to a depth of 18 meters, which is significantly different from the maximum depth of 5 meters in the pool. Furthermore, they also have to take into account the saltwater conditions, marine life, and oceanographic factors that are present in the sea (Giglio et al., 2020).

In general, the open water session is conducted for four diving sessions (4 logs), which is the standard for Open Water Diver (OWD) certification. To be recognized as 1 log, a dive must be conducted in open water for a minimum of 15 minutes with a minimum depth of 5 meters. To obtain an OWD license, prospective divers must complete four open water dives with a maximum depth of 18 meters (Scuba Schools International, 2022). The four logs will become the first 4 records in the diving history of the aspiring diver. The diver will record each diving activity log, starting from the first 4 logs during the OWD certification and continuing thereafter. The more logs of diving activities recorded, the more skilled the diver is considered to be in conducting diving activities. The number of logs will reflect the experience of a diver.

In novice divers, technical problems are often encountered during the first 4 dives. These problems can occur due to lack of preparedness, panic, doubt, or negligence of the novice diver, which can result in errors in equipment preparation, both SCUBA and skin dive equipment, movement errors, communication errors, and so on. Problems that occur during diving can threaten the safety of both individuals and teams, and even threaten lives (Buzzacott & Vann, 2009), so divers need to be alert to potential problems that may occur, especially during the first 4 dives, which are the first diving experience for novice divers. By understanding the potential problems that arise in the first 4 dives, all involved divers, whether instructors, divemasters or participant divers, can have mental preparedness and a greater chance of acting appropriately when problems occur.

A study revealed that the main cause of death during diving is drowning (Aquila et al., 2018). Drowning referred to here is drowning in the context of accidents caused by specific problems that occur during diving. Under normal conditions, divers drown at water depth equipped with SCUBA equipment that allows them to breathe underwater, but if a problem occurs, there is a potential failure of the respiratory system in SCUBA equipment that can cause divers to drown without being able to breathe. According to a study by Hart (Hart et al., 1999), the main risk factors for diving accidents are rapid ascent, cold water temperature, limited vision, the number of diving logs for each diver, and the experience of each diver. The number of diving logs can reflect a diver's level of experience. Unfortunately, diving accidents can occur not only in novice divers, but even divers who have several diving logs have the potential to experience accidents if they do not prepare and plan for diving properly. These risks can be prevented by identifying what problems may occur from the moment the diver starts into the world of diving, starting from the OWD certification. Therefore, it is necessary to identify problems that occur in the first 4 logs of open water divers.

This research aims to identify technical problems experienced by novice divers in their first 4 open water dives, which is a requirement to obtain the OWD license. By knowing the problems that arise in the first 4 dives, instructors can be more vigilant and better prepare for the next dives. This knowledge can also serve as an early warning for OWD certification candidates to prepare for potential problems during the diving process. With good awareness of potential problems, both instructors and certification candidates can dive more calmly, safely, and have a plan in place to solve any problems that may arise during the dive.

METHODS

This study is a descriptive quantitative study that identifies technical problems in the first 4 open water diving logs. The study was conducted through interviews with 10 respondents who participated in the OWD certification program on September 2-5, 2022 in the waters of Karimunjawa. The respondents consisted of 3 males and 7 females aged 19-23 years old. The interviews were conducted after completing all the open water sessions (4 logs), in the evening at the accommodation hall during the evaluation before rest, in a relaxed and pressure-free atmosphere for all respondents. The total interview time was around 30 minutes. The researcher did not design a specific schedule, location, or atmosphere, but only followed the normal agenda that had been scheduled in the diving certification program, so that all respondents were expected to act naturally. The only question asked was what problems were experienced during the 4 diving logs. The collected data only included the respondent's name and a list of problems experienced during the 4 logs. No other data was collected.

The interview was conducted by the instructor/trainer in the OWD certification program. The discussion and evaluation session between the instructor and the participants after the

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diving session is one of the standard procedures that must be carried out in every diving certification program. In the evaluation, the instructor must ask about the problems experienced by each participant. Since the evaluation session conducted by the instructor is a standard procedure and not a research design, it can be assumed that all respondents will provide honest answers to all questions from the instructor. All respondents were asked the same question about what technical problems they experienced during the 4 diving logs that they had completed. Then, the respondents will take turns answering what problems they experienced, and the answers are recorded by the researcher. The interview data is then grouped based on the similarity of answers, and each finding is described.

RESULT

Based on the summary of interview results from all respondents, 25 issues were identified and categorized into three categories: physiological issues **(Table 1)**, technical equipment issues **(Table 2)**, and mastery of material issues **(Table 3)**. The tables provide a breakdown of the identified issues and their respective percentages of occurrence among all respondents.

Table 1. Physiological Issues

Issues	Experienced by
Air waste	20%
Equalization difficulties	10%
Sea-sickness	70%
Abdominal pain	20%
Gastrocnemius muscle spasm	20%

Physiological problems encountered during diving include air wastage (20%), difficulty in equalizing (10%), seasickness (70%), abdominal pain (20%), and gastrocnemius muscle spasms (20%). It is evident that the most dominant problem is seasickness, although it is not a problem that occurs in the water, but rather on the boat, the experience of seasickness has a significant impact on the readiness of divers to enter the water, including its relationship with consciousness and precision in preparing SCUBA, and also affects the psychology and performance when underwater.

Table 2. Technical Equipment Issues

Issues	Experienced by
The cylinder (air tank) is detached	10%
Water gets into the mask	50%
Misty mask	10%
Too much weight plate	20%
BCD is too big	20%
Regulator Leak	50%
The position of the weight plate is unbalance	50%

The technical equipment problems that occurred were mostly not too dangerous for the safety of the divers, but only affected their comfort, such as water entering the mask (50%), mist in the mask (10%), divers carrying too much weight (20%), unbalance distribution of weights (50%), and using a BCD that was too big for the diver's body (20%). However, there were also serious technical problems that could threaten the safety of the divers, namely detachment of the tank from the BCD (10%) and regulator leakage (50%). The regulator leakage refers to o-ring damage, which can be resolved by replacing the damaged o-ring. However, there were also major regulator leaks caused by the inflator hose breaking and

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detaching from the first stage, rendering the regulator unusable. Fortunately, this happened while the divers were still on the boat. It would have been dangerous if the inflator hose broke while the divers were underwater.

Table 3. Mastery of Material Issues

Issues	Experienced by
Regulating Buoyancy	50%
Fin pivot	90%
SCUBA installation	40%
Remove and attach the inflator	100%
Remove and attach the weight plate underwater	50%
Take off and put back on SCUBA underwater	40%
Rowing technique (finning)	50%
Air sharing	70%
Communicate underwater	60%
Understand commands in the water	60%
Get off the ship into the water (entry)	40%
Deployment of Surface Marker Buoy (SMB)	40%
Maintaining composure	10%

The issue of mastery of diving-related knowledge and skills, coupled with the attitudes of the diver while underwater, is of paramount importance. The predominant knowledge-related problem that arises is critical and poses a threat to the safety of the diver, such as the ability to don and doff the SCUBA gear while submerged (60%), as well as the precision of SCUBA gear assembly prior to entering the water (40%), inflator attachment and detachment (100%), weight plate attachment and detachment (50%), communication (60%), command comprehension (60%), sharing of air with another diver (70%), deployment of surface marker buoy (40%), and maintaining composure (10%). Furthermore, issues concerning the attitudes of the diver while underwater, which may endanger marine life, include rowing techniques (50%), buoyancy control (50%), fin pivot (90%), and entry techniques (40%).

Based on the three tables above, it appears that the most frequently occurring issue relates to mastery of the required knowledge and skills. The second most common problem is related to technical equipment, while health-related issues occur less frequently. Serious issues that may jeopardize safety, such as rapid ascent, contact with hazardous marine life, decompression sickness, and so on, were not observed in the four dive logs analyzed in this study.

DISCUSSION

Air Waste

20% of the respondents reported that they had high air consumption during diving. Air consumption can be measured and monitored through the pressure gauge used by each diver. Usually, divers pay close attention to their air supply through the pressure gauge before entering the water and check it regularly while underwater. Air consumption during diving is influenced by various factors, including physiological and environmental factors. Physiological factors include lung volume, VO2max, body composition, hemoglobin levels, and others (Putra et al., 2022; Putra, Karwur, et al., 2020; Putra, Pratama, et al., 2020; Sistiasih, 2014). Environmental factors include water pressure, temperature, and the presence of currents that can force the body's muscles to contract harder. High water pressure and cold temperatures can reduce the volume of air, causing the reserve air to deplete more quickly (Davenport, 1979; Haworth, 1967; Loske, 2013).

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Equalization difficulties

From all respondents, 10% reported experiencing difficulty in equalizing. Equalization is a technique used to balance the air pressure in the middle ear with the surrounding water pressure. Equalization is necessary when there is a change in pressure due to a change in diving depth. Equalization is essential to prevent damage to the eardrum and serious barotrauma injury to the middle ear (Bove & Davis, 1990; Farida et al., 2020; Koriwchak & Werkhaven, 1994). There are three equalization techniques commonly used by SCUBA divers, namely the Valsalva maneuver, Toynbee method, and voluntary tubal opening by jaw movement. The Valsalva maneuver is known to be the most successful equalization technique (Arbanto et al., 2018). However, each individual has different conditions and abilities to perform equalization. Failure to equalize which causes the diver to descend slowly, is still commonly found.

Sea Sickness

Sea sickness / motion sickness (Lackner, 2019) is the most common physiological problem experienced by respondents. 70% of the respondents experienced sea sickness during the travel to the diving location using a boat. According to the researcher's observation, sea sickness only occurs on the surface, while the diver is still on the boat. However, the nausea and dizziness from sea sickness will decrease when the diver enters the water at a depth of more than 3 meters. This may be influenced by natural conditions on the surface. Large waves that cause the boat to sway quite vigorously, strong winds that feel very cold, and the aroma of fuel produced by the boat's engine are suspected to be triggers of sea sickness (Golding, 2016). Meanwhile, underwater where the depth is more than 3 meters, there is no sensation of wave turbulence and it is relatively calmer. The phenomenon that can be felt underwater is the presence of currents that can drag the diver along the current direction. However, the current does not cause nausea, but requires the diver's effort to paddle harder to change position. A person who has experienced severe seasickness with symptoms such as repeated vomiting on the surface is at high risk when diving because the effects of seasickness can potentially persist underwater and worsen the diver's condition. However, further research is needed.

Abdominal Pain & Gastrocnemius (Calf) Muscle Spasm

Twenty percent of the respondents reported experiencing abdominal pain while in the water. It was also found that 20% of the respondents experienced spasms in the gastrocnemius muscle. It is not yet clear whether the abdominal pain is originating from the internal organs (digestive tract) or from the abdominal muscles. It is possible that it is related to psychological factors (stress) that can lead to an increase in gastric acid. Further research is needed to confirm this. (Megha et al., 2022). The researchers also suspect that the abdominal pain is also a form of muscle spasm similar to that which occurs in the gastrocnemius muscle. Muscle spasms are highly likely to occur during diving, especially in the gastrocnemius muscle. In diving, the diver moves by relying on kicking with the legs aided by fins, while the hands do not contribute to the kicking as in swimming. The gastrocnemius muscle works hard to maintain the position of the legs during the kicking movement. The task of maintaining the position of the legs becomes more difficult with the use of large fins, especially open-heeled fins. The gastrocnemius muscle can quickly become fatigued and end up in spasms (Giuriato et al., 2018). Furthermore, in certain cases such as the presence of currents that require divers to strengthen their leg strokes to avoid being swept away, the gastrocnemius muscle has to work harder. The abdominal muscles also have a high potential to experience spasms because the technique of leg strokes in diving is not only performed by the femoris muscle as the agonist, but also involves the abdominal muscles (Matsuura et al., 2020).

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The cylinder (air tank) is detached

The occurrence of tanks becoming detached from their BCD (Buoyancy Compensator Device) attachment is highly possible and can be attributed to human error during SCUBA installation and adjustment. The tank's surface is relatively slippery and it is not uncommon for the tank to slip out of its BCD attachment when the SCUBA is lifted. Novice divers often lack attention to detail during buddy checking of their dive partner's equipment. Divers should carefully inspect and strengthen the grip of the tank's attachment if this happens. Tank detachment can be dangerous, especially when the tank is almost empty of air. Tanks with low air supply tend to be lifted more easily to the surface compared to those fully filled. This study found that 10% of respondents experienced detached tanks while diving, but this incident was quickly noticed and addressed by the diver's buddy.

Misty mask and water get into the mask

The main function of a mask in scuba diving is to aid in underwater vision. Direct contact of the eyes with water causes human vision to become blurry, therefore an apparatus is needed to create a space between the eyes and water so that the eyes do not come into direct contact with water. A mask creates a space between the eyes and water, with large-sized lenses that come into contact with water on the outer side and face the eyes at a distance of several millimeters on the inner side. This mechanism enables the eyes to see the surrounding environment through the mask lens without direct contact with water. However, the inner side of the lens often becomes misty due to evaporation (Sherwood, 2015) that occurs on the facial skin within the mask area. The mask contains an empty space that provides distance between the eyes and the lens. This space is airtight because the side of the mask that contacts the facial skin is made of silicone rubber that adheres well to the skin and does not allow any gaps for air and water to enter or exit between the internal space of the mask and the surrounding environment. Water vapor resulting from the evaporation of the skin that is inside the mask eventually becomes trapped and accumulated, adhering to the entire surface of the inner part of the mask, including the inner lens, forming misty spots that will eventually obstruct the eye's view through the lens.

The misted lenses of the mask can impair the diver's visibility and potentially cause them to lose direction and coordination. Therefore, it is necessary to perform a mask-clearing action underwater by inserting water from the surrounding environment into the mask to rinse the inner lens, and then expelling the water from the mask until the inside is completely clear again. Divers can prevent mist on the lens by applying a cleaning compound (usually baby shampoo, toothpaste, or a specific anti-fog gel) that can prevent the accumulation of water vapor on the inside of the mask lens.

Water can enter the mask if it is not properly fitted or if there is damage to the silicone rubber, causing the diver to perform mask clearing more frequently. Additionally, the shape (contour) of the diver's face and facial muscle movement can also affect the likelihood of water entering the mask, so it is necessary to choose the appropriate mask for each individual. A mask that is suitable for one diver may not necessarily be suitable for another. In this study, 50% of the respondents experienced water entering the mask, which may be due to the diver not having the right adjustment for the mask they are using, or the mask type not fitting their facial contour. The occurrence of misted lenses was only 10% because divers had applied a cleaning compound to the inner lens.

Too much weight plate

When the human body enters water, it will experience one of three possible buoyancy states: positive buoyancy, negative buoyancy, or neutral buoyancy (Abercrombie, 2012). Positive buoyancy means there is a buoyant force that causes the body to tend to rise to the surface. Negative buoyancy means there is no buoyant force, causing the body to tend to sink. Neutral buoyancy, on the other hand, means the buoyant force and gravity are balanced, resulting in the body not tending to rise to the surface nor sink (Toyoshima & Nadaoka, 2015). When divers use SCUBA and skin dive equipment, the equipment alters buoyancy and can act as a floatation device in the water. Additionally, if the BCD jacket is filled with air, it will provide extra lift to the surface. To balance the lift force provided by SCUBA equipment, divers require weights. These weights usually take the form of plates made of lead, with each plate weighing 1kg.

Novice divers typically lack knowledge about the appropriate amount of weight to carry while diving, leading to issues of either overweighting or underweighting. The amount of weight required by a diver varies between diving in freshwater and saltwater. Diver undertaking saltwater dives necessitate a greater quantity of weight as compared to freshwater dives due to the disparity in the density of saltwater and freshwater. This discrepancy affects divers' ability to submerge and necessitates a greater amount of weight to dive in saltwater than in freshwater (Kasli & Aminullah, 2016; Paulev & Zubieta-Calleja, 2007). Novice divers frequently lack understanding of the appropriate weight amount for diving in the sea. The ideal weight amount is dependent on body composition, anthropometry, and the set of equipment used. The simplest way to determine the ideal weight amount is by trying it out directly in the water. The ideal weight amount is achieved when the body experiences no significant upward or downward movement (neutral buoyancy), and the diver can control buoyancy merely by adjusting their breathing, without manipulating the air in the BCD. The weight experiment is typically conducted during the first of four dives, during which the diver typically only goes as deep as 6 meters to undergo a practical competency test with their instructor. The first dive serves as an initial introduction for the diver to the marine environment, before diving into deeper waters.

Excessive weight amounts may result in the body tending to sink, requiring additional lift from the BCD by filling it with air. This can cause air in the tank to deplete more quickly, as divers must frequently manipulate air to fill their BCDs instead of focusing on proper breathing management. In this study, 20% of respondents reported carrying too much weight. However, the majority of respondents could accurately predict the required weight amount before diving. Only 20% of divers still experienced excessive loading.

Unbalance Weight Distribution from Weight Plate Positions

Around 50% of respondents experienced weight distribution issues caused by unbalance placement of weight plates. Despite each weight having the same size and weight, imbalanced placement can make it difficult for divers to position their bodies correctly. The normal body position in the water is perfectly horizontal. Faulty weight placement can cause the body to rotate unintentionally, making divers change direction or struggle with certain maneuvers, including evading coral. Failure in water maneuvers can cause the body to move irregularly and potentially hit and damage nearby coral. In addition, it can increase the risk of contact with dangerous marine life (Toyoshima & Nadaoka, 2015).

The placement of weights is related to the comfort factor of divers. Each diver will have different preferences in terms of the position of weight placement. To achieve the best arrangement, divers should utilize pool sessions to learn the characteristics of the SCUBA set they will use and the weight placement position when using that particular SCUBA set. The use of different SCUBA sets may have an impact on the weight distribution as well. Further research is needed to investigate this matter. In addition, the position of the weights attached to the

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diver's body can shift during the dive. The movement of the weights while in the water is caused by the increasing pressure and decreasing volume as the diver descends (Loske, 2013) resulting in the compression of the diver's body and making them more streamlined. This condition does not occur with nylon weight belts, as the material does not change in size even with changes in pressure. Therefore, when the diver reaches the depth, they may feel that the belt they are wearing is loose and causes a shift in weight position and distribution. This problem does not occur with rubber belts, as the size of the rubber belt can follow the changes in the diver's body size due to pressure changes.

Oversized BCD & Regulator Leakage

The problems that occur in parts of SCUBA equipment include issues that can increase the risk of diving failure. SCUBA equipment is the main system that supports the life of divers in the water. The regulator has a vital role as it is the air channel that allows the use of air in the tank. The regulator is the only device that allows air in the tank to flow to the BCD and breathing channels (second stage & octopus). If there is a problem with the regulator, it will disrupt the air distribution, which is dangerous in the water. Leakage in the regulator causes air to be depleted faster due to the release of air. In some cases, small leaks may be tolerated by divers because they will only run out of air faster. However, large leaks will require the diving to be immediately terminated, and the diver must manage their ascend to the surface for safety. Leakage in the first stage regulator can occur due to damage to the o-ring attached to the tank. In this study, 50% of respondents experienced mild regulator leaks, allowing diving to still be conducted but with a shorter time limit.

The use of a BCD that is too large also causes divers to deplete their air supply in the tank more quickly. With an oversized BCD, the amount of air needed to inflate the BCD is also greater. In addition, the BCD cannot fit precisely on the diver's body because the diver's body dimensions are smaller than the circumference of the body that the BCD can accommodate. An ill-fitting BCD will allow the BCD to move from its position during the dive. This can disrupt the diver's maneuvering and also cause body rotation.

Mastery of Material Issues

Before a diver earn an OWD license, they must demonstrate mastery of basic diving materials (Scuba Schools International, 2022). In this study, it appears that many respondents experienced problems related to their mastery of the material. Issues related to SCUBA equipment remained a dominant problem. These included the installation of SCUBA gear (40%), attaching/detaching the inflator (100%), adding/removing weights underwater (50%), and attaching/detaching the SCUBA gear underwater (40%). Problems related to SCUBA gear may arise because the divers are not yet accustomed to the SCUBA equipment being used. Typically, in OWD training and certification, the SCUBA gear used belongs to the instructor or certification agency and not the individual diver. Divers typically begin to invest in their own diving gear after obtaining their OWD certification. Using equipment that is not one's own causes divers to be unfamiliar and tend to experience several difficulties during usage.

In addition to SCUBA-related issues, problems related to coordination in water are also dominant. The most common problems experienced are fin pivot movement (90%), buoyancy control (50%), stroke technique (50%), and entry technique when entering the water (40%). Safety-related material also still poses many issues. Air sharing technique (70%), communication and understanding of commands (60%), maintaining composure (10%), and installation of SMB (40%). Difficulties in mastering movement and safety-related materials are common for divers in their first four dives. These materials require more experience and diving time to be mastered perfectly.

The limitations of this study are primarily related to the number of subjects. Difficulty in obtaining subjects is due to the fact that there are not many novice divers taking diving certification simultaneously in a large group, especially to obtain homogenous subjects. Further research is needed to improve this study, which can be optimized through collaboration with dive centers and conducted over a sufficient length of time.

CONCLUSION

In the first four diving logs, physiological issues such as air consumption, difficulty in equalization, seasickness, abdominal pain, and gastrocnemius muscle spasms were identified, as well as technical equipment problems such as water entering the mask, misty mask, excessive weighting, unbalance weight placement, oversized BCD, tank detachment, and regulator leakage. In addition, issues with mastering diving skills were also noted, including disassembling and assembling SCUBA gear underwater, accurate SCUBA placement, removing and attaching inflators and weights, communication, understanding commands, air sharing, SMB deployment, panic, finning technique, buoyancy control, fin pivot, and entry technique. These problems are commonly experienced by beginner divers. Despite the apparent prevalence of these issues, if they are mild, diving can still be conducted safely. With increasing diving experience and log records, these problems can be reduced and minimized.

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