Preparedness and resilience in high-risk operations: An exploratory study of training needs for search and rescue (SAR)

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VTI unpublished report

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Approved for reporting

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Summary

The aim of this pre-study is to chart the needs for training and preparedness for search and rescue (SAR) operations in the Mediterranean for professional seafarers and volunteers. The study addresses the following research questions:

1. What are the training needs for volunteers involved in the search and rescue of migrants in the Mediterranean?
2. What training and support is available for professional seafarers in the context of SAR operations involving migrants, and what additional training or resources are needed?
3. Based on the training needs of volunteers in SAR operations involving migrants, what lessons can be learned for professional seafarers?

To address these research questions, this pre-study combines a literature study with expert interviews. 26 interviews were carried out with 28 experts from maritime training and education institutions, shipping companies, maritime authorities and non-governmental organisations (NGOs) involved in the SAR of migrants in the Mediterranean.

The results from the study show the complexity and diversity of SAR operations and training, as well as the wide range of organisations and individuals involved. Starting with training for volunteers in international NGOs involved in the SAR of migrants, the interviews identified three types of training needs: general knowledge and skills for life and work on board, mission specific knowledge and skills, and mental health-related knowledge and skills. Although interviewees agreed that the current training was effective, they identified a key challenge related to the limited time available for training. Currently most of the training takes place during an intense training week in the beginning of each mission. This condensed schedule can be overwhelming for trainees, especially for new volunteers who are unfamiliar with life and work on a ship.

Turning to the second research question regarding training and support for professional seafarers in the context of SAR operations involving migrants, the interviews suggested that the current training concentrates on technical aspects of SAR operations (e.g., planning and conducting a search; handling equipment). Mass rescue situations or SAR of migrants might be mentioned, but were generally not the main focus of courses, modules, or even specific lessons or practical exercises at the maritime academies discussed by interviewees. While students at these academies learned how to launch their vessel's own rescue boat in order to evacuate their vessel in an emergency, there was little or no training for saving people from the water or a lifeboat.

In line with legal requirements (such as the Work Environment Act or *Arbetsmiljölagen* in Sweden), the support provided by shipping companies included measures for creating a good work environment as well as providing professional psychological support if needed. In addition, two types of practical support specifically for the SAR of migrants were provided, namely information materials and a "SAR kit" with basic supplies.

Considering the need for additional training and resources, several interviewees noted that it was difficult to rescue survivors from the water with the currently available equipment. In addition, interviewees emphasised the need for more practical training (incl. simulator training) in MET programmes, as well as a stronger focus on communication and non-technical skills such as decision making, teamwork and leadership in the context of complex and dynamic situations, such as SAR. In addition, a stronger focus on mental health in MET programmes was considered desirable, including training for reducing mental health-related risks in the aftermath of difficult or traumatic situations.

Taken together, the pre-study led to a number of suggestions and recommendations for improving training and support for SAR in general, and for SAR of migrants in particular. Preparedness and resilience require procedures and resources that enable crews (both on NGO vessels and commercial vessels) to adapt and act flexibly in evolving complex and uncertain situations, such as SAR. Training

of standardised technical and non-technical skills needs to be complemented by team building and by continuous learning at the individual, crew and organisational level. To enable this, a working environment characterised by mutual trust, social support and psychological safety should be created. Moreover, close attention should be paid to establish practices and structures that allow the incorporation of lessons learned by particular individuals or crews into the body of organisational knowledge and practices.

To improve training for volunteers in NGOs involved in the SAR of migrants, decisions about training development should be based on systemically assessed training needs. To reduce overload during onboard training, different training modalities (e.g., e-learning) can be used to spread out training over time for topics that can be trained online.

In commercial shipping, preparedness for mass rescue situations should receive more attention, both regarding equipment and training. Ways of incorporating a stronger focus on mental health (including how to reduce the mental health risks of difficult or traumatic situations) in MET programmes should be explored. For instance, peer debriefing and defusion can be used to provide "mental first aid" and as well as a way of learning from SAR operations and emergency situations.

In addition, the pre-study identified several directions for future research. First, a better understanding of the relationship between individual-level, team-level and organisational-level resilience is needed. Second, more research is needed on the interplay between different factors contributing to resilience, and how these can be promoted. This includes resources (e.g., equipment, procedures), effective training methods, and a social environment characterised by mutual trust, social support and psychological safety. Concerning training, a better understanding of the effectiveness of different training approaches with regard to retention, real-world transferability and extensibility to new situations is needed. Finally, a better understanding of the effectiveness of mental health interventions and the contributions of particular aspects of the work environment to promoting seafarers' mental well-being is needed.

1. Introduction

1.1. Background

Over 80 people died and several hundreds of people were missing and feared dead after a boat with up to 750 migrants on board sank in the Mediterranean on 14 June 2023 (Guardian, 2023a, b; SVT, 2023). Although this may have been the deadliest shipwreck in the Mediterranean this year so far, it is not the only one. The Mediterranean Sea has become the world's deadliest sea crossing, where thousands of migrants drown each year in their attempts to cross by boat (UNHCR, 2023). In the presence of this humanitarian crisis, seafarers within the merchant fleet, governmental vessels, as well as volunteers on board of vessels operated by non-governmental organisations (NGOs) participate in SAR operations. Vessels of Swedish shipping companies passing through these areas have been called upon to assist migrant boats in distress (e.g., Sjöfartstidningen, 2015; SVT P4 Gotland, 2015). Although this may not be an everyday event, the rescue operation and taking care of rescued migrants on board, often for several days, can place a high strain on the crews.

SAR operations require high levels of professional skills and well-coordinated teamwork from all crew members involved. Even with highly skilled crews, professional seafarers and volunteers risk their own safety during SAR operations. However, in the aftermath of an operation, they are often left to deal with the psychological consequences of their experiences. This includes facing potential injuries or death during the SAR operation itself, as well as interacting with the rescued people, who are often traumatised, distressed and in bad physical shape. In this way, SAR operations involving migrants can be considered high stress situations that may affect the psychological and physiological well-being of professional seafarers (Jensen and Oldenburg, 2019).

While shipping companies may have means to provide appropriate support, it is not clear what kind of additional preparedness and training is needed for seafarers in the context of SAR operations involving migrants. Such operations involve practical challenges that may not yet be well-covered in existing maritime education and training. Moreover, it is vital to understand how training can contribute to minimise the consequences of traumatic experiences during SAR operations for the psychological well-being of seafarers. We also need better insights into what organisations can do to support their crews in the best possible way. Thus, a deeper understanding of the training needs of professional seafarers in the context of SAR situations, especially those involving migrants, is needed. This includes practical knowledge and skills, as well as knowing how to deal with traumatic experiences.

In comparison to commercial companies, NGOs operating in the Mediterranean are non-profit, non-governmental charitable organisation. They are funded by donations and largely depend on the work of volunteers (Cusumano, 2019; Stierl, 2018). On board of their vessels, a limited number of permanent crew with professional training and experience from the merchant fleet are complemented by volunteers who often have no or very limited prior experience of operations on board. As NGOs do not have the time and resources to provide their volunteers with professional maritime training over a longer period of time, volunteers are normally trained on board by experienced crew members during the first few days of their mission. This not only adds significantly to the workload of experienced crew members, but the volunteers' lack of extensive training and experience may also present an additional risk for the safety of vessels and crews. Consequently, there is an urgent need to analyse the existing training of volunteers and identify potential ways of improvement.

1.2. Purpose of this pre-study

The aim of this pre-study is to chart the needs for training and preparedness for search and rescue (SAR) operations in the Mediterranean for professional seafarers and volunteers. The study addresses the following research questions:

1. What are the training needs for volunteers involved in the search and rescue of migrants in the Mediterranean?
2. What training and support is available for professional seafarers in the context of SAR operations involving migrants, and what additional training or resources are needed?
3. Based on the training needs of volunteers in SAR operations involving migrants, what lessons can be learned for professional seafarers?

This pre-study aims at exploring training needs with regard to the SAR operation itself, the interactions with migrants during their time on board, and seafarers' mental health in connection with these events. Originally the project aimed to analyse training needs through a formal "Training Needs Analysis" (TNA), including task analyses, competence mappings and a gap analysis. However, due to the complexity and diversity of the operations, and the limited access to NGOs and volunteers within the time frame of the pre-study, training needs were explored more broadly through expert interviews. The expert interviews provided insights into training needs as well as current approaches to the training of volunteers engaged in SAR operations involving migrants.

Moreover, the pre-study aimed at providing insights into the training and support for SAR involving migrants that is currently available to crew members of commercial vessels. Comparing this with insights from the training of volunteers on SAR NGO vessels, the pre-study helps to identify areas where more training and support may be needed for merchant crews and/or areas where a more focused follow-up study of training needs and support is required.

1.3. This report

This report summarises the findings of the interview studies with respondents from NGOs, MET institutions, shipping companies, and active seafarers. The report is structured as follows. The next chapter presents the methods used for the literature review and the expert interviews. Chapter 3 presents the findings of the literature study. Chapter 4 presents the findings from the interviews with experts from SAR NGOs and other organisations involved in the SAR of migrants in the Mediterranean. Chapter 5 turns to the expert interviews concerning training and support of seafarers in the merchant fleet. The report concludes with a discussion of the findings and their implications in Chapter 6.

2. Methods

This chapter presents the methods used in this pre-study. First, a literature study was carried out during autumn 2022 and spring 2023. In winter and spring 2023, this was followed by interviews with experts from a range of organisations in the maritime cluster. Originally, a formal "Training Needs Analysis" (TNA) had been planned as well, but could not be carried out as planned due to limited access within the time frame of the pre-study. Instead, training needs were identified based on expert interviews with NGO representatives.

2.1. Literature review

Initial searches on literature concerning the search and rescue of migrants in a maritime context suggested that previous research had addressed the topic from legal, political, and medical perspectives. Only very few studies addressed merchant shipping, and only few considered the training and support available for the volunteers and professionals engaged in the search and rescue. For the literature review for this pre-study, we therefore decided to start broadly with the overarching concepts of resilience and preparedness in a maritime context and supplemented this with searches specifically addressing training and support for seafarers involved in SAR.

We started with a search for resilience (topic = "resilien*") and training (topic = "train*") in a maritime context (using multiple search terms such as maritime, seafar*, ship*, vessel*). This provided 152 initial results in Web of Science, of which 21 were relevant upon closer inspection. A second search, in which resilience was replaced with preparedness (topic = prepared*), yielded 147 initial results in Web of Science, of which 13 were relevant. Additional searches (in October 2022) in ScienceDirect, PubMed and Oria (a discovery service offered by Norwegian university libraries) for articles published between 2017 and 2022 yielded another nine relevant articles (two on resilience and seven on preparedness). In addition, we included a study by Steigenberger and Lübcke (2022), which had been recommended by one of our interviewees, as well as a recent report on safety training (Viktorelius et al., 2023). The third search focused specifically on SAR (topic = SAR or "search and rescue*") and training (topic = train*) in a maritime context. The Web of Science search yielded 110 results, of which 13 were relevant (three of these articles had already come up in the search on "preparedness"). In addition, we included one study (Gkionakis, 2016) that we had come across during our initial searches on the search and rescue of migrants. In total, this provided 56 articles on training in connection with resilience, preparedness and SAR in a maritime context.

Concerning support, we started with exploratory searches for welfare or support in relation to SAR in the maritime context. However, restricting the search to SAR gave no or very few results. We therefore conducted a broader search for welfare or support (topic = welfare* or "social support*" or "peer support*" or "company support*" or [(family or community or supervisor*) and support*])[1] in a maritime context. The Web of Science search yielded 11057 results. Restricting the occurrence of welfare or support to the title yielded 378 results, of which 21 were relevant. Because debriefing and/or defusion were mentioned in relation to mental health support in several interviews, we conducted an additional search for debriefing or defusion (topic = debrief* or defus* or ("after action" AND review*)) in a maritime context. This yielded 152 results, of which 11 were relevant. We included an additional article (Teperi et al., 2019) that had been mentioned during data collection. In total, this provided 33 articles on welfare and support.

Articles identified through these literature searches are marked * in the reference list.

[1] An initial search for the topics "welfare* or support*" in a maritime context yielded 78529 results. In subsequent searches, we therefore used more specific terms for support.

2.2. Expert interviews

Taking an exploratory approach, we conducted interviews with experts from government agencies, commercial ship operators, MET institutions, and NGOs/volunteer organisations. The aim was to get different perspectives concerning the training needs of volunteers and professional crew members participating in SAR of migrants in the Mediterranean, as well as concerning the training and support available to professional seafarers. Concerning the training and support for professional seafarers, for practical reasons, the focus was on Sweden and Finland.

In total, we conducted 26 interviews with 28 individuals (this included two interviews with two participants each). Table 1 provides an overview of the interview participants' affiliations. Half of the interviewees were affiliated with organisations in Sweden, about 25% with organisations in Finland and the remaining 25% were from Germany, the Netherlands, Norway, and the UK. In addition, in some cases we received supplementary information via e-mail from interviewees' contacts.

Considering the organisation that interview participants were currently affiliated with (or, in one case, the organisation discussed during the interview), government agencies, shipping companies, MET institutions, and NGOs/volunteer organisations were almost equally represented. Many interviewees had personal experiences from different contexts and often discussed these during the interviews. For instance, an individual's career at sea might be followed by a subsequent career on land (e.g., at a MET institution, a government agency or in the office at a shipping company).[2] Moreover, some of the participants currently or previously affiliated with the Coast Guard, MET institutions, shipping companies and the Swedish Sea Rescue Society (*Sjöräddningssällskapet*) had participated in the SAR of migrants in the Mediterranean.

Table 1. Overview of interview participants' affiliations

	Number of interview participants
Country	
Sweden	14
Finland	7
Other (Germany, the Netherlands, Norway, UK)	7
Type of organisation	
Voluntary organisations engaged in maritime SAR in the Mediterranean and/or northern Europe	7
Government agencies (e.g., maritime administration, MRCC/JRCC, Coast Guard, etc.)	5
MET institutions	9
Shipping companies	7

At the beginning of the interview, participants were provided with information about the study, and verbally provided their informed consent to participate. To ensure confidentiality, interviews were not recorded. Instead, detailed notes were taken during the interview by the researchers and written up directly after the interview.

Interviews were conducted in Swedish, English or German, depending on participants' preferences. Where possible, interviews were conducted by two researchers. One researcher focused on taking

[2] Considering those for whom this information was available, on average, interview participants had about 13 years of experience at sea (ranging from none to over 30 years), and about 10 years (ranging from about one year to over 20 years) of experience in their current job.

detailed notes (and asking additional questions), and one focusing on asking questions (and taking additional notes).

2.3. Training Needs Analysis (TNA)

The original plan for the pre-study included a formal “Training Needs Analysis” (TNA) (Larsson et al., 2023), including task analyses focused on routine work and mission-related operations, as well as a gap analysis to suggest suitable training options for the volunteers participating in civil SAR operations.

Interviews with experts from SAR NGOs highlighted the complexity of the work and the variety of organisations, crew members and vessels that participate in SAR NGO missions. Due to this complexity, together with limited access to rich information about onboard operations within the limited time frame of the pre-study, it was not possible to conduct the Training Needs Analysis according to plan.

Instead, interviews with experts from SAR NGOs in the Mediterranean and in Sweden were used to identify areas in which training is currently provided and to highlight potential areas of improvements. Lessons to learn from volunteer training for professional crews will be outlined based on these interview findings.

3. Literature review: Findings

Previous research on the search and rescue of migrants in a maritime context has considered the topic from legal, political, and medical perspectives. From a legal perspective, Ghezelbash et al. (2018) provide a useful overview and discussion of relevant international legislation, including the International Convention for the Safety of Life at Sea 1974 (SOLAS Convention), the International Convention on Maritime Search and Rescue 1979 (SAR Convention), and the United Nations Convention on the Law of the Sea 1982 (UNCLOS). These conventions set out the obligation of flag states to require vessels under their flag to participate in the search and rescue of "any person found at sea in danger of being lost" (UNCLOS, Article 98(1), in Ghezelbash et al., 2018: 320). Moreover, coastal states are required to see to it that adequate search and rescue services are provided in their SAR region (Ghezelbash et al., 2018: 320-321). The 1998 revision of the SAR Convention sought to provide more clarity regarding the terms "search" and "rescue". "Search" was defined as "an operation to locate persons in distress", whereas "rescue" was defined as "an operation 'to retrieve persons in distress, provide for their initial medical or other needs, and deliver them to a place of safety'" (Ghezelbash et al., 2018: 322). However, some ambiguity remains, for instance concerning the definition of a "place of safety" (Ghezelbash et al., 2018; Schatz and Fantinato, 2020).

The second stream of literature focuses on the NGOs involved in the search and rescue of migrants in the Mediterranean. Cusumano (2019), Cuttitta (2018) and Stierl (2018) provide an overview of the NGOs involved and their approaches to search and rescue, with a focus on the early phase around 2014-2017. Cusumano (2019) distinguishes between two types of NGOs in 2014-17 (see Stierl, 2018, for a similar distinction). NGOs with larger, faster vessels, such as Migrant Offshore Aid Station (MOAS), Médecins sans Frontières (MSF), or Save the Children focused on "rescue and disembarkation" of migrants. Other NGOs, such as Jugend rettet, Pro-Activa Open Arms, Sea-Eye, or Sea-Watch, focused on "patrolling and rescuing", and transferred those rescued to other vessels for disembarkation. According to Cusumano (2019), this was because for their smaller, slower vessels, disembarkation would have entailed a lengthy absence from the SAR area, and because they wished to force coastal states to fulfil their SAR responsibilities. Other studies in this stream of literature focus on political and legal developments, as well as the media debates about the NGOs involved in the SAR of migrants (e.g., Cusumano and Bell, 2021; Mainwaring and DeBono, 2021; Schatz and Fantinato, 2020).

A third stream of literature considered the medical needs of migrants in the Mediterranean, based on the medical examination of those rescued (e.g., Canardo et al., 2020; Kulla et al., 2016; Trovato et al., 2016). Theodosopoulou et al. (2021) provide a useful review of such studies between 2014-2020. They found that the most common health problems were "physical exhaustion, malnutrition and lack of fluids" (p. 103) together with dermatological and respiratory conditions. They also discussed the arrangements used for medical treatment on board, as well as the types of skills and medical expertise that was needed most (e.g., emergency doctors, midwives, nurses, psychologists), and made recommendations for the training needed for medical personnel on vessels involved in the SAR of migrants in the Mediterranean.

We identified only three publications (Aarstad, 2015; Dittmann et al., 2015; Senu, 2021) that discussed the involvement of merchant vessels in the SAR of migrants. Reports suggest that numerous commercial vessels have participated in the SAR of migrants, while others may have "deliberately bypassed migrant vessels in distress", and some companies have "started to re-route to avoid areas of heavy migrant boat traffic" (Aarstad, 2015: 415). Aarstad (2015), Dittmann et al. (2015) and Senu (2021) list several "disincentives" or challenges for commercial vessels regarding the SAR of migrants. These include the legal uncertainty (e.g., concerning permission for disembarkation, and possibly criminal charges), economic costs not covered by insurance, security and safety risks (e.g., dangerous cargo as a challenge for accommodating large numbers of people on board; concerning tensions or threats of violence among the migrants, or between migrants and crew), the unsuitability of

merchant vessels for accommodating large numbers of rescued people (e.g., with regard to space, accommodation, sanitary facilities, supplies, medical care), lack of training of the crew for such situations, and the stress that this may entail for the crew.

While these studies suggest that training and support for seafarers involved in the SAR of migrants might be needed, this has not been considered in any further detail. Therefore, as part of this pre-study, we present an overview of existing research on training and support as a way to increase the preparedness and resilience of seafarers involved in SAR and other emergency situations.

3.1. Preparedness and resilience in SAR and other emergency situations

This section presents findings from a literature review about training for maritime SAR, as well as for preparedness and resilience more broadly. The focus is on the maritime domain, including commercial cargo and passenger vessels, commercial fishing vessels, naval vessels, and offshore oil and gas platforms.[3] The aim is to present a broad overview about current research trends and gaps, as well as to discuss how this knowledge can guide the further development and improvement of maritime training for search and rescue.

The results show a wide variety of concepts and methods associated with preparedness and resilience and how to foster and train these. In section 3.1., we start by discussing preparedness and resilience, before we consider training in more detail in section 3.2.

In emergency management, **preparedness** is defined as "a state of readiness to respond to a disaster, crisis, or any other type of emergency situation" (Haddow et al., 2014: 392, cited in Kruke and Auestad 2021: 4). It involves a "continuous cycle" of activities, including "planning, organising, training, equipping, exercising, evaluating, and taking corrective action in an effort to ensure effective coordination during incident response" (Teo et al., 2016: 295).

Most of the studies considered preparedness for various emergency situations at sea (e.g., fire on board), situations that required abandoning a (passenger) vessel or an offshore oil platform, preparedness for SAR, and preparedness for medical emergencies or emergency care in the context of SAR.

Preparedness was considered at the level of individuals, ships/crews and at the inter-organisational level. Studies concerning emergencies on one's own vessel often focused on individual preparedness, for instance, individuals' knowledge about safe escape routes (Smith et al., 2019), using equipment (such as immersion suits) that might be required in an emergency (Perkins, 1997; Sanli et al., 2019), or having the knowledge and skills to assist passengers when evacuating a passenger vessel (Chae et al., 2021; Chaure & Gudmestad, 2020). In addition to practical knowledge and skills, Sanden et al. (2014), in their study of the Royal Norwegian Navy, highlighted the importance of "mental preparedness" for international deployments. Similarly, studies concerning the preparedness for medical emergency care tended to focus on the individual level, for instance the extent to which medical experts, who might find themselves being the only medical expert on board or the first expert to arrive on the scene, were prepared through training (e.g., DeForest et al., 2018; King et al., 2019; Montocchio-Buades et al., 2018; Nealeigh et al., 2019; Schemke et al., 2011; Turkistanli and Sevgili, 2018). The ship or the crew level was addressed in studies concerning a variety of crises or emergency situations. This included emergencies on one's own vessel (e.g., Bartolucci et al., 2021; Kennedy, 2011; Tac et al., 2020), SAR (Andreassen et al., 2018; Radojevic and Kresojevic, 2020), medical emergencies (Reymer and Reemts,

[3] Although we did not intend to exclude leisure boats, none of the studies identified in the literature search addressed leisure boats.

2008; Montocchio-Buades et al., 2018; Theodosopoulou et al., 2021) as well as one study on cybersecurity (Kanwal et al., 2022). At the other end of the scale, most of the studies focusing on the inter-organisational level concerned preparedness for search and rescue (Andreassen et al., 2018; Ford and Clark, 2019; Kruke and Auestad, 2021; Larsson et al., 2018) or for medical emergencies (Montocchio-Buades et al., 2018; Woldaregay et al., 2017).

The studies discussed a range of measures for achieving preparedness. At the inter-organisational level, this included adequate legislation and compliance monitoring (Chaure and Gudmestad, 2020; Kanwal et al., 2022), provision of resources and support services by government and local authorities in the context of SAR and medical care (telemedicine) (Kruke and Auestad, 2021; Montocchio-Buades et al., 2018; Teo et al., 2016; Woldaregay et al., 2017), as well as inter-organisational communication and cooperation to ensure smooth collaboration for SAR (Andreassen et al., 2018; Baumeier, 2008; Krajewska 2021; Larsson et al., 2018; Schmied et al., 2017).

Emergency plans and procedures or action plans (Kruke and Auestad, 2021; Schmied et al., 2017; Smith et al., 2019) were mentioned both at the inter-organisational level and at the ship level. Such plans were intended to enable a "timely and systematic" response in an emergency (Teo et al., 2016: 295). These plans had to be flexible, so they could be adjusted to the requirements of unforeseen and evolving situations (Bartolucci et al., 2021; Teo et al., 2016). Moreover, Bartolucci et al. (2021) cautioned that plans and procedures had to be designed to mitigate the impact of potential human error.

At the ship level, other aspects of preparedness included equipment that was fit for purpose, such as rescue boats (Reymer and Reemts, 2008), communication equipment (Krajewska 2021), or survival kits (Kruke and Auestad, 2021). Spatial arrangements were important as well. For instance, Theodosopoulou et al. (2021) described spatial arrangements and adjustments made on board in order to accommodate large numbers of rescued people. Tac et al. (2020) identified the "incorrect placement" of tools and equipment as one of the factors that led to lower performance in the firefighting drills that they studied.

Leaders taking an active role in providing information, instructions and supervision in emergency situations are also highlighted as important (Bartolucci et al., 2021; Tac et al., 2020). Based on an analysis of witness statements on the evacuation of the *Costa Concordia*, Bartolucci et al. (2021) found that in the absence of clear leadership, passengers received inaccurate or conflicting information from different crew members. This eroded passengers' trust in the crew. As a consequence, passengers no longer followed crew instructions, or, indeed, did the opposite of what they were instructed to do. Bartolucci et al. (2021) concluded that leadership was essential; however, they recommended that training programs should also consider unexpected scenarios, such as situations where incumbents of key roles (e.g., the Master) were unable to fulfil their roles.

At the individual level, training practical knowledge and skills (such as knowledge of safety equipment, escape routes, medical procedures, etc.) was mentioned in almost all the studies as an important aspect of preparation. In addition, Sanden et al. (2014) draw attention to the importance of "mental preparedness", which they characterise as including a sense of meaningfulness, self-efficacy, and "an active attitude toward solving problems" (p. 94), as well as confidence in one's equipment, procedures, and skills. Three studies noted that preparedness should include also orientations or training concerning mental health (Benedek and Ritchie, 2006; Gkionakis, 2016; Teo et al., 2016) in order to prepare individuals for challenging deployments or SAR.

Resilience, or the ability to adapt successfully to (sudden) changes and cope with disturbances, has been defined both on an individual (psychological) and a system (team or organisational) level, with different streams of literature dedicated to each. Psychological resilience is addressed in the "positive psychology" literature, whereas system level resilience is at the core of the "resilience engineering" literature.

At the individual level, psychological or personal resilience has been defined as the "positive psychological capacity to rebound, to 'bounce back' from adversity, uncertainty, conflict, failure or even positive change, progress and increased responsibility" (Luthans, 2002: 702, cited in McVeigh et al., 2021: 270). Most of the studies on psychological resilience focus on resilience in regard to a working environment characterised by high levels of stressors, such as the working environment on commercial vessels (e.g., McVeigh et al., 2019; Jonglermontree et al., 2022) or on naval vessels (e.g., Hardy et al., 2010; Millegan et al., 2016; Nordmo et al., 2020b; Saus et al., 2012).

Psychological resilience has been linked to individuals' personality. It has been variously measured as "hardiness" (McVeigh et al., 2021; Nordmo et al., 2020b), as "personal resilience" (Hardy et al., 2010) or as a certain combination of "Big 5" personality traits (i.e., low neuroticism, high extraversion and high conscientiousness) that was labelled a "resilient personality type" (Saus et al., 2012; Makarowski et al., 2020). Existing studies provide some initial evidence that these traits may have beneficial effects on mental health (lower levels of suicidal ideation: Yurgil et al., 2021) and performance (higher situational awareness: Saus et al., 2012; successfully passing training programme: Hardy et al., 2010, Udell et al., 2018; performance: Nordmo et al., 2020b). However, it remains unclear whether psychological resilience should be considered a stable personality trait or disposition, or whether it should be considered a changeable capacity that can be trained and strengthened (Jonglermontree et al., 2022; McVeigh et al., 2021; Rozanov, 2020). If psychological resilience is considered a trait, this entails that crew members should be selected based on their personality (Rozanov, 2020; Saus et al., 2012). One study (McVeigh et al., 2021) sought to assess the effects of a training programme on self-reported resilience, but found no significant effects. Thus, the question of whether psychological resilience *can* be trained, and, if so, how, remains open.

At the system or organisational level, resilience has mainly been addressed within the resilience engineering community. Within this line of research, resilience is defined as a system's "ability to sustain required functioning and attain to operational goals under a variety of operating conditions (Hollnagel, 2011)" (Praetorius et al., 2020: 575). Here the focus is on how a system (e.g., a crew) can adjust to a variety of operational circumstances, including both "normal" and unforeseen or challenging conditions. While some of the studies address everyday operations - albeit with a focus on "critical" operations (Aditha et al., 2023; Griffioen et al., 2021; Wahl et al., 2020) or potentially dangerous operations such as those on naval vessels (Howell, 2020), a few consider emergencies (Steen et al., 2022) or SAR (Steigenberger and Lübcke, 2022). Another set of studies addresses resilience in relation to information technology, such as cybersecurity, AI, or autonomous ships (Afenyo and Caesar, 2023; Erstad et al., 2023; Onishchenko et al., 2022; Veitch and Alsos, 2022; Van den Broek et al., 2020).

In contrast to individual resilience, existing research on system level resilience identifies numerous ways of strengthening resilience for both challenging and normal operations. Throughout, the focus is on trust, communication, leadership, and organisational culture to enhance adaptability to changing and/or challenging circumstances (e.g., Howell, 2020, Rozanov, 2020; Steen et al., 2022). While formal organisations, emergency plans and procedures remain important (Steen et al., 2022), they were considered not so much as precise prescriptions for action (as they would be from a "preparedness" perspective), but as frameworks or resources for action which individuals and organisations could use in developing flexible responses to a particular situation. Drawing on previous work by Margerum, Steen et al. (2022) distinguished six functions of resilient strategies in an organisation:

1. effective two-way communication among participants
2. formal consultation and engagement with stakeholders
3. effective conflict resolution to develop a shared vision of the goals to be achieved
4. building consensus about goals and actions
5. cooperation among participants in working towards the common goal
6. coordination, i.e., working together with mutual adaptation and adjustment

The importance of flexibility and improvisation in these strategies was supported by empirical studies. For instance, in a study of emergency response organisations, Steen et al. (2022) found that resilience was based on "robust coordination", characterised by improvisation, transparency, and trusting communication among the participants. Robust coordination allowed participants to go beyond standard procedures when required by the situation. Steen et al. (2022) further suggest that robust coordination could be achieved by "network building", i.e., creating and maintaining collaboration through regular joint exercises.

Other studies drew on Hollnagel and Woods' (2006) work, who identified four mutually dependent "resilience abilities" that helped to adjust performance to a range of circumstances. These were:

1. "responding, knowing what to do"
2. "monitoring, knowing what to look for"
3. "anticipating, knowing what to expect", and
4. "learning, knowing what has happened" (Griffioen et al., 2021: 6).

Empirical studies of individuals' and teams' ability to respond to different scenarios during simulator training (Wahl et al., 2020) or on a training ship (Aditha et al., 2023) provide initial evidence for the importance of these skills in contributing to resilience.

Training was presented as an important way for achieving resilience in teams' ability to deal with crises and changing circumstances (Griffioen et al., 2021; Viktorelius et al., 2023). Training was also a central strategy for enhancing crew resilience in regard to information technology threats (e.g., cyberthreat, autonomous ship systems) (Afenyo and Caesar, 2023: Erstad et al., 2023; Van den Broek et al., 2020; Veitch and Alsos, 2022). In the next section, we provide a more detailed discussion of training for preparedness and resilience in a maritime context.

3.2. Training for preparedness and resilience

As noted in the previous section, training was considered an important way of improving both preparedness and resilience. In this section, we take a closer look at the information provided in previous studies about *how* preparedness and resilience can be trained. While there were similarities between training for preparedness and for resilience concerning the methods of training, the literature review for this pre-study also revealed some notable differences.

First, preparedness training was predominantly focused on training individuals in technical knowledge and skills. Only two studies focused on preparedness training beyond the individual level: Radojevic and Kresojevic (2020) examined training for the bridge team, while Larsson et al. (2018) considered training at multiple levels. Preparedness training typically focused on theoretical knowledge and practical skills concerning technical aspects of the operation, such as how to treat hypothermia (Baumeier, 2008), safety procedures for evacuating cruise passengers onto the ice (Chaure and Gudmestad, 2020), or donning immersion suits and breathing apparatus (Sanli et al., 2019). Only two articles discussed the training of non-technical skills: Ripoll-Gallardo et al.'s (2020) study on training for doctors joining MSF missions considered non-technical skills such as communication, leadership, and mental health; Ford and Clark (2019) discussed non-technical skills needed by volunteers participating in SAR in the Arctic, such as collaboration with the RCMP and with other organisations participating in the SAR operation. Moreover, training is typically standardised and designed based on regulations and legal requirements, rather than adapted to individuals' needs (Musharraf et al., 2018; Smith et al., 2019; Praetorius et al., 2020; Viktorelius et al., 2023). This may be one of the reasons for the limited effectiveness of training noted in some studies (Praetorius et al., 2020).

By contrast, in resilience training, over half of the studies focused on training at the ship/crew level or at the inter-organisational level. Most focused on bridge teams (Griffioen et al., 2021; Wahl et al.,

2020), the crew (Howell, 2020; McVeigh et al., 2021), or participants in multi-agency exercises (Erstad et al., 2023; Steen et al., 2022; Steigenberger & Lübcke, 2022). In line with this, there was a strong focus on communication, coordination and collaboration among the participants. For instance, Wahl et al. (2020) note that the training aims to train participants in the four "resilience abilities", as well as in "non-technical skills such as communication, risk awareness, and decision-making" (p. 5). Similarly, the training described by Griffioen et al. (2021) aims at integrating the four resilience abilities with non-technical skills concerning "allocation, assignment and prioritization of resources, effective communication, assertiveness and leadership, obtaining and maintaining situational awareness, and consideration of team experience including workload management and decision making" (p. 7). Erstad et al. (2023), discussing cyber resilience training, make a point of highlighting that the training focuses on "understanding, teamwork and communication in relation to cyber risk scenarios" rather than on "ship handling" (p. 257). Kilskar et al. (2019), in their review of studies on sense-making and resilience, recommend that training for sense-making in ambiguous situations should teach participants to switch perspectives and frames, to understand other participants' perspectives, to recognise "hazardous states" (p. 7), and to take a "questioning attitude" to "support the exploration of cues and interpretations" (p. 8).

The methods used in preparedness and resilience training were similar. Both used a range of methods, from classroom lectures and individual distance learning to group discussions, simulator training and practical exercises (e.g., donning an immersion suit). However, the descriptions of the training sessions and programmes suggested that in resilience training, there was a stronger emphasis on open-ended scenarios where Standard Operating Procedures did not apply and that did not have one single correct solution, thus forcing participants to adapt to changing conditions and find solutions (Erstad et al., 2023; Wahl et al., 2020). Moreover, in the descriptions of resilience training, there was a strong emphasis on debriefing and discussion among trainees in order to bring into the open different perspectives, interpretations and different possible solutions (Erstad et al., 2023; Griffioen et al., 2021; McVeigh et al., 2021; Wahl et al., 2020). Participants' real-life experiences outside of training could also be included in these debriefings and discussions (McVeigh et al., 2021; Wahl et al., 2020). From the information presented in the studies, it is not clear whether this difference reflects differences in the actual training, or whether it reflects different emphases in the description of the training by the authors of the articles.

Another notable difference in the articles was a sense of exploration in the articles concerning resilience training. Rather than presenting an agreed-upon best practice for resilience training, several articles aimed at developing and exploring possible approaches for training resilience. In this endeavour, unresolved contradictions, constraints and hinders were noted as well. For instance, Praetorius et al. (2020: 578) noted that in resilience engineering, resilience was defined at the system level, whereas training assessment focused on individuals instead of at the team or system level (see also Griffioen et al., 2021: 15-16).

Further, a better understanding of the effectiveness of different training approaches is needed, both concerning short-term and long-term training effects and concerning real-world transferability. Studies addressing the effectiveness of preparedness training are few, and do not yet provide a complete picture to guide programme development. For instance, Smith et al. (2019) found that simulation-based training was more effective than lecture-based learning. Chae et al. (2021) found that virtual reality training gave better learning results than video-based training when learning outcomes were measured immediately after the training, but this was reversed after one month, as retention increased for video-learning and decreased for virtual reality training over time.

Moreover, while resilience has been identified as important, none of the studies in this review empirically evaluated approaches to resilience training. For instance, Griffioen et al. (2021) developed a programme for resilience training, but did not evaluate whether the suggested training actually leads to improved resilience on a system level in the short-term or in the long-term. Wahl et al. (2020)

observed current simulator training and discussed which aspects of this training might help crews to adapt to and cope with complexity in operations. However, Wahl et al. (2020) did not actually look at training specifically designed to foster resilience at the crew-level, and they did not evaluate training effectiveness empirically. In sum, despite resilience being a concept that is advocated as a novel and much needed approach to training, it remains unclear how to design training for resilience and whether the suggested approaches actually lead to increased resilience in real-life operations.

There is still a gap concerning concrete training measures and knowledge on how to best strike a balance of training enough for extreme events that rarely happen, while maintaining the ability to cope with complexity and variability in everyday operations. In order to start to fill these research gaps, there is therefore a need for empirical studies that explore what constitutes resilience and preparedness in everyday operations and in maritime training practices.

3.3. Mental health and support in SAR and other emergency situations

SAR operations require technical and non-technical knowledge and skills, as well as coordination and collaboration among those involved. In addition, SAR and other emergency situations may have a psychological impact on those involved, with negative consequences for their mental health. In this section, we provide an overview over previous research on support for dealing with the psychological impact of SAR and other emergencies at sea.

Our literature search suggested that this area has received little attention to date. We found only few studies about mental health specifically in relation to SAR and other emergency situations in a maritime context, and even fewer considered the support available for dealing with such experiences. In this section, we contextualise these studies within research on seafarers' well-being, mental health and support more generally.

Historically, research on seafarers' well-being has focused on physical health and fatigue. Previous research has shown that the risk of work-related injury or illness has historically been greater in shipping than in many land-based occupations (Moen et al., 2008). Traditionally, crush and fall injuries have been overrepresented together with certain cancer types (Forsell et al., 2022). Some reports have associated abuse of alcohol and tobacco products among other things with liver and cardiovascular diseases. However, the general opinion among health care providers and maritime medical experts is that alcohol-related sickness has decreased systematically for several years and continues to decrease, but few studies are available (Saarni et al., 2001). Another prominent stream of literature has focused on identifying the factors that contribute to sleepiness and chronic fatigue, such as long work hours, workload, time at sea, or the impact of different watch systems (e.g., Andrei et al., 2020; Pauksztat, 2017; Van Leeuwen et al., 2021; Wadsworth et al., 2008).

In contrast to these mainly physical conditions, over the last decade there has been an increasing focus on mental health in society at large and in the shipping industry, a trend that has accelerated in connection with the COVID-19 pandemic. This is reflected in an increasing number of studies in this area. In Sweden, Dahlman (2016) showed that mental illness was the second largest cause of sick leave among certain types of certificates in shipping. The fact that this was not previously known is probably largely due to the fact that not all shipping companies are linked to occupational health care providers. Further, organisational and occupational culture may not facilitate awareness, and may even stigmatise mental ill-health (Lefkowitz et al., 2019), thus leading to under-reporting.

Survey studies before the COVID-19 pandemic have focused on stress and problems related to the psychosocial work environment (for reviews, see Carotenuto et al., 2012; Sliskovic, 2017). More recently, mental health problems such as depression and anxiety have been considered as well, especially since the COVID-19 pandemic (Lefkowitz and Slade, 2019; Pauksztat et al., 2022a; Sampson and Ellis, 2021). Lefkowitz and Slade (2019), based on data from a cross-sectional survey

among seafarers in 2018-19, reported that between 17 and 25 per cent of the seafarers in their study reported scores suggesting depression and/or anxiety disorders. While these studies, based on self-report data and convenience samples, cannot give an exact picture of the prevalence of mental health problems among seafarers, they highlight the need for more attention to these issues.

In addition, some studies have addressed the impact of potentially traumatic events such as pirate attacks or accidents at sea. Seafarers who had been taken hostage by pirates often experienced symptoms indicative of post-traumatic stress disorders (PTSD) and reported higher levels of symptoms than seafarers not exposed to piracy (Abila and Tang, 2014; Aleksandrov et al., 2015; Seyle et al., 2018; Ziello et al., 2013). In addition to their mental well-being, these experiences also affected former hostages' physical well-being and future career decisions. Other studies considered the impact of accidents at sea, such as the *Herald of Free Entreprise* (1987), *Scandinavian Star* (1990), and *Estonia* (1994) disasters, on surviving passengers and crew. Follow-up studies (Arnberg et al., 2011; Blix et al., 2020; Joseph et al., 1997) showed that the incidents left survivors with significant symptoms, even several years later. When looking at crew members who witnessed accidents at sea, those who had lost a fellow crew member at some point in their career experienced more negative effects than when no lives had been lost. PTSD symptoms lasted on average about 1.5 years, but very few gave up working on board (Líndal and Stefánsson, 2011).

Search and rescue personnel, first responders and military operators all face situations that are potentially traumatic. Throughout their careers, they can encounter many different situations ranging from individual casualties to mass rescues. Several studies conclude that this population is at a greater risk of experiencing PTSD (Carey et al., 2014; Carmassi et al., 2020; Chatzea et al., 2018). Individuals that helped during the European refugee crisis at Lesvos in 2016 reported PTSD, perceived burnout symptoms and low levels of well-being (Chatzea et al., 2018). Lee et al. (2021) found symptoms of acute, delayed, and chronic PTSD among local residents who had witnessed, lost property or had been involved in the rescue efforts in the Sewol ferry disaster in 2014. Similarly, looking at crew members of one of the passenger ferries involved in the search and rescue efforts in the *Estonia* disaster, Lindeman et al. (1996) show that post-traumatic symptoms are present and constitute major problems in everyday life.

Turning to research on welfare and support for seafarers, our literature search identified 21 articles. All of them concerned measures for enhancing seafarers' physical and mental well-being during their tours of duty. Five studies addressed onboard welfare and support (Ariza-Montes et al., 2021; Dohrmann et al., 2019; Haslund, 1956; Pauksztat and Grech, 2022; Ulleberg and Rundmo, 1997), three concerned support from family and friends (Arjona-Fuentes et al 2022; Nordmo et al., 2020a; Wu et al., 2020), and eight considered port-based welfare services (Anonymous, 1947, 1948; Evang, 1951; Kennerley, 2007; Oldenburg & Jensen 2019; Sampson et al., 2022; Zhao et al., 2021; Zuidema et al., 2023). The remaining 5 studies addressed multiple sources of support (Exarchopoulos et al., 2018; Pauksztat et al., 2022b, c; Zhang et al., 2020) or did not specify the source of support (Xiao et al., 2017).

Studies concerning onboard welfare and support highlight the need to create a good working and living environment on board to promote seafarers' physical and mental well-being. Zhang et al. (2020) note the importance of food quality, internet access and facilities for leisure activities (gym; library). This attention to "onboard welfare" is not new; already in 1956, Haslund advocated the organisation of "spare-time activities" on board, such as sports, study groups, entertainment, and other hobbies. The importance of access to fast, reliable and free internet on board is highlighted by numerous studies identified by the literature search (Exarchopoulos et al., 2018; Pauksztat et al., 2022b, c; Oldenburg & Jensen 2019; Sampson et al., 2022; Zhao et al., 2021) as a way for seafarers to communicate with their families and friends at home, and to get access to support ashore.

In addition, several studies showed that support from supervisors and/or co-workers had positive effects on seafarers' mental and physical well-being and motivation, and buffered the negative effects

of stressors such as bullying, work-family conflict and perceived risks from major accidents (Ariza-Montes et al., 2021; Dohrmann et al., 2019; Pauksztat et al., 2022b, c; Ulleberg and Rundmo, 1997). Only one of the studies in our literature search examined factors that facilitate the development of social support. Pauksztat and Grech (2022) found that opportunities for informal interactions (i.e., sufficient rest hours to allow leisure time; joint leisure activities) were pivotal for the development of social support.

Support from family and friends at home buffered the effects of stressors such as bullying, fear of unemployment, and stressors during deployment on naval missions on mental health and perceived quality of life (Arjona-Fuentes et al 2022; Nordmo et al., 2020a; Pauksztat et al., 2022c; Wu et al., 2020). This underlines the importance of internet access to allow communication with friends and family at home during a tour of duty.

While in port, seafarers appreciate opportunities to contact families or friends using less expensive and more reliable land-based communication options, make purchases, and engage in leisure activities away from the ship. However, time for shore leave is often limited due to long work hours and fast turnaround times, and arranging transportation to/from the ship at a reasonable price may be difficult (Zhang et al., 2020; Zhao et al., 2021). Port chaplains and seafarer centres were therefore highly valued for providing free transport; access to internet, wifi and simcards; monetary services (e.g., exchange; transfer); helping to arrange doctor's visits and medical care; spiritual and social services; etc. (Oldenburg & Jensen 2019; Sampson et al., 2022; Zhao et al., 2021). Other shore-based organisations and institutions provide important services as well (Pauksztat et al., 2022b). Studies providing an overview of the history of port-based welfare services (Zhao et al., 2021; Zuidema et al., 2023) or describing particular time periods (Anonymous, 1947, 1948; Evang, 1951; Kennerley, 2007) suggest that the reliance on welfare organisations has a long tradition. However, based on their analyses, Sampson et al. (2022) and Zuidema et al. (2023) conclude that the system needs reform. Noting that port welfare services currently are "overstretched and under-resourced", Sampson et al. (2022) criticise the shipping industry's reliance on the free services provided by port chaplains and welfare organisation. Zuidema et al. (2023) call for governments to take a more active role in providing port-based welfare services.

The literature search for welfare and support in a maritime context did not identify any studies concerning training or interventions for improving mental health. Instead, the current body of research suggests the importance of preventive measures to address the root causes of mental and physical ill-health. This is in line with Sampson and Ellis (2021), who argue that reactive measures (such as offering counselling) or strengthening individuals' psychological resilience are not sufficient for reducing mental health problems. Instead, it is essential to address the underlying conditions that contribute to mental ill-health (tour length; internet access; relationships among crew members; recreational activities). Indeed, measures addressing root causes are also the types of measures that are considered to be most effective by seafarers themselves (Tang et al., 2022).

Moreover, the studies identified in our literature search consider mental health in the context of the demands of everyday work, rather than in connection with traumatic events or disasters. Indeed, studies on the impact of piracy on seafarers' well-being conclude that more support and systematic attention from shipping companies or occupational health care providers to these problems is needed (Abila and Tang, 2014; Aleksandrov et al., 2015; Seyle et al., 2018).

One such measure that was mentioned in the interviews in our pre-study (see section 4 and 5) were debriefing or defusion sessions after an event. Defusing is a form of "peer-driven (colleague-to-colleague) support, and includes a structured, small-group discussion within 8 to 12 hours of the occurrence of the critical incident to rapidly decrease and normalise the reactions caused by the event, and to support recovery after the event" (Teperi et al., 2019: 660). Defusing can be considered a form of "mental first aid" and was developed to provide a "light model" of Critical Incident Stress

Management that was flexible and easy to implement by employees in the City of Helsinki after critical incidents at work (Teperi et al., 2019).

Our literature search for debriefing or defusion in a maritime context comprised two articles that considered the use of debriefing or defusing after critical incidents: a shipwreck in Senegal (Diagne et al., 2021) and a nuclear-powered submarine's collision with the sea bottom (Baert et al., 2011). Diagne et al. (2021) provide a detailed description of the psychological care provided by an emergency intervention team through a combination of group meetings, individual meetings and home visits to survivors, victims' families, and local healthcare workers. The purpose of these meetings is to allow individuals to express their feelings and thoughts, in order to reduce the negative psychological impact of the experience.

Baert et al. (2011) found that most of the submarine crew members had discussed the incident with relatives and/or co-workers. However, although many experienced symptoms of PTSD, only three crew members had talked to a doctor, and many downplayed the symptoms during a routine medical examination that assessed their fitness for duty. Baert et al. (2011: 646) suggest that this may be out of "concern about losing submarine duty status" and/or the stigmatization of mental ill-health, and that this presents an obstacle to providing care for traumatised crew members. They conclude by highlighting "the importance of active screening by unit medical officers and prolonged aftercare following a potentially traumatic event" (p. 646).

Another nine articles discussed debriefing not as a way of preventing negative psychological effects of potentially traumatic events, but in the context of simulator training (Hontvedt, 2015; Hontvedt and Arnseth, 2013; Kandemir et al., 2018; Sanfilippo, 2017; Sellberg, 2018; Sellberg et al., 2018, 2021; Sellberg and Wiig, 2020; Viktorelius and Sellberg, 2023). In these studies, debriefing is used as a pedagogical tool to encourage students to reflect upon their experiences during the training and to "transform experience into learning" (Hontvedt and Arnseth, 2013: 92). Emotions might be addressed at the start of a debriefing to allow participants to "vent", to avoid that emotions interfered with subsequent learning through reflection and analysis (Viktorelius and Sellberg, 2023: 811).

Taken together, previous studies on mental health, welfare and support focus on improving everyday work and life on board. Only few studies consider the potential psychological impact of SAR and emergency situations in a maritime context, and there is even less research on the training and/or support that might be required to mitigate potential negative mental health consequences.

4. Training needs for SAR of migrants in the Mediterranean

This section addresses the training needs for crew members involved in the search and rescue of migrants in the Mediterranean. The focus will be on volunteers. The information in section 4.1. is based on interviews with participants from international SAR NGOs in the Mediterranean. Insights from interviewees from Swedish organisations who had participated in the SAR of migrants in the Mediterranean are discussed in section 4.2. Section 4.3. concludes the chapter with a discussion of the mental health support for crew members that is provided by international SAR NGOs and other organisations in the Mediterranean.

4.1. Training of volunteers in SAR NGOs in the Mediterranean

This section focuses on the training of volunteers in international NGOs involved in the SAR of migrants in the Mediterranean. To provide some background, we start with an overview of the role of volunteers on SAR NGO vessels in the Mediterranean. We then turn to the training needs identified by interviewees and describe the current approach to training as well as the challenges encountered.

4.1.1. Volunteers on SAR NGO vessels

In contrast to commercial companies, NGOs operating in the Mediterranean are non-profit, non-governmental charitable organisation. They are funded by donations and largely depend on the work of volunteers. While most of the volunteers come from European countries, they are a diverse group with regard to education, occupational background and age. Some of the volunteers have previous experience working for other SAR NGOs or they may have been engaged in activist or volunteer work ashore. Some may have permanent jobs ashore and join the NGO as volunteers during their annual leave.

Volunteers take on a variety of roles on board, depending on their interests, knowledge, skills and (depending on the role) formal qualifications. They may, for instance, coordinate accommodation, meals and activities for those rescued, or act as interpreters or cultural mediators. The group of volunteers also includes fully qualified doctors and medical experts. In addition, there may be photographers, journalists or media professionals who document and provide information about the situation in the Mediterranean to the general public.

On larger NGO vessels, a professional crew takes care of the ship-related work, i.e., tasks related to the navigation and operation of the ship. This includes the Master, chief engineer, nautical and engine officers, as well as ABs and/or ratings who form part of the navigational watch. The manning of the vessels is in accordance with current rules and regulations; in line with this, smaller vessels tend to have a smaller professional crew. Here volunteers are more involved in the ship-related aspects of the work, in addition to their mission-related work.

Regardless of the size of the vessel and the number of professional crew members, on all vessels volunteers need to be able to be safe while they live on board and go about their tasks. This requires a basic knowledge about the shipboard environment as well as basic safety knowledge.

4.1.2. Training needs of volunteers

While volunteers may have specialist training in their field (e.g., as medical doctors or media professionals), they often have no or very limited prior experience of life and work on a ship and with the search and rescue of migrants. Hence interviewees identified a range of training needs. The

training needs mentioned by interviewees can be roughly divided into two categories: (1) knowledge or skills concerning ship-related tasks and general behaviour on board, and (2) knowledge and skills related to SAR, i.e., the rescue of migrants and their accommodation on board. Table 2 provides an overview over different types of knowledge and skills required by crew members, according to the interviewees. The table also indicates which of these were considered training needs by interviewees.

Table 2. Training needs for volunteers in SAR NGOs in the Mediterranean

Types of knowledge & skills	Examples of knowledge & skills	Training needs for volunteers?[a]
I. Ship-related tasks & behaviour on board		
Professional maritime knowledge & skills	• Navigation / nautical skills • Engineering	No
General ship-related tasks & general behaviour	• Ship familiarization • Emergency situations • Routine work	Yes
Shipboard culture & interactions on board	• Being prepared for (dis)comfort, self-discipline • Hierarchy • Teamwork, inclusion / anti-discrimination	No consensus
II. SAR		
The rescue itself	• Different phases of the rescue, such as RHIB driving, taking migrants on board the RHIB and the vessel • Recovery of persons from the water	Yes
Accommodation on board	• Crowd management	Yes
Other	• Introduction to the NGO • Media training	Low priority for onboard training

Note: [a] According to interviewees.

Ship-related tasks and behaviour on board

Starting with training needs concerning ship-related tasks and general behaviour on board, interviewees discussed knowledge and skills related to three areas: professional maritime knowledge, general ship-related tasks and behaviours, and shipboard culture and interactions on board.

First, interviewees discussed professional maritime knowledge and skills, such as the knowledge and skills learned by deck and engine crew during their professional education and training (e.g., "how to drive a boat"). On SAR NGO vessels, these skills were held by professionally qualified and certified crew members, who had acquired these skills through their previous education and work before joining the NGO. An interviewee noted that advanced courses or refresher courses that might be required (such as those required for certification) existed elsewhere or could be bought in if required. Hence the NGO did not develop or offer their own training in this area. Given the limited time available for training volunteers and the limited time volunteers normally serve on board, interviewees agreed that it would be unrealistic to expect that it would be possible to train volunteers to a professional level. Hence these skills were not considered training needs for volunteers.

The second area that was discussed concerned general ship-related tasks and behaviour on board. This included a *familiarization* with the vessel and practical aspects of life on board. This could include learning how to deal with garbage, toilet etiquette, being on deck at night, and opening and closing doors. It also included trainings that were required for safety reasons. For instance, interviewees

explained that volunteers needed to learn what to do in different types of *emergency situations*, such as firefighting, "man over board", or when abandoning the vessel. Moreover, volunteers need to learn about *routine situations*, such as mooring, or RHIB launch and recovery, so they knew how to keep safe (e.g., where is it safe to stand) and so that they could assist others under the supervision of professional crew members if needed.

All interviewees agreed that all of these knowledge and skills were important training needs for volunteers. They were considered important for several reasons. Most importantly, perhaps, all interviewees agreed that having knowledge and skills concerning ship-related tasks and general behaviour on board was essential for keeping the volunteers safe. Moreover, some interviewees noted that, as the number of crew members was limited, it would be an advantage if volunteers were able to help out with certain tasks if necessary. This could help to reduce the workload of other crew members. It could also increase flexibility and speed. For instance, one interviewee explained that for launching the RHIB, two line handlers are needed. Hence the launching could be done with just two ABs. However, if there are other people who are trained at doing this, this provides flexibility for instance when the ABs are busy with other tasks or off-duty. In addition, it was noted that the volunteers' involvement in tasks on deck might contribute to a better understanding of the professional crew members' work. This might help to reduce occasional "friction" or "tensions" and "bridge the gap" between the "professional crew" and the "mission crew".

A third area concerned knowledge and skills regarding shipboard culture and interactions on board. Interviewees highlighted that many volunteers had never lived and worked on a ship before, so they might be "unprepared for life on board", for instance with regard to the level of (dis)comfort and self-discipline required by living on board. The hierarchy on board and being required to follow orders could be a challenge for some volunteers as well. "It's not a democracy on board", and this might feel "old fashioned" to volunteers used to flat hierarchies. In addition, several interviewees highlighted the importance of equality and inclusion on board.

Interviewees agreed that shipboard culture, collaboration, and social interactions on board might be unfamiliar and perhaps "challenging" for volunteers. However, there was no consensus about whether this should be trained. Two interviewees thought it might be useful to have training on "group dynamics" and "team building", but noted that this perhaps might have lower priority given the limited time available for training. Others, referring specifically to anti-discrimination training, suggested that this might be useful as an online training prior to the mission, but should not take time from training general ship-related tasks and general behaviour on board.

SAR

Turning to SAR related activities, the knowledge and skills discussed by interviewees can be grouped into three categories: knowledge and skills required during the rescue operation, knowledge and skills regarding the accommodation of migrants on board, and other knowledge.

First, interviewees discussed knowledge and skills required during the rescue itself, from spotting a boat in distress to taking those rescued on board the NGO vessel. They discussed different aspects of the rescue, such as approaching the migrant boat, communication with the migrants, taking them onto the RHIB, and transferring them to the vessel. Depending on the situation, crew members also had to be able to recover people, and sometimes bodies, from the water. All interviewees agreed that knowledge and skills in these areas were important training needs for the volunteers involved in this, to ensure that the rescue could be carried out safely and effectively.

Another area that was highlighted was the knowledge and skills required when hosting migrants on board. Interviewees noted that having large numbers of migrants on board could be "challenging". Sometimes it could get very crowded. According to one interviewee, having 200 people on board was

"easy", but having 400 people on board was "super stressful". Good "crowd management" was considered essential by all interviewees. This entailed following the principles established by the NGO and the directions of the volunteers responsible for coordinating the accommodation of migrants on board. Interviewees explained that it was essential that all crew members followed the same set of rules, and that all migrants were treated in the same way. This was because showing a preference or giving extra privileges to one person (e.g., providing extra food) might lead to tensions and even to fights. Interviewees noted that this might be hard to understand for new volunteers. For instance, the medical team might want to provide not only urgent care, but might also wish to treat less urgent illnesses (e.g., scabies), without realizing that there was no time for this: providing less urgent care left less time to rest, and it left less time to assist with other tasks on board (thus reducing the rest hours available to other crew members). Consequently, the crew might become exhausted more quickly, and have less energy left if they suddenly took a large number of new migrants on board. Because crowd management required a coordinated approach, all crew members (both professionals and volunteers) were expected to have basic knowledge and skills in this area.

Interviewees also discussed other types of knowledge or skills where training was currently provided, such as an introduction to the NGO and its history and media training. While they thought that these topics might be "interesting", these topics were seen as "less critical" compared to training needs in other areas, especially given the limited time available for training.

4.1.3. Current training

As described by interviewees, the SAR NGOs they had been (or currently were) involved with took a comprehensive approach to training the volunteers on their vessels. Training touched on all of the areas discussed above. The main focus was on ship-related tasks and behaviour on board (especially general tasks and behaviour on board) as well as knowledge and skills related to the SAR of migrants.

Before they joined the ship, volunteers received written information via email. In one NGO, this comprised "three information emails with at least ten attachments" with basic information. This was "a lot of paper to read". In addition, e-learning courses and online meeting tools were used for pre-departure learning (e.g., security awareness training) and pre-departure meetings and workshops (e.g., psychological briefing).

Typically, most of the training occurred during "training week", which took place while the vessel was in port prior to the start of the mission. During the training week there was a "tight training schedule", with briefings "from 8:00-19:00 each day", as one interviewee put it. This included training units where everyone participated, as well as time allocated for training and preparations for each team or department (e.g., RHIB practice for the members of the RHIB team; time for the medical experts to familiarise themselves with the medical equipment and facilities on board).

On the first day, upon arrival, volunteers were given an "informal tour" of the vessel to introduce them to "basic day-to-day things", such as the garbage system, the location of the mess, etc. In addition, they were given a ship familiarization by one of the officers. This included for instance information about safety equipment, muster stations, and firefighting equipment. Other training units for all crew members during the training week included for instance general ship-related tasks such as firefighting, anchoring, "abandoning ship", "man over board", and mooring. SAR-related training included for instance training concerning the rescue itself (e.g., RHIB launch and recovery; procedure for taking migrants on board of the vessel), the accommodation of rescued people on board (e.g., crowd management, first aid), and more general briefings about the NGO and its work (e.g., media training).

After departure, there might be time for additional training during the transit to the SAR zone, which took about one to four days depending on the port of departure and the speed of the vessel. For instance, the transit time might be used for RHIB practice or advanced medical training. However,

sometimes training during transit was not possible due to weather conditions. Moreover, the time available for training was limited by the time needed for routine tasks while the vessel was underway (e.g., watch keeping duties) and because it was considered important that crew members got as much rest as possible before reaching the SAR zone.

During the mission, there might be time for additional training when there were no other tasks. Interviewees noted that volunteers continued to learn and hone their skills throughout their time on board. The onboard culture was characterised as a "questioning culture", where crew members were encouraged to continue to ask if they were unsure or could not remember something.

Training methods varied depending on the topic. During the pre-departure phase, information was provided in written form, for volunteers to read in their own time. This could be supplemented by e-learning and online briefings or workshops. However, most of the training (in one NGO all of the training) took place in person on board during the training week. Training concerning ship-related tasks and behaviour on board typically followed a similar pattern of "explain" – "show" – "try". First, the trainer provided an overview and explained the principles, for instance through a presentation in the mess room, sometimes with video clips. Next, the trainer showed participants relevant pieces of equipment and demonstrated the procedure step by step, with detailed explanations. This was typically followed by practical exercises where participants practiced the skills in question, sometimes with different participants taking on the different roles involved in the task. If time permitted, this might be followed by more complicated scenarios or a "surprise scenario". For instance, one interviewee described the training for launching an RHIB as follows. The training starts with the trainer showing a video and explaining the procedure. Next, the trainer takes participants on deck while the vessel is alongside in port, and shows them the equipment, e.g. davits and lashings. The trainer then explains the procedure step by step, passing around relevant pieces of equipment so participants get an understanding of how they work. The participants then go through the procedure of launching the RHIB several times while the vessel is alongside, until everyone can do it. As a final step, this is followed by additional training at sea during daytime and at night.

Apart from training related to particular roles and positions on board (e.g., RHIB driving), the training during training week was the same for all crew members. That is, there were no separate "beginner" training sessions for new crew members, and no separate "advanced" training sessions for more experienced crew members. Instead, everybody (both volunteers and professionals, both new and experienced crew members) participated in the same training. Interviewees explained that the training was important as a refresher even for experienced crew members ("you can never train enough"). Moreover, it was considered important that new and experienced crew members trained together, in order to learn to work together as a team. Experienced crew members could also help to show new crew members how things are done, or they might bring up different topics or questions during a training session, thus making the training more interactive.

4.1.4. Considerations regarding training design

The NGOs' design of training for volunteers was influenced by several considerations. This included regulations and certification standards, safety considerations, experience, trainees' level of knowledge and skills, as well as consideration of constraints.

Regulations and certification standards, which varied depending on the vessel's type, provided the baseline. Certain kinds of training (e.g., firefighting, "abandon ship") were required before departure, and thus had to be trained while the vessel was alongside.

Safety was a key consideration throughout. As one interviewee explained, "safety is the most critical thing". Hence the "safety element" was incorporated into every part of the training. Moreover, volunteers' ability to operate safely was considered the standard that trainers wanted to achieve. One

interviewee explained that volunteers needed to be “safe”; they did not have to be “perfect” or “super-smooth” or fast, but they had to be able to perform their tasks in a safe way.

In designing the training, the organisations and trainers also drew on their own experience and expertise from the merchant fleet, from other SAR NGOs (e.g., the RNLI in the UK), or from their experiences with SAR of migrants in the Mediterranean. Feedback from long-time crew members, as well as data from accidents and near misses could be evaluated as well to adjust the training schedule.

Although the training was the same for everyone (see section 4.1.3.), some adjustments could be made on the spot by individual trainers, depending on the trainees’ level of knowledge or skills. For instance, trainers might take extra time for tasks that trainees struggled with. Moreover, participants were encouraged to ask questions, which allowed the trainers to adjust the training to individuals’ needs.

Finally, constraints, notably the limited time available for training, had to be taken into account. Interviewees explained that given the limited time available, you could not expect to be able to train volunteers up to a 100% professional standard – that was “simply not possible”. Instead, NGOs relied on professional crew members to ensure the safety of the vessel and to supervise the volunteers. This entailed that volunteers had to be trained to have a “minimum level of competence”. The aim was that they had to be good at the “basics” so that they “can do them in their sleep”, and that they had a “general idea of what to do”, while professional crew members supervised the volunteers’ work and were expected to take the lead in emergency situations.

4.1.5. Evaluation: Challenges and ideas for improvements

Overall, interviewees agreed that their NGO’s training for volunteers was “very good” and “very professional”. In general, the quality of training provided was considered “much higher” than on cargo ships, because, as several interviewees pointed out, the volunteers tended to be highly motivated and keen to learn, and on the NGO vessels, they “really want to teach people”. However, interviewees also mentioned several challenges, as well as ideas for improvements.

Interviewees agreed that the limited time available during the training week was a challenge. There was a “crazy amount of training”, as one interviewee put it, within a short period of time. Getting enough time for the many different training units was a big problem – there was very little time in port before departure, and there was always a “fight” among trainers as everyone wanted to get more time for their trainings. Interviewees agreed that the intensity of the training week led to an “overload” of information, especially for new volunteers. Trainees might feel that there was a lot of information and all could make a difference to “life and death”. Thus, the training week could be “daunting” and “overwhelming”, and often left people “confused” or “puzzled”. One interviewee noted that during the first few days, people often asked questions about things that had actually already been answered during a training session. Participants were told during the training that it always takes a few days to get used to things and learn what to do, and that they are not expected to remember “every single thing” right away, but were welcome to ask questions. Interviewees agreed that usually after a week or so, things were “quite clear” to everyone. Nevertheless, the current approach with an intense training week was perceived as very stressful both for volunteers (especially new volunteers) and professional crew members.

A second challenge, according to several of the interviewees, was that some things could not really be trained. This included situations characterised by a high degree of complexity (e.g., the ship on fire or “abandon ship” with 500 people on board) as well as situations with a high degree of uncertainty, with many different possibilities of what might happen. Two interviewees explained that you can have too much training as well. They remembered a situation where departure was delayed so that they had three extra days to train. People started to think of all kinds of “nightmare scenarios”. In consequence,

the volunteers on board started to get very worried, and lost confidence in themselves. In addition, the disagreements about what to do in unlikely scenarios was felt to harm cohesion among the crew. The lessons they learned from this was that it was important for experienced crew members to "stay calm" and not to "bombard" new volunteers with "all possible nightmare scenarios" or to "scare" new people with the worst past experiences. Instead, all of the trainers highlighted the importance of focusing on "the basics" and "standard scenarios".

Relatedly, interviewees agreed that it was a big step from training to reality, e.g. an emergency situation, an actual rescue, or having a large number of migrants on board. An interviewee explained that it was hard to predict how people would behave in an emergency situation (e.g., fire on board) and whether they would panic or not. Another explained that while training could be pretty playful and fun, a real situation was different. For instance, when you do your first real rescue, you can see in people's faces that "now it's real". This is not something you can train for. You can read about handing over a baby or you can do some training with a life jacket as a dummy, but you do not know what it is "really like" to hand over a real baby. Similarly, while you can learn about the principles of crowd management, actually having a large number of migrants on deck was like "being on another planet" and could be very overwhelming. An experienced crew member observed that crews differ in the extent to which they follow crowd management rules, and that it was quite unpredictable in which crews it would go well or not. According to this interviewee, this was not due to lack of training, but because these situations were very difficult. Interviewees also noted that volunteers (especially new volunteers), being highly motivated to help, often wanted to do as much as possible, forgetting that their own (and the crew's) resources were limited and that it was important to "take care of yourself" as well (e.g., getting enough rest and sleep). While this was considered something that volunteers learned by trial and error from their own experience, one interviewee thought that this should get more attention during training.

Ideas for improvements mostly revolved around ways of reducing the "information overload" during training week. Interviewees highlighted the importance of establishing clear priorities for what should be included in the training week. Interviewees suggested that the training week should only include topics that had to be trained on board (e.g., general ship-related tasks and general behaviour, SAR-related knowledge and skills concerning the rescue itself, and concerning the accommodation of migrants on board), rather than topics that could be covered via e-learning or online workshops (e.g., history of the NGO; anti-discrimination training; media training). Removing these topics from the training week and offering them in an online format instead would allow more time for the training that had to be conducted on board. Moreover, the online format would make it easier to offer training in a "basic" and an "advanced" version, thus allowing to adjust the training to the needs of different target groups.

In addition, interviewees suggested that e-learning could be used to provide general background knowledge about "the basics", such as basic terminology (e.g., port/starboard, bow/stern) or basic knowledge about the functioning of a ship (e.g., ship stability, water supply and sewage system, routines on board). In addition, online simulation exercises were under consideration as a possible way to improve training. While this would not replace the training on board, it would require less time and would make the training week less stressful and less overwhelming for trainees, because they already have some foundation and a "basic understanding", so would not need to learn everything from zero.

Other suggestions included having a training RHIB, a training ship or a training centre in northern Europe, where volunteers could train prior to joining the vessel or between missions. In this way, it would be possible to train basic skills without the stress of mission preparation. Concerning topics, one interviewee noted that their NGO was focused on "training, training, training". By contrast, group dynamics and team building, although important for the success of the mission, were not a focus of the preparation and might deserve more attention.

4.2. Swedish organisations in the Mediterranean: Experiences and perspectives

This section is based on interviews with interviewees who were familiar with SAR operations in Sweden and in the Mediterranean, as carried out by the Swedish Sea Rescue Society or the Coast Guard.

Swedish organisations, such as the Swedish Sea Rescue Society (SSRS) and the Swedish Coast Guard, have participated in the SAR of migrants in Greece and in the central Mediterranean. The Swedish Sea Rescue Society (SSRS) participated in the SAR of migrants in Greece from October 2015 till June 2016, an initiative known as "Gula Båtarna". The Swedish Coast Guard has participated in the SAR of migrants in connection with Frontex operations in Greece and Italy intermittently since 2015, using planes, small vessels, and large offshore vessels (Kustbevakningen, 2015-2017, 2019-2022). In this report we only consider SAR operations with vessels.

4.2.1. SAR in Swedish waters vs. SAR of migrants in the Mediterranean

Interviewees who had participated in SAR operations in Sweden as well as in the Mediterranean highlighted several differences between the SAR of migrants in the Mediterranean and typical SAR operations in Swedish waters.

In Sweden, a typical summertime SAR mission might involve a family on a sailing boat that was leaking or had run aground. Although there were many incidents, making summer the "high season" for SAR missions in Sweden, according to one interviewee usually this was "very undramatic". In winter, a typical mission might involve a fishing vessel that needed towing. Because the Coast Guard in Sweden also sought to salvage the vessels and had a responsibility to prevent negative consequences for the environment, rescues could be technically demanding, especially when the weather was bad. By contrast, SAR operations in the Mediterranean were considered technically easier, but they presented different kinds of challenges. According to one interviewee, the biggest difference was the "sensory overload" in the Mediterranean, due to the large number of people in distress, different languages and communication difficulties, and a general sense of "chaos".

Interviewees described SAR operations in the Mediterranean as being "like a mass evacuation all the time", involving a large number of distressed people. This also led to practical challenges of how to find space for large numbers of rescued people on board of the relatively small SSRS or Coast Guard vessels. In addition, interviewees noted that the mood among those rescued was often volatile, as people might be "desperate", extremely tired and exhausted, in fear of their lives (many carried knives for self-defence) and worried about their future.

In addition to the large number of people involved, one interviewee estimated that in Greece, about 60 percent were women and children, which is a higher percentage than is typically the case in Sweden. In general, rescues are by many considered especially stressful when children are involved. Moreover, interviewees observed that both the boats and the equipment used by the migrants in the Mediterranean were of lower quality (often not seaworthy) than in Sweden. When sub-standard or damaged equipment was used, this could give a false sense of safety to those in distress and to the rescuers (e.g., when migrants wore life jackets but the jackets were damaged or did not work). Many of those who were rescued were in bad physical condition and needed urgent medical care (e.g., CPR). Due to the large number of people in distress, crews sometimes had to make triage decisions about who (not) to rescue. By contrast, rescue situations in Sweden were rarely "so dramatic", as one interviewee put it.

Moreover, interviewees explained that in the Mediterranean, the migrants typically were "not seafarers" and often had little or no experience at sea. Transferring the migrants from their boats to the

SAR boats was “dangerous”, and there was a sense that “anything could happen”. During the rescue phase, it was therefore essential to prevent people from panicking. Hence the usual approach of going alongside the boat in distress to take people on board did not work, and crews had to find new ways of taking people on board. Keeping calm, as well as clear and calm communication with those in distress were considered essential for preventing panic and to ensure that the rescue could proceed safely and effectively.

While language, communication and cultural differences were not generally considered a problem in Sweden, this could be a challenge in the Mediterranean, both with regard to the people in distress, with partner organisations involved in a rescue and with other organisations ashore. In contrast to Sweden, where the collaboration with partner organisations at sea (e.g., SSRS, Coast Guard, Navy, etc.) and on land (e.g., ambulance service, hospital, police, etc.) was well-established and could be relied on to function relatively smoothly, in the Mediterranean collaborations had to be built from scratch, and there was a sense that “we are on our own”. Interviewees also noted that there was much less information provided when they were called to an emergency than what they were used to in Sweden. Another interviewee noted a strong general sense of uncertainty at the start of the operation, when lack of information, contradictory and wrong information made it difficult to get a reliable picture of the situation. This could be compounded by the unclear legal situation.

4.2.2. Approaches to training for SAR of migrants

Both SSRS and Coast Guard crew members are highly trained and experienced with SAR operations in general. Hence those who were selected to participate in the SAR missions in the Mediterranean were “highly experienced” with SAR in Sweden. For instance, interviewees recalled that for the SSRS, it was essential to select the “right people”, i.e., people who were experienced with SAR, had relevant other experiences (e.g., military background; extreme sports; medical expertise; international experience; experience with emergencies / disaster situations) that complemented those of other team members, and enabled them to handle complex, risky and unpredictable situations. All were able to take responsibility for their own safety, and all had a “general competence” for dealing with “dynamic, fast changing and risky” situations. However, they were not trained for the specific challenges related to the SAR of migrants; for instance, as one interviewee noted, none of the SSRS volunteers had done a rescue of more than ten people at a time prior to the mission in the Mediterranean.

Given that there was not much information available and no standard operational procedure established at the start of the first missions to the Mediterranean in 2015, training for the mission was limited. Interviewees recalled that the first crew members who participated in SAR missions in the Mediterranean were given a presentation that showed pictures and/or films from SAR operations in the Mediterranean. In addition, participants were given some information about the political context. The aim was to provide participants with a “mental picture” of what they might encounter and understand what would be required. One interviewee recalled that it was highlighted that “it will be chaotic” and that it would be necessary to come up with “ad hoc solutions” on the spot. Interviewees also mentioned additional preparations carried out by SSRS participants in the few weeks before their departure to Greece. They made certain adjustments to their boats (including some modifications that they expected to be useful), and trained what they thought they might need (e.g., CPR).

Interviewees recalled that the first crews who participated in the SAR of migrants in Greece experienced a steep learning curve, and some practices that would typically be used in SAR in Sweden had to be adjusted. According to two interviewees who had participated in the SSRS mission in Greece, the need for flexibility and the ability to adjust to changing and unpredictable situations entailed that procedures had to be “dynamic agreements”. Some of the initial rules that the teams had agreed upon proved to be useful and were retained (e.g., the principle that the two SSRS boats should not be split, but worked together as “one team”), while others were revised in line with what worked

or did not worked in this new context (e.g., the rule not to allow passengers on the bridge was dropped, because it turned out that this was the best place for CPR for children). The teams established working relations with key local actors, such as the Greek Coast Guard, and developed new approaches and solutions (e.g., using inflatable floats to transport people who were stranded on cliffs to the boat).

Experiences were shared with subsequent crews in several ways. First, change days were adjusted during later missions, so that only half of the crew changed. In this way, half of the crew remained and could show newly arrived crew members around and share their experiences, both concerning practical matters regarding accommodation, local geography (e.g., dangerous places) and approaches and routines during SAR. In addition, interviewees mentioned that in the SSRS, new routines were documented through photos and video clips, which were sent to the SSRS office in Sweden, so that subsequent crews could look at these materials. Moreover, crew members could call the SSRS office to ask the person on duty (all of them had been in Greece themselves) for advice or tips. In this way, later teams were better prepared both because they had developed a suitable approach and because they were better prepared mentally about what to expect.

4.3. Mental health support during SAR of migrants in the Mediterranean

This section is based on interviews with individuals who were familiar with international SAR NGOs, as well as the experiences of organizations from the Nordic countries (e.g., SSRS, Coast Guard) in the Mediterranean. We start by discussing mental health-related challenges described by interviewees, and then turn to interviewees' descriptions of the approaches taken by their organisations during their operations in the Mediterranean. To some extent, the experiences from the Mediterranean also affected the organisations' approach back home.

4.3.1. Importance of mental health support

Interviewees agreed that participating in the SAR of migrants in the Mediterranean could have an impact on the mental health of crew members. For volunteers in SAR NGOs, especially during their first mission, adapting to life on board could be highly stressful due to the overload of new information and impressions, the strain of rescue operations, and the crowdedness and lack of privacy on board.

Potentially traumatic events or experiences presented additional stressors. This included situations where people were in the water and when it was not clear whether it would be possible to rescue all of them. One interviewee recalled a situation where they "knew that people were going to die today" because there were too many people in the water, and it was clear that it would be impossible to rescue everyone. Sometimes people were taken on board but passed away despite crew members' efforts to revive them, or the crew had to stop CPR for one person in order to help others with a higher chance of surviving.

For crews of SAR NGOs in the central Mediterranean, another type of potentially traumatic events or experiences included interactions with the Libyan Coast Guard, whose behaviour was often seen as unpredictable by NGO crew members. There had been instances where the Libyan Coast Guard had helped to get migrants out of the water and on board of an NGO vessel, whereas at other times, migrant boats were pushed back to Libya. Having weapons, the Libyan Coast Guard might also threaten to attack the NGO crew or take them prisoner, thus posing a threat to crew members' lives. Moreover, experiencing a pushback, when crew members saw a boat being pushed back to Libya by the Libyan Coast Guard, and were unable to do anything to help, could be difficult.

Potentially traumatic experiences could also be connected to the post-rescue phase while migrants were on board, especially for crews of international SAR NGOs in the central Mediterranean where migrants might be on board for several days, and it was uncertain when and where they would be able to go ashore. On the one hand, this concerned experiences of aggression, fights, and sexual harassment. Exhaustion, fear, and high levels of tension among migrants on board could escalate into conflicts and, at times, aggressive behaviour and fights. Sometimes there were suspected cases of sexual harassment among migrants, or sexual harassment by male migrants or crew members of female migrants or crew members. Often these situations were ambiguous, as behaviours could be misinterpreted, but they could be experienced as very serious and difficult.

On the other hand, this related to situations and events that instilled crew members with a sense of helplessness. When the ship had to wait to go to port, sometimes migrants threatened with suicide, or tried to commit suicide by jumping over board. For crew members, this could lead to feelings of helplessness and futility. In addition, both in the central Mediterranean and in Greece, interviewees noted that crew members were fully aware that when migrants went ashore in a European port, they were "saved" from the sea, but they were "not coming to a place that was really good", but they were going to refugee camps, and they were likely to experience racism.

While new volunteers might experience their first mission as especially stressful, interviewees related mental health risks primarily to the number of missions (the more missions, the higher the mental health risk), especially if individuals had been on multiple consecutive missions without taking breaks. To reduce this risk, interviewees in international SAR NGOs and the SSRS noted that their organisations sought to avoid selecting individuals for consecutive missions.

4.3.2. Approaches to mental health support

Interviewees from all organisations – international SAR NGOs, SSRS and Coast Guard – described multiple forms of mental health support provided by their organisation.

According to interviewees, much attention was given to ***selecting the "right" people*** for the SAR missions in the Mediterranean. An interviewee explained that their international SAR NGO had developed a set of criteria or questions related to stress tolerance and resilience that potential candidates were asked in order to select individuals who could be expected to cope well with the demands of a SAR operation. Similarly, the SSRS used multiple criteria to identify suitable candidates based on their skills, but also used criteria related to candidates' experience with crisis or disaster situations and their expected ability to cope. Similarly, for the Coast Guard, selecting experienced individuals who could remain calm even in stressful situations, was considered an important criterion.

Education and training related to mental health was included in the basic training offered by the Coast Guard and the SSRS to all of their employees and members, respectively. For crew members in an international SAR NGO, the NGO offered a "psychological briefing", given as an online workshop before the start of the mission (during the COVID-19 pandemic), or as an in-person workshop during the training week. Participation was mandatory for all crew members. The briefing covered stress (defined broadly) and stress management, team building (including group dynamics and conflict management), and introduced the organisation's support system.

Interviewees named several types of mental health support during the mission in the Mediterranean: debriefing after rescues, peer support, shore support, and the possibility to talk to a professionally trained psychologist if/as needed. Interviewees who had participated in the SSRS mission in Greece recalled that they had ***debriefings*** at the end of the day after a rescue, described as an "informal form of after action review" where crew members discussed what they had expected to happen, what did happen, and what they could do differently in future rescues. The main purpose was to discuss "operational aspects", but these conversations were also an opportunity to check how crew members

felt, to comfort each other, and to identify if anyone needed extra (professional) support. Crew members sometimes went back to the location of the rescue to go over events and develop and document new routines.

In other organisations, interviewees explained that debriefings were routinely arranged at the end of a mission after migrants had disembarked. An interviewee recalled that in Greece in 2015, Coast Guard crews had had formal debriefings at the end of the mission, before going home, regardless of what had happened during the mission. In recent times, debriefings with professional facilitators were used especially when something happened during the mission so that crew members felt the need for a debriefing. In one international SAR NGO, the debriefing can take place virtually in small groups, or (when the mission had been difficult, e.g. people had died or there had been difficult situations on board) the NGO usually succeeded in arranging for a psychologist to meet the crew in port. In addition to group meetings, 1:1 meetings with trained psychologists were arranged if/as needed.

In addition to formal debriefings, all interviewees highlighted the importance of ***peer support*** on board. One interviewee explained that it was essential to create a supportive and caring environment, where crew members felt accepted, safe, and appreciated, and could remind each other that they did their best to save people, even though they were sometimes unable to save everyone. In an international NGO, peer support was formalised in a "buddy system". Here each crew member was assigned another crew members as a "buddy", and they were expected to have a daily chat about "how you are doing". The aim was to prevent loneliness, support individuals in managing stress, and provide an opportunity to talk about difficult experiences.

Interviewees from the SSRS and from an international SAR NGO also mentioned ***shore-based support***. The SSRS teams had daily contact with the "operative team" in the SSRS office in Sweden to discuss daily events as well as potential needs for instance regarding equipment. Similarly, interviewees in an international NGO in the central Mediterranean noted that they could contact a support group on land with questions or problems. This support group consisted of individuals from different departments or functions (e.g., the medical team on board could consult with a medical expert).

Moreover, interviewees noted that their organisation made it possible for them to get ***professional help*** if and as needed, both during the mission and afterwards. During the mission, the Master and (in international SAR NGOs) the Head of Mission had a special responsibility to pay attention to the well-being of their crew, and to arrange support if and as needed. They could also decide whether a debriefing would be required for the whole crew or for certain crew members.

After returning home, all organisations continued to offer the possibility to get professional help. Interviewees from the SSRS and a SAR NGO also noted that their organisations were proactive in following up with participants a few weeks after they had returned home to check in with them by telephone or via email and provide information about the option to get professional support if needed. In addition, the SSRS arranged reunion meetings for those who had participated in the SAR mission in Greece.

4.3.3. Impact on activities back home

Interviewees from the SSRS in particular also highlighted lessons learned for activities back home. One interviewee noted that the SSRS had sought to look after the mental health of crew members even before 2015. For instance, there had been courses on peer support, and district coordinators were expected to arrange for participants to meet after a rescue and talk about what happened. However, since then there had been a "culture change", partly in consequence of the SSRS' experiences in Greece. This was not so much a change in what the SSRS formally offered or required, but an informal change. As the importance of mental health support was recognised, there has been an

increased effort to strengthen social support in local stations, and to remove the stigma attached to mental ill-health by emphasizing that it is “ok” to talk about one’s feelings. As a result, the SSRS became “more caring”.

Another interviewee suggested that a similar change had taken place in the Finnish Coast Guard. During the first mission in the Mediterranean, there had been little emphasis on aftercare, and for some participants, their experiences led to symptoms of mental ill-health. This led to increased attention to the importance of aftercare, and an increased emphasis on “defusion” meetings in particular. Today the aim is to have at least one or two trained defusion specialists per unit, in order to prevent mental health problems (such as PTSD) and ensure that crew members could continue to work “in good spirits” after adverse events.

5. SAR training and support for professional seafarers

5.1. Involvement of merchant vessels in SAR

According to the Swedish Maritime Administration's annual statistical report for 2022 (Sjöfartsverket, 2022: 4-5), there were 964 emergency calls ("cases") concerning maritime SAR, which was lower than in previous years. Most of them (58 %) occurred during the summer months, and many (64 %) concerned leisure boats, while only 12 % concerned merchant vessels (Sjöfartsverket, 2022: 16-17).

Emergency calls are handled by Maritime Rescue Coordination Centres (MRCCs), or, in Sweden, the Joint Rescue Coordination Centre (JRCC) who coordinate both maritime and air rescue. These centres coordinate the rescue operations and call upon relevant resources. In Sweden, this can include the Swedish Sea Rescue Society (SSRS), the Swedish Coast Guard, rescue helicopters, merchant vessels and other relevant resources. Often participants from multiple organisations participate in a rescue. In 2022, the SSRS was involved in 74 % of the emergency cases in Swedish waters (Sjöfartsverket, 2022). In the Swedish Maritime Administration's statistical report, merchant vessels are included in the category "ad hoc resources" (together with leisure craft and other resources). Resources in this category participated in 5 % of the cases (Sjöfartsverket, 2022: 28).

Interviewees agreed that it did not happen very often that merchant vessels participated in SAR, although there were some differences depending on the vessel's traffic area. One interviewee noted that on their current line in the Baltic, it was "not uncommon" that they assisted leisure crafts (e.g., sailing boats) during the summer months. This was also the case in other traffic areas that were near coastal areas with large numbers of leisure boats, such as the Caribbean. On the open sea, merchant vessels could become involved if they happened to be the "vessel of opportunity", i.e. the vessel closest to the scene. In this way, two interviewees said that they had been involved in searches after another vessel had capsized.

A few interviewees had experienced emergency situations on their own vessel. Two interviewees had experienced "man over board" situations on their vessel, and one had experienced collisions. Medical emergencies requiring evacuation were mentioned as well, both on cargo vessels and, more commonly (as the large number of people on board also increased the likelihood of accidents or illness), on passenger ferries.

While involvement of merchant vessels in SAR was rare, interviewees agreed that involvement in SAR of migrants was even less frequent. According to interviewees, very few shipping companies from the Nordic countries had been involved in SAR of migrants, and only one interviewee had experienced such situations personally. Interviewees thought that this might be due to the traffic areas of the vessels (which were mainly in the Baltic and the North Sea) and the well-organised SAR systems in areas where they might encounter migrant boats, such as the English Channel or Gibraltar.

Although SAR situations were considered rare, there was a strong sense, expressed by all interviewees, that when encountering people in distress at sea, merchant vessels had both a legal obligation and a moral duty to assist, unless this would put their own crew in danger. This also applied to migrant vessels. As interviewee put it, a migrant vessel in distress was "arguably the same" as any other vessel with passengers on board, and as in any SAR situation, it would be self-evident to help.

Merchant vessels can contribute to SAR operations in several ways. An interviewee with experience in coordinating resources for maritime SAR operations listed four different possible functions, which were also mentioned in the examples given by other interviewees in how their vessels had been involved. These were:

1. As "ship of opportunity", if they happen to be close to the site of the emergency. For emergencies that occur at sea (as opposed to near the coast), merchant vessels are often closest.

2. As a “search resource”: merchant vessels are well-suited for searching for people in the water, because the bridge typically is high above the water, enabling them to see far. Moreover, merchant vessels are equipped for being at sea for days or weeks, so they can participate in a search for a longer time than for instance a leisure boat.
3. Creating lee to protect the vessel in distress
4. During an evacuation, merchant vessels can be used as an intermediate “stopover” station for people taken up by helicopters from the water or from the vessel in distress. This is especially important when a large number of people need to be rescued. Passenger ferries are especially well-equipped for this purpose because they have the facilities to accommodate large numbers of people, and their crew are experienced in looking after passengers.

By contrast, as several interviewees highlighted, merchant vessels are not well-equipped for taking up people from the water or from another boat. This was considered a key challenge, or indeed, a key limitation, for SAR situations.

5.2. Challenges

Concerning SAR situations in general, several challenges were mentioned in the expert interviews. Most frequently mentioned were the limitations imposed by the vessel and its equipment; the availability of resources or rescue units; the dynamic, unpredictable nature of emergency situations; and stress management.

As noted above, several interviewees highlighted that merchant vessels were not well-equipped for taking up people from the water or from another boat. This limited what merchant vessels could do to assist in emergency situations. Moreover, especially for smaller cargo vessels, manoeuvring might be difficult, especially with strong winds and current. Recalling an emergency situation where their vessel was called upon to assist a small boat that had run aground on a small island, an interviewee described that their vessel went as close as possible to the island, but there was nothing more that the crew could do. Taking people up on board from the sea would have been difficult, especially as there were waves. It would also have been difficult to get people from the island to the ship. They did not have a fast rescue boat, only a small 4 m boat, but the crew judged that it would be too dangerous (because of the strong wind and waves) for their own crew to launch that boat. Other interviewees noted that getting people from the water onto the ship had also been a problem during the rescue of survivors from the *Estonia*. Interviewees highlighted that a fast evacuation of a vessel in distress (e.g., a vessel that is sinking or on fire) is the first step, but being in a lifeboat or float does not mean that you are “safe”. Hence the question is what equipment is available to help people who are in the water, or on a lifeboat or float, especially if there are a large number of people in distress (e.g., an emergency involving a passenger vessel). Interviewees agreed that at the moment, with the equipment currently used, it would be difficult to save people from the water or from lifeboats or floats.

The availability of resources (e.g., vessels or helicopters) that might be called upon to assist in an emergency could be another challenge, depending on the location of the emergency. For instance, while there might be numerous resources (e.g., SSRS stations, leisure craft, and/or merchant vessels) near Stockholm or Gothenburg, there might be fewer resources available when emergencies occurred in the open sea or in remote coastal locations. Comparing responses to emergency situations at sea with those on land, an interviewee explained that there were usually fewer units involved at sea. On land, you may easily have 10 units, with 40-50 firemen, responding to a house fire. In a maritime emergency, your rescue vessel may be the only vessel who is there, and it may take a long time to get backup. This makes it especially important to evaluate the risk to yourself and your own crew in a rescue mission. Moreover, there may be more people in distress than there are rescuers. This means

that you may not be able to help everyone, forcing you to make difficult "triage" decisions about who to help.

That emergency situations at sea often were complex, dynamic and involved a high degree of uncertainty was mentioned as a challenge as well. This made it impossible to predict what might happen, or to have an exhaustive list of scenarios that one could prepare for. One interviewee explained that emergency situations at sea were even more unpredictable than emergencies on land. At sea, there were "more open questions", hence there was no "basic structure" or standard procedure that always worked and that rescuers could rely on. Instead, it was important to assess each emergency situation and figure out what to do, being creative and adjusting your plans as new information emerged.

The complex, dynamic and unpredictable nature of emergencies, together with the high risks they might involve, made such emergencies also highly stressful. Hence a key challenge that was mentioned was to deal with stress and remain calm and level-headed, as panicking could exacerbate the risks for oneself and others. For Masters in particular, it was considered important to keep an overview and to think one step ahead. Referring to information provided during "Crowd and crisis management" and similar courses, as well as their own experiences, interviewees noted that it was impossible to predict people's reactions (i.e., whether they would panic or not) beforehand. This added another level of uncertainty.

Other challenges mentioned less frequently included handling media inquiries directed at the vessels and/or the shipping companies involved in an emergency situation, as well as rescuers forgetting to consider their own safety in their eagerness to assist others. According to one interviewee, it was not uncommon that rescue boats went too fast in conditions of poor visibility, thereby risking colliding with something or running aground.

From the perspective of those coordinating the rescue operation, such as the MRCC (or, in Sweden, the JRCC), key challenges concerned uncertainty about the skills and experience of those involved in the rescue operation, and communication. While emergency responders on land (such as ambulance personnel or firefighters) are usually trained professionals whose everyday work focuses on emergency response, the situation is different at sea. For instance, in a Swedish context, SAR is only one of many tasks of the Swedish Coast Guard. And while the SSRS focuses on SAR, it consists of volunteers with different levels of skills and experiences. Crews on most merchant vessels are unlikely to have much experience with SAR. For the MRCC or JRCC, this entails an uncertainty about the competence of the rescue units involved in the SAR operation.

Another challenge connected to the coordination of SAR operations concerned communication. First, getting the relevant facts could be a challenge, as the person reporting the emergency might not be close enough to observe relevant details (e.g., number of people in distress, number of people injured, types of injuries). Second, relevant facts might be omitted or distorted, or there might be misunderstandings, such that communication sometimes resembled a game of "Chinese whispers". Third, cultural norms and expectations around radio communication could be a challenge as well. Several interviewees noted that "too much radio talk" could be a challenge when a SAR operation involved multiple units with crews who were eager to get involved and share information about their actions, observations, and plans. This could lead to a "traffic jam" and make it hard to get through with essential information. This was perhaps less of a problem in the communication with merchant vessels, who usually kept radio communication to a minimum and kept to following MRCC (or, in Sweden, JRCC) instructions. An interviewee observed that while other SAR participants might question MRCC instructions, merchant vessels usually did not; hence it was considered important that the MRCC coordinator was attentive to comments that suggest that instructions may not be suitable.

Challenges specifically concerning the SAR of migrants were mentioned as well by a few interviewees. This was based on their own experiences, reading news reports about cases where

merchant vessels had participated in the SAR of migrants, and/or reading information compiled by the UNHCR, IMO and ICS or by the Norwegian Shipowners' Association (ICS, 2015; NSA, 2015; UNHCR, 2015). They highlighted challenges relating to the post-rescue phase when migrants were hosted on board. More specifically, they noted challenges related to the large number of people involved, perhaps several hundred. Given the limited space on board, and limited amounts of food and water, the large number of people that might need to be accommodated posed practical challenges. For instance, finding space on board where they could be accommodated safely, as well as protected from the sun, rain or wind; or finding sufficient food and water and distributing this to those rescued.

Another challenge that was mentioned was connected to the expectation that those rescued might be injured or ill, as merchant vessels did not have doctors on board, and both the medical expertise of crew members and the type and amount of medical supplies on board was limited.

Accommodating and taking care of a large number of rescued people on board might also be stressful for the crew. This might be further exacerbated by the escalation of tensions into threatening situations, perhaps when the journey to port took very long, or when the vessel was directed to a port where the migrants did not want to disembark. An interviewee from a SAR NGO speculated that this stress might be stronger and more challenging for crews of merchant vessels than for NGO crews, as merchant vessels just happened to become involved in such rescues, while NGO crews expected to be involved and therefore were better trained and mentally more prepared.

5.3. Preparedness for SAR

Interviewees noted that in general, the focus in the shipping industry is on preventing emergency situations. Ships are built to be as safe as possible, including numerous sophisticated backup systems for critical parts of the ship such as a backup engine control room, emergency lighting, emergency generators, etc.. Accident investigations after accidents or near-misses are conducted by crews, shipping companies, and accident investigation authorities to identify the causes of the accident, and to develop solutions to prevent its reoccurrence. For instance, after fires on board, prevention and monitoring systems were improved, for instance by installing sprinkler systems or by using real time information to monitor the ship and detect leaks, unusual heat, or other problems as early as possible. Moreover, potential risks were reduced as far as possible; for instance, a ferry company decided to stop using fryers in their kitchens, to rule out fryers as a fire hazard on board.

As one interviewee explained, the construction of the ship is the first and most important safeguard. This is supplemented by two further "layers" of safeguards, i.e. training the vessel's crew to respond and resolve emergency situations (discussed in sections 5.4. to 5.7.), and, as a last resort, the organisation of assistance from outside.

Having well-functioning routines, including procedures, check lists, and an emergency response organisation or "crisis team" ashore were considered important as well. Although the crew on the vessel involved in an emergency situation will do most things themselves, the shore-based crisis team supports the crew, for instance by compiling and analysing information to support decision making on board, communicate with relevant organisations ashore, and deal with media enquiries.

The onboard emergency equipment is another important part of preparedness. Some of this is required, while other equipment is provided based on the judgment of the shipping company. For instance, a company had the required medical supplies and first aid equipment on board, but in addition also provided defibrillators on their vessels. Several interviewees noted that equipment for SAR operations had been improved since the *Estonia* disaster showed important shortcomings of the equipment available at the time. Still, not all interviewees were convinced that the current equipment would be sufficient for evacuating a passenger vessel. One interviewee explained that mathematically, this might be possible today, but only under perfect (and thus unrealistic) conditions. Moreover, as noted

in section 5.2., people in a lifeboat or float are not “safe” yet; however, their rescue would not be easy even today. Several interviewees mentioned that there had been efforts to improve the equipment for taking people on board, but implementing these improvements was impeded by current industry regulations.

The knowledge and skills of the crew on board were highlighted as another important element in preparedness for emergency situations. Interviewees noted the importance of having leaders who can keep calm and deal with emergency situations effectively. This involved selecting the right people for leadership positions, e.g. as Masters. Being “mentally prepared” was considered important as well. This could be achieved for instance through training, from previous personal experiences or by hearing about others’ experiences with different types of emergency situations. For rescuers, this also involved getting sufficient and correct information about the emergency, thus allowing them to form a mental picture of the situation and prepare themselves for what they might encounter. In addition, having a “good team” on board and being able to rely on fellow crew members was mentioned as another aspect of preparedness.

Because the merchant vessels that interviewees were involved in expected SAR of migrants to be a rare or (in some traffic areas) a highly unlikely occurrence, most did not make any particular arrangements in preparation for such a situation. One shipping company whose vessels occasionally went through the Mediterranean provided the Masters on these vessels with relevant information and guidelines, such as those prepared by the UNHCR, IMO and ICS or by the Norwegian Shipowners’ Association (ICS, 2015; NSA, 2015; UNHCR, 2015). Another company, whose vessel went through the Mediterranean more frequently, had developed procedures for such a situation and provided their vessels with emergency supplies of durable food and rescue blankets (Sjöfartstidningen, 2015).

In addition, interviewees agreed that education and training was vital. This will be discussed in the next section.

5.4. SAR in maritime education and training (MET)

This section is based on interviews with nine interviewees from six MET institutions in Norway, Sweden and Finland. All of them were experienced lecturers and were responsible for maritime training programmes and/or courses related to SAR and/or mental health.

5.4.1. SAR in current MET programmes

At all six MET institutions, the maritime programmes were designed in line with STCW requirements, which prescribed the content to be covered for certification purposes. Consequently, the programmes were relatively similar. Differences concerned whether certain specialised or advanced courses were included in the programme as a mandatory course, or offered as elective, as a freestanding course, or by other organisations. For instance, the “crowd and crisis management” course was a mandatory part of the programme in some schools, whereas in others it was an elective, or it was not offered as part of the programme but could be taken at separate safety training centres. Similarly, “on scene coordinator” courses were offered as an elective in some programmes, or, in Sweden, as an advanced training course by the Swedish Maritime Administration.

The content required for each subject area in line with the STCW was extensive, and none of the required topics could be omitted. Given the limited time available, this left little leeway for programmes or individual teachers to include additional topics that they felt might be important – indeed, it was felt that it was already difficult to fit all the required content within the limited time available. What could be decided locally was *how* the content was taught, e.g. whether to use lectures,

group work, out-of-class assignments, simulator exercises, or practical training.

At all MET institutions, there was at least one course (in one institution: a module) with a strong focus on SAR, usually scheduled towards the end of the education, so that students already had some basic knowledge. This course typically covered the planning and execution of a search, search patterns, and radio communication (both with the JRCC/MRCC and among the vessels involved). Some interviewees mentioned that the IAMSAR manual was used as the course book for this course. Usually, this course also included aspects of on-scene coordination. At some institutions, the SAR-related topics were combined with content related to Bridge Resource Management (BRM).

The SAR course typically combined lectures and group discussions in class with simulator exercises where students practiced scenarios such as coming to the assistance of another ship or "man over board". Interviewees noted that what students found most difficult during these exercises was radio communication, manoeuvring (e.g., "Williamson's turn"), and the planning of the SAR operations (e.g., taking into account distance and time required; taking on the role as OSC).

Case studies were mentioned as well in connection with the SAR course. At one institution, teachers included case studies of SAR situations (e.g., *Finnbirch*; *Tampa*; *Aniara*) to illustrate the challenges faced by the crews, and how to deal with them. At another institution, teachers used case studies (e.g., *Costa Concordia*; *Sleipner A*; airplane accidents) to make students aware of risk of human error and to highlight the importance of training.

In addition, topics related to SAR were covered as part of other courses, such as basic safety training, personal survival, survival craft and rescue boats, fast rescue boats, as well as courses addressing radio communication, navigation, emergency situations (e.g., groundings, collisions) and procedures (e.g., firefighting, emergency towing). At one institution, SAR and emergency situations were also addressed as part of the leadership course.

In general, the focus of the maritime education programmes was on the technical knowledge or skills (e.g., how to conduct a search), and less on the "crisis" and mental health-related aspects of SAR. Interviewees noted that there was no "pure" course focusing on mental health. Instead, mental health related topics could come up in several different courses, usually during lectures. For instance, stress and stress management might be mentioned as part of the SAR course, or integrated into the "Crowd & crisis management" course, the "basic safety" course or first aid and medical care courses. Usually there was relatively little time available for mental health related topics as they competed for time with other course content. However, in one institution, stress and stress management were a prominent part of the "Crowd and crisis management" course, a mandatory course at that institution. Some interviewees mentioned that discussions of mental health, notably stress and stress management, were included as part of the debriefing after simulator exercises. Although debriefing (or, relatedly, defusion) was not a topic of training in itself, some institutions used these post-simulator exercise debriefings to model how debriefings could be conducted.

SAR of migrants was not covered specifically at any of the MET institutions. Mass rescue situations were not practiced either, but might be mentioned in connection with case studies (e.g., *Estonia*). One interviewee explained that SAR courses tend to focus on "man over board" situations or situations where a cargo ship participates in a search. They are not intended to cover mass rescue situations, which are "difficult to train" and "difficult to simulate" in a simulator exercise because of the large number of distressed people that would need to be modelled (or simulated). Moreover, interviewees noted that the education addressed launching one's own rescue boat to evacuate one's own vessel in case of an emergency. However, there was little or no training regarding how to save people who are in the water or on a lifeboat or life float.

5.4.2. Approaches to teaching SAR

Interviewees noted that most likely only an "extremely small percentage" of their students would ever be involved in SAR situations during their careers, and this could be many years after they had completed their education. On the other hand, SAR situations, if they occurred, could be highly complex, dynamic, and unpredictable, potentially endangering the lives of many people. Interviewees discussed several strategies or principles for training students to "be prepared not to be prepared" in such situations.

First, interviewees highlighted the importance of focusing on the basics. Mastering the basic skills was thought to give students the tools to handle more complex situations in the future. One interviewee explained that it is often the case that each situation is unique. However, if you train enough, this can give you some tools that you can use. It can also "trigger" a kind of automatic response, so that you know what to do. In this context, interviewees highlighted that the education that students received at MET institutions was only the first step. One interviewee explained that training students in the content required by the STCW would give them the basics and relevant theory, as well as the required certificates for working at sea. Working at sea then would give them further experience. Another interviewee noted that as a seafarer, you never finish learning; when encountering a new situation, it is important to analyse the situation, and use one's knowledge, skills, and the available resources to try to deal with it as well as possible.

Another approach was to expose students to complex scenarios. This could take the form of analysing case studies of actual SAR situations, or of simulator exercises with complex and stressful scenarios. One interviewee explained that it was important for students to reflect on the lessons to be learned from previous accidents and disasters. Simulator exercises could be used to expose students to situations where a lot happened at the same time, so they could train to remain calm and keep and overview of the situation. At the same time, interviewees highlighted the importance to adapt the simulator exercises to the skills level of the students and keep the pedagogical purpose of the exercise in mind. Moreover, a thorough debriefing was considered essential for highlighting the learning points of the exercise.

Interviewees also discussed the attitudes they wanted to convey to students to enable them to deal with new, complex situations. For instance, one interviewee highlighted to students that when arriving on an accident scene, it was "better to do something than nothing", using the knowledge, skills, and resources at their disposal. Another explained that it was important to point out that mistakes could happen, and that it would be important to discuss and reflect upon them afterwards in order to learn from them.

Finally, one interviewee explained that concerning SAR in particular, it was not important that students memorised all the details in the IAMSAR manuals, but that they knew how to use the manual. As SAR situations might occur many years after the course, it was unlikely that students remembered the details; however, it would be important that they would know how to look up relevant information in the manual.

5.4.3. Ideas for improvements

Interviewees agreed that the time available to cover the content required by STCW regulations was limited and often did not allow them to cover topics – whether SAR-related or other – in the depth they would have wished. Hence overall, more time would be desirable.

Given that students were unlikely to be involved in SAR very frequently during their careers, interviewees thought it was difficult to decide how to prioritise SAR compared to other topics, and that it was important to find the right balance. For instance, one interviewee explained that too much

focus on SAR might mean less time for other topics, so it was important to find the right balance to ensure that future officers did not have gaps in their training that would lead them to become the *cause* of SAR operations. This was in line with the focus on prevention noted by other interviewees. For instance, one interviewee explained that the focus in teaching was on how to get the job done effectively and safely, in order to "avoid making mistakes" that would lead to disasters. Consequently, there was "very little focus" in current maritime education and training on what happens if things go wrong after a mistake has occurred.

Concerning SAR training, interviewees mentioned several potential improvements. First, although the training described by interviewees already included simulator exercises and practical elements, ideally this should be emphasised even more. This was because students were thought to learn more when trying to solve problems in real time, rather than through lectures. Another interviewee thought it would be desirable to introduce students to more realistic (and more difficult) conditions as well. For instance, real-world SAR situations might occur during bad weather, with limited visibility, strong winds, etc., and it would be important to practice for instance how to take up people from the water under such conditions.

In addition, more focus on radio communication would be desirable as well. This was based on the importance of communication during SAR operations, and the difficulties that students often had with this. One interviewee thought that simulator exercises with participants from schools in other countries might be desirable as well, in order to give students a better understanding of the challenges that could emerge in communication (e.g., due to different pronunciations).

Several interviewees thought that more focus on non-technical skills would be desirable as well, such as bridge teamwork, or understanding and taking into account human factors. Several interviewees would also like to see the "on scene coordinator" course as a mandatory course. One interviewee thought it would be desirable to discuss mass rescue situations and SAR of migrants, in order to alert students to the differences between these situations and "normal" SAR situations. More generally, one interviewee thought it would be important to place more emphasis on training officers who could take responsibility not only for themselves but also for their crew, and who could think critically. Critical thinking would be important to prepare students for dealing with complex real-world situations – in contrast to maritime education where students learn to the "correct answers", in real world situations, there usually is not one correct answer.

5.5. SAR training in the SSRS and the Coast Guard

Taking a historical perspective, interviewees noted that in the past, SAR operations were organised informally, as seafarers and fishermen in coastal communities came to the assistance of boats in distress. In 1907, the SSRS was established to provide more effective and well-organised SAR in Swedish waters (SSRS, 2023a).

Today, anyone who is interested can become a member of the SSRS. This entailed an "enormous need" to train volunteers for SAR. During the 2000s, the SSRS therefore created a training programme that combined training and regular practice provided at local stations with a number of courses given centrally. Today the central courses are given by the SSRS and in collaboration with the Öckerö Maritime Center and the training school of the Swedish Maritime Administration in Arkö (SSRS, 2023b). Courses offered by the SSRS today include the following (SSRS, 2023b):

- Basic safety
- Basic SAR
- First aid and medical care
- Deck /ship's officer Class VIII

- Engineering officer Class VIII
- Fast rescue boat
- Rescue Management
- Maintenance
- Environmental protection

Key considerations in designing these courses were to train SSRS volunteers to look after their own safety as well as others' safety. The courses were adapted from existing courses (e.g., the "basic safety" course was adapted from STCW "basic safety" courses; the first aid and medical care course was adapted from the ambulance services' IVPA ('I Väntan På Ambulans' / 'while waiting for an ambulance' course), but tailored to the needs of SSRS volunteers.

In contrast to the SSRS who have SAR as their main purpose, the Swedish Coast Guard are "generalists", with SAR being one task among many. In line with this, Coast Guard members are provided with a broad education. During the first year, courses include topics such as environmental protection, first aid and medical care, Swedish and European law, border control, and fishery control (Kustbevakningen, 2023). While there is no specific course dedicated to SAR, topics related to SAR come up in other courses. For instance, a course on environmental protection includes information on different aspects of SAR organisation in Sweden, such as the role of the JRCC or the SSRS. Another course on crisis and disaster situations also includes mental health related information, to prepare students for exceptionally demanding or stressful situations. In addition, SAR related topics are included in the maritime training (deck /ship's officer class VII; engineering officer class VII) at a maritime college (e.g., Chalmers; Kalmar) that students have to complete at the end of their training if they do not already hold the relevant certificates (Kustbevakningen, 2023).

After the basic training, SAR exercises are "woven into" everyday activities and Coast Guard members practice "all the time". In addition, Coast Guard units are called to numerous SAR cases. In this way, SAR activities are "a natural part of everyday life", as one interviewee put it. In spring, additional "start of the season" exercises are arranged as refreshers to prepare for typical SAR situations that the Coast Guard encounters during the summer, such as towing a leisure boat. After the basic training, all members of the Coast Guard take a "Basic SAR" course during their first year of working in the Coast Guard. Depending on their role and interests, this may be followed by an "Advanced SAR" and a "SAR - On Scene Coordinator (OSC)" course. All three courses are offered by the Swedish Maritime Administration (see section 5.6).

In Finland, the Finnish Border Guard has the main responsibility for maritime search and rescue. The basic training for joining the Coast Guard takes about one year (or about six months for those who have already worked in other parts of the Border Guard). SAR related training includes basic safety training, a "rescue swimmer" course, as well as first aid and medical care. During these courses, mental health related topics are addressed as well, including stress and stress management, keeping physically and mentally healthy, and debriefing / defusing. Border Guard officers take an additional "SAR unit leadership" course, the content of which is comparable to the "Advanced SAR" course offered by the Swedish Maritime Administration. In addition to regular exercises and responding to distress calls as part of their everyday work, the Coast Guard participates in one or two larger exercises per year, where they train certain scenarios (e.g., a mass evacuation).

5.6. Advanced SAR education and training

In addition to the courses offered as part of the basic maritime education at MET institutions, there were advanced courses in SAR, such as those offered by the Swedish Maritime Administration. In Sweden, these were the "Basic SAR", "Advanced SAR" and "SAR - On Scene Coordinator (OSC)" courses offered by the Swedish Maritime Administration. The "Basic SAR" course was intended for

anyone working on a unit (e.g., a vessel) involved in SAR, while the "Advanced SAR" course was for leaders of SAR units (e.g., Master of a vessel). The "SAR – On Scene Coordinator (OSC)" course was intended for those organising the collaboration of the units involved on the scene.

Moreover, large-scale exercises involving participants from multiple organisations were held at regular intervals. For instance, in Sweden such exercises were organised regionally, and involved for instance the SSRS, the Coast Guard, shipping companies, as well as emergency services on shore (e.g., ambulance service, police). Similar large-scale exercises take place in Finland as well. These exercises were considered important for training the collaboration between different organisations. While technical skills were practiced as well, the focus was on improving collaboration by allowing participants to get a better understanding of the goals and ways of working of the other organisations (i.e., "what they want from us, and what we from them").

Interviewees noted that for participants, the main challenge in these exercises was situational awareness (e.g., avoiding "tunnel vision" during a stressful operation) and radio communication (e.g., communicating key information).

5.7. Onboard training related to SAR

In addition to the regular refresher courses that are mandatory for individual seafarers, there are additional training and drills on each vessel, as well as large-scale exercises with participants from multiple organisations.

Drills and exercises were held at regular intervals (e.g., once a week, once a month, etc.) following guidelines and legal requirements. The training schedule depended on the type of training and the type of the vessel. Some of the trainings were also relevant for SAR, such as "man over board", rescue boat trainings, or medical care and first aid.

Some of the training was specific to crew members in particular departments. For instance, on passenger vessels, the medical team might have different types of training together. Training participation was recorded for each crew member, making it possible to monitor training and ensure that all crew members participated in the required training. Other training involved all crew members. For instance, interviewees explained that on passenger vessels, there was a weekly exercise that involved the whole crew, with a different scenario each week, such as "fire on board", "man over board" or a collision. Similar exercises were mentioned in regard to cargo vessels. While there were certain criteria concerning the scenarios that had to be trained, two interviewees mentioned that in their company the specific scenario was developed by one or two crew members (e.g., junior officers or engineers), so that it would be a surprise to the Master as well.

Interviewees agreed that these exercises and drills were vital – shipping was a "very risky sector", so it was important to "practice, practice and practice". Hence training was taken seriously, and typically involved not that "you get together [and talk through a scenario] and then you go again", but it was important to really "practice", also in bad weather if possible. Trainings often involved practical elements, for instance handling the equipment and practicing the use of different tools and equipment. Trainings were followed by a debriefing to assess what had gone well, and what needed to be improved.

In addition to these regular trainings, vessels might participate in large scale exercises (see section 5.6). In one shipping company, vessels were used by rescue helicopters crews to train evacuations when the vessels were at anchor or underway. This was also considered a good training opportunity for the vessels' crews.

Moreover, informal sharing of experiences and discussion of emergency situations could be an important informal way of learning from peers. Discussing others' experiences can help crew

members to get a “mental picture” of what to expect in future emergency situations, and how they might be handled. One interviewee noted that in general there was not much talk specifically about SAR among crew members on their vessel. However, each year at the start of the summer when they started to encounter more leisure craft at sea, the bridge officers usually discussed what types of situations they might be faced with and how they would handle them. Moreover, after assisting in a SAR operation, crew members might discuss the events informally among themselves.

Interviewees agreed that SAR rarely was on the agenda for the officer meetings that were regularly arranged by shipping companies. However, emergency situations could be discussed when one of the participants had recently experienced them on their vessel.

5.8. Support for crew members in connection with SAR operations

Interviewees described different types of support available to crews during and after SAR operations. As mentioned in section 5.3., during the SAR operations the crew on board was supported by a crisis team ashore. The crisis team compiled and analysed information to support decision making, acted as sounding board for the crew on board, and provided advice. In addition, the crisis team took care of all communication with relevant organisations ashore and dealt with media enquiries.

After the emergency situation, shipping companies had a support system in place to provide psychological support if and as needed. This was provided through the company health care provider. Some companies had additional contracts with independent services that crew members could contact. Masters had a key role in noticing crew members who found the SAR experiences difficult to cope with, and to encourage them to seek help. Masters could also alert the shipping company’s personnel department if required, who had routines for arranging professional support.

Interviewees also mentioned measures and initiatives aiming at improving the psychosocial work environment on board more generally. This was considered to contribute to crew members’ mental and physical well-being as well. This included measures to improve life on board (e.g., high quality food; musical instruments, games, gym equipment, etc., for leisure activities; free WIFI to allow seafarers to communicate with their families at home). Other examples were well-being projects that included both individual and crew tasks and activities, and different types of leadership training for Masters and senior officers.

6. Discussion and recommendations

This pre-study has taken an exploratory approach to identify training needs and lessons to be learned for improved preparedness and resilience in SAR operations. The pre-study was guided by three research questions:

1. What are the training needs for volunteers involved in the search and rescue of migrants in the Mediterranean?
2. What training and support is available for professional seafarers in the context of SAR operations involving migrants, and what additional training or resources are needed?
3. Based on the training needs of volunteers in SAR operations involving migrants, what lessons can be learned for professional seafarers?

In the next sections, we will discuss the pre-study's findings regarding each of these questions in turn. Section 6.1. summarises the findings regarding the first research question, while section 6.2. summarises the findings concerning the second research question. Section 6.3. addresses the third research question, but more broadly: drawing on insights from the literature study, we discuss the lessons learned for how training and support can contribute to enhancing the resilience of crew members – both professionals and volunteers – in complex, dynamic and highly uncertain situations.

6.1. Training needs of volunteers in SAR operations in the Mediterranean

The first research question concerned the training needs of volunteers involved in the search and rescue of migrants in the Mediterranean. The interviews identified three types of training needs: general knowledge and skills for life and work on board, mission specific knowledge and skills, and mental health-related knowledge and skills.

Specific training needs that were highlighted by the interviewees were skills and knowledge to enable ***work and life on board***. This included a familiarization with the vessel and onboard routines, as well as preparedness for emergency situations (such as a fire on board). These training needs were considered essential to allow crew members to live together in a small and confined space and to ensure smooth collaboration as a team. In addition, these training needs were highlighted in relation to safety, as the safety of the vessel and her crew was a key concern for all.

Another set of training needs highlighted in the interviews concerned knowledge and skills for ***mission-specific tasks and roles***. This included practical skills for rescues (e.g., launching and driving a RHIB; embarkation of rescued people), as well as interactions with rescued people during the time they spent on board. What was emphasised as especially important, but also very difficult, was the interaction with rescued people, notably treating everyone in the same way. This was crucial for the mission, but very difficult and challenging in practice because it required coordination (all rescued people were to be treated in the same way by all of the crew) and because in some circumstances it might mean that crew members could not provide as much care as they perhaps would have liked to (e.g., the medical team might wish to provide not only urgent care but also treat minor ailments).

In addition, interviewees highlighted that experiences during SAR missions could be difficult, and perhaps even traumatic, especially when the NGO vessel arrived at the scene too late to save people's lives, or when it was not possible to rescue everyone. While ***mental-health related knowledge and skills*** were not mentioned as a training need, interviewees appreciated that mental health and stress management were addressed as part of the training, and that formal and informal support systems (e.g., peer support on board, debriefing at the end of the mission, and access to professional help if/as needed) were available and well developed. This suggests the importance of addressing peer and

organisational support as part of the training and to provide adequate information on what is available and how it is accessed.

The interviews suggested further that all of these areas were addressed in current training. Interviewees did not identify any major "gaps" (in the sense that some essential topics were not addressed at all). However, given the importance they placed on training and safety, there was a sense that "you can never train enough", i.e., more training would always be desirable because you can always practice more and learn more. Moreover, all appreciated the combination of presentations and explanations with practical exercises.

The key challenge that was mentioned by all interviewees related not to the "what" or "how" of the training, but to the limited time available. Currently most of training takes place during an intense training week in the beginning of each mission. This condensed schedule presents challenges for trainers and trainees. For volunteers, the intensity and density of information may be "overwhelming". For trainers, this dense schedule meant that training had to be limited to the basics and to ensuring that trainees could fulfil their tasks and roles safely. Consequently, there was little or no time to cover advanced topics, or to provide more in-depth training (e.g., including an additional training unit with a "surprise scenario" to train how to deal with unexpected events).

The interviews also provided ***suggestions*** concerning possible ways forward to reduce the time pressure experienced during the training week. First, due to the limited time available, different topics "compete" for space in the tight training schedule during the training week. Only the most necessary should be given space in the already tight training schedule. Topics to be included should be selected based on (1) their necessity for crew members' and passengers' safety and well-being in fulfilling their tasks and roles, and (2) whether the topic involves practical skills (e.g., handling of equipment) or knowledge (e.g., spatial knowledge of locations on board) that must be trained on board.

Second, making use of different training modalities (such as synchronous or asynchronous e-learning) could potentially help to distribute the training units so that less time is required during the training week on topics that can be trained equally well online. Topics that might be transferred into e-learning may include:

- General information on the history, purpose and culture of the NGO
- Media training
- Background knowledge concerning life and work on board, such as basic terminology (e.g., bow/stern), functioning of a ship (e.g., stability, water supply, sewage system, routines)
- (Advanced) training or workshops on teamwork, conflict management, diversity and inclusion, and mental health related topics

In addition, the interviews suggested that individual trainers have extensive knowledge and experience about what works (and what works less well) regarding *how* to train a particular topic. Much of the quality of the training therefore currently depends on the pedagogical skills, knowledge and experience of individuals. There is a certain support by the organisation, but there seems to be no systematic way of including lessons about training and training design as part of organisational learning. Therefore, incorporating individual trainers' "know-how" regarding training methods into organisational knowledge and practices (e.g., by documenting best practices and well-working procedures) is important to maintain training quality standards and to avoid the loss of valuable knowledge when individuals leave the organisation.

6.2. Support and training for professional seafarers

The second research question concerned the currently available training and support for professional seafarers in the context of SAR operations involving migrants, and the additional training or resources

that might be needed.

Interviews with experts from different organisations and institutions in the Nordic shipping cluster showed that ***training*** for professional seafarers mostly concentrated on technical aspects of SAR operations, such as planning and conducting a search, or handling equipment (e.g., lifeboats) that might be used in an emergency situation. The training that is provided through maritime educational programmes, as well as through regular refresher courses and drills on board is largely guided by certification requirements.

SAR of migrants might be mentioned occasionally, for instance by guest speakers or in connection with discussions of particular cases (such as the *Tampa*), but it is generally not the main focus. None of the interviewees was involved in, or was aware of, any courses or modules offered at MET institutions that focused specifically on SAR operations involving migrants. Mass rescue situations more generally did not receive much attention either. They might be mentioned in lectures or case discussions, but were not trained with practical exercises. While students learned how to launch their vessel's own rescue boat to evacuate in an emergency, there was little or no training (and, as some interviewees highlighted, no suitable equipment) regarding how to save people who are in the water or on a lifeboat or life float.

The interviews suggested that the ***support*** that is provided by shipping companies encompasses measures intended to create a good work environment more generally, as well as providing professional psychological support if needed and upon request. This is in line with what is legally required of employers based on labour and work environment laws such as the Work Environment Act (*Arbetsmiljölagen*) in Sweden. Although these measures may not have been adopted with SAR situations in mind, they can contribute to enhancing crew members' preparedness and resilience in such situations by providing the basis for a healthy work environment, as well as identifying individuals' and organisations' responsibilities.

In addition to these more general support measures, interviewees mentioned two types of practical support provided by shipping companies that related specifically to the SAR of migrants: providing vessels with information materials and basic guidelines for the SAR of migrants (e.g., ICS, 2015; NSA, 2015; UNHCR, 2015), and a "SAR kit" with basic supplies such as blankets and durable food that had been developed by one shipping company for their vessels.

The interviewees also discussed the ***need for additional training and resources***. They agreed that in the event of a mass rescue or SAR of migrants, a potentially very large number of lives might be at stake. However, the interviewees also recognised that the likelihood that professional seafarers encounter SAR situations during their careers was low, and the likelihood of being involved in the SAR of migrants was even lower, although this might depend on the traffic area of the vessel. Given the time constraints in current maritime education and training, and the constraints provided by current certification requirements, additional SAR training – let alone additional training for mass rescue or SAR of migrants – was not considered a high priority.

In addition, several interviewees noted the shortcomings of current equipment for rescuing people from the water. While this has been discussed since the *Estonia* disaster, some interviewees explained that with the equipment that is currently available, rescuing survivors from the water was still difficult. However, it was also mentioned that there had been an effort several years ago to develop more suitable technical solutions, but these had not been included in relevant legislation, and hence were not used yet.

More generally, interviewees highlighted the need for more practical training and simulator training during maritime training programmes in order to improve students' basic skills. In addition, several interviewees advocated a stronger focus on communication and non-technical skills. Communication (especially radio communication) was highlighted in relation to the cooperation between vessels and other participants (e.g., MRCC) involved in a SAR operation. Non-technical skills, such as decision

making, teamwork and leadership, were discussed in relation to collaboration among crew members, and were considered especially important to allow crews to adjust to unforeseen, complex and dynamic situations, such as SAR.

Further, the interviews pointed to the importance of mental health and the necessity to place a stronger emphasis on reducing mental health-related risks in connection with potentially difficult or traumatic situations. Nevertheless, there was a general lack of means and resources on how to integrate this into training (e.g., lack of time given current certification requirements; lack of specialist knowledge on mental health).

6.3. Lessons for resilience and preparedness for SAR

In this section, we combine insights from the interviews with NGOs and experts from different organisations in the maritime cluster with insights from the literature study of previous research on training, support, preparedness and resilience in the context of maritime SAR and other high-risk operations. Based on this, we consider how training and support can contribute to enhancing the resilience of crew members – both professionals and volunteers – in complex, dynamic and highly uncertain situations. We start by considering insights that apply to crew members in both contexts (i.e., both in SAR NGOs and in commercial shipping), and then discuss insights and lessons learned for commercial shipping more specifically in section 6.3.5.

6.3.1. From “preparedness” to “resilience”

The results show an emphasis on “being safe” both in everyday work and life on board, and in emergency situations. To achieve this, the focus is on preparedness training, which provides crew members with practical skills (e.g., donning protective equipment, launching a lifeboat) and knowledge of procedures for routine operations and for SAR situations. This focus can be found both in the education and training of professional seafarers and of volunteers in maritime SAR NGOs.

At the same time, the expert interviews highlighted that by their very nature as complex, dynamic situations with a high degree of uncertainty, SAR and other emergency situations may be difficult to prepare for. Discussing the difficulties encountered by the *Costa Concordia* crew in the unexpected absence of clear leadership, Bartolucci et al. (2021) suggested that emergency plans should be prepared to cover different scenarios. For instance, there might be a standard plan for a particular scenario (e.g., abandoning ship), as well as back-up plans for different variations of this scenario (e.g., for situations when leaders are unable to fulfil their leadership role). However, this approach may be limited in practice by the ability to foresee different scenarios, and to prepare a plan for each combination of possible scenario characteristics. As pointed out in the interviews, each emergency situation is likely to have unique features. Hence it cannot be expected that all aspects of a real-world situation will be fully covered in standard scenarios and that crew members can go strictly “by the book” when facing an emergency situation. In addition, interviewees noted practical limitations for training complex emergency situations (e.g., how do you train for a mass rescue situation with several hundred people in the water?). In other words, the interview findings suggest that not everything may be “trainable”.

This raises the question of how to train for such situations. This question was not only raised by our interview findings, but is also a question that is at the core of current research on resilience. While preparedness and resilience overlap to some extent, the resilience perspective entails a fundamental shift by emphasizing the importance of strategies that allows crew members to deal with variation – both small variations that may occur as part of routine work, and more dramatic variations presented by emergency situations.

The interviews suggested three basic approaches for training, which were linked to different levels of prior knowledge and skills of the trainees. For beginners, the focus was on basic skills, routines and procedures for standard scenarios. This was emphasised in the training of SAR NGO volunteers, as well as in the training of professional seafarers in maritime education programmes and in regular drills on board. There are several assumptions underlying this approach. First, basic skills provide the foundation – without basic skills, it is not possible to tackle more complex and demanding situations. Second, it is assumed that regular repetition of basic skills and routines will lead to internalisation, so that they will be triggered even under stress. Third, it is assumed that basic skills can be extended and/or recombined to enable crew members to deal with novel and more complex situations. While basic skills are undoubtedly important, our literature study showed that we still know very little about the effectiveness of different training methods with regard to retention (i.e. remembering what was learned) over time (Sanli et al., 2019; Smith et al., 2019), let alone remembering in stressful situations, or whether training in basic skills is sufficient to enable trainees (perhaps many years later) to transfer and apply those skills in real world situations, or to extend or recombine these skills to deal with more complex situations (Praetorius et al., 2020).

Another approach was to expose trainees to more complex, stressful scenarios, where several events occurred simultaneously. This approach appeared to be less common, and was usually used for more advanced trainees who already had some basic knowledge and skills (e.g., professional seafarers; advanced students in MET programmes). The approach was described in connection with certain onboard drills (where scenarios were designed by crew members) and in connection with simulator scenarios in some MET programmes. The aim was partly to get students to experience and reflect upon their own and others' reactions in a stressful situation, and partly to train how to deal with complex situations, for instance through the division of tasks among team members. While instructors recognised the potential value of such complex scenarios, they also noted the importance of carefully designing the scenario in relation to the learning goals, and to adjust it to the students' level of knowledge and skills. Moreover, the possibilities for training such scenarios were limited by time constraints in MET programmes, as well as by technical and practical possibilities. As with the first approach, we know little about the effectiveness of this type of training with regard to remembering (retention) and transferability to real world situations (Praetorius et al., 2020).

The third approach was adopted in the initial phase of the SSRS and the Swedish Coast Guard's SAR operations in the Mediterranean. As described in the interviews, this was a phase when crew members were faced with new situations. As established routines and procedures were not necessarily applicable, it was important to be flexible and adapt to the demands of these new situations. Here the SSRS and the Coast Guard did not so much rely on training but on the selection of individuals who were highly experienced with SAR and/or dealing with extreme situations. Knowing how to keep safe, the ability to quickly assess a situation, and to improvise were emphasised as important. In addition, interviewees highlighted the importance of being able to rely on other crew members and to work as a team. As pointed out by one interviewee, training of technical skills was not sufficient to deal with novel, complex and dynamic situations. Instead, mutual trust, support and a sense of psychological safety were highlighted as preconditions that made it possible to openly discuss and collectively learn from problems and challenging situations. Here the pre-study pointed to the importance of the social aspects of resilience, i.e., the importance of mutual trust, social support and psychological safety as the basis that allows teams to adapt to sudden changes and cope with disturbances (Pauksztat, 2022). While trust, social support and psychological safety are beginning to receive some attention in connection with well-being initiatives (McVeigh et al., 2020), our interview findings suggest that they may also be fundamental to enable resilient behaviours at the crew level. The benefits of trust, social support and psychological safety in general are well-established (e.g., Cohen et al., 2000; Edmondson and Lei, 2014; Gausdal and Makarova, 2017; Håvold, 2015; Pauksztat et al., 2022b). However, more research is needed to gain a better understanding of their role in enabling resilience, as well as of the factors contributing to their development. Initial findings suggest that these are promoted by

sufficiently high manning levels, HR practices (e.g., permanent contracts; repeated assignments to the same vessel) and opportunities for joint leisure activities (Pauksztat and Grech, 2022). However, more research is needed to further explore the interplay between different factors contributing to resilience, and how these, in turn, can be promoted.

In sum, the pre-study highlights the need for a better understanding of the effectiveness of different forms of training, especially training with a view to enable resilient behaviours in SAR and other emergency situations. This concerns both the retention and transferability of knowledge and skills acquired through training.

Moreover, the pre-study suggests that training in itself may not be sufficient to enable crews to deal with novel, complex and dynamic situations. Instead, the findings point to mutual trust, social support and psychological safety as key pre-conditions for achieving resilience. More research is needed to gain a better understanding of their role in enabling resilience, as well as of the factors contributing to their development.

6.3.2. Communication, coordination and collaboration

Communication, coordination, and collaboration, both among crew members and with other SAR units and shore-based organisations, was identified as a key ingredient for ensuring flexibility and adaptability in the light of situations characterised by a high degree of complexity, changeability and uncertainty.

Interviews with SAR NGOs highlighted the importance for crew members to become a “team”. Good coordination and collaboration among crew members were considered essential to ensure the safety of everyone on board, as well as for the success of missions. According to the interviewees, on the international SAR NGO vessels, the team building process started during the training week. By practicing together, crew members did not only acquire, refresh, or maintain practical skills, but also got to know each other and learned to trust each other. This team building was one of the reasons why everyone (including experienced crew members) was expected to participate in the training.

While team building was a central topic in the interviews with SAR NGOs, this did not emerge as an equally central topic in interviews with maritime education and training instructors, although SAR-related simulator training was carried out in teams. Perhaps this was due to the fact that the interviews focused on SAR. Non-technical skills related to coordination were addressed in dedicated CRM/BRM courses, while SAR-related courses often concerned more technical skills (e.g., planning a search, search patterns), hence interviewees may not have thought of discussing non-technical skills when they were asked about SAR. Another possibility is that this reflects a true difference in perspective between SAR NGOs and MET institutions: MET institutions seek to train students in particular (transferable) skills, which students are expected to apply in a variety of settings throughout their career. In this context, team building among (temporary) bridge teams composed of students for a particular exercise is not a primary concern. By contrast, on SAR NGO vessels who are about to embark on a SAR mission, team building among the individuals on board is of utmost importance.

Communication, coordination, and collaboration between different SAR units and shore-based organisations that participate in a rescue was a central theme in our literature study. It was also highlighted in the interviews, both by instructors at maritime education and training institutions, and from an MRCC (or, in Sweden, JRCC) perspective. Interviewees highlighted the importance of communication, as well as the fact that communication could be an especially challenging aspect of SAR simulator exercises for students and in large-scale SAR exercises, as well as in actual SAR operations.

Taken together, the results of the pre-study highlight communication, coordination, and collaboration,

both within and between SAR units and organisations, as essential for safe and effective SAR operations. Moreover, underlining the point made in 6.3.1., and in line with previous studies (Steen et al., 2022), the results suggest that providing individuals with technical skills and standardised non-technical skills in courses such as BRM/CRM may only be the first step. This should be followed by team building among those actually working together on a particular vessel, and among members of different organisations who cooperate in a SAR mission.

6.3.3. Organisational learning

As emphasised in the resilience engineering literature, the ability to learn from what has happened is a key characteristic of resilient behaviour (Hollnagel, 2011). Learning as a cornerstone of resilience incorporates both learning from incidents and unanticipated events, as well as from everyday work and anticipated situations. Learning is important for individuals, as well as for teams, organisations and networks of organisations who are involved in a SAR operation. Learning allows to prepare suitable responses for future events, as well as to monitor progress and, if necessary, reconfigure potential responses and resources.

Learning can occur informally, for instance when individuals reflect privately upon their experiences and what they might learn from them, or when crew members talk informally (e.g., over a meal or a coffee in the mess or during their watch on the bridge) about events that they experienced or heard about. Learning can also be organised as part of a formalised system. An example are debriefing sessions where those involved in an event get together to discuss what happened, what went well and what went wrong, and what can be learned from the event.

Interviews with SAR NGOs suggested that learning took place at the individual level, as individual crew members learned from their own and their fellow crew members' experiences during the mission. To make the step from individual to organisational learning, the new knowledge, skills, procedures, and solutions developed by individuals must be transferred to and incorporated by the organisation. The interviews include several examples of successful organisational learning. For instance, during the initial phase of the SSRS' SAR mission in Greece, interviewees described that participants set aside time for regular debriefings, usually in the evening after an SAR mission. This sometimes included revising the scene of a rescue to discuss and practice newly developed approaches and techniques in situ. Insights were fed back to the organisation in Sweden in "real time" through photos and videos that documented the new techniques and procedures. In this way, the learning was incorporated into the organisation's body of knowledge, and could be shared with future SAR volunteers who went to Greece.

Another example from the interviews concerned creating a supportive culture that allows discussing issues related to mental health and well-being; this included formal debriefing/defusion meetings, buddy systems, as well as informal interactions. The importance of this was highlighted during the SSRS' time in Greece. The lessons learned with this in the Mediterranean prompted the SSRS to put a stronger emphasis on this also at home in Sweden and to integrate this into the organisation.

A third example, from an international SAR organisation in the Mediterranean, concerns organisational learning from mission reports and accident reports. Interviewees described that the shore office was in almost continuous contact with the crew on the vessel in the Mediterranean, and in this way received information about events in real time. Insights from this, as well as from reports about accidents and near-misses, was reviewed and discussed regularly at meetings in the shore office, and steps were taken to incorporate lessons learned into the training (e.g., a new online learning module) and/or operational routines.

The interviews also included examples where the step from individual to organisational learning may not have been quite achieved. For instance, while in one SAR NGO the training topics to be addressed

during the training week were set by the NGO, it was up to the trainers to decide how to carry out the training. Individual trainers develop a suitable approach from their own experience, from observing others, or from remembering training units in which they participated in the past. However, if their approach is not be recorded (e.g., included in a "trainer handbook" compiled by the organisation) or shared with others (e.g., through informal discussions with other trainers during handover), their insights may not become part of the organisation's knowledge, and may be lost to the organisation if they move on to a different job or volunteer position.

In commercial shipping, interviewees noted that crews, organisations and (if relevant) accident investigation authorities carried out analyses of root causes in the aftermath of an adverse event. Accident investigation reports from larger events were also used to inform policy discussions in the IMO and other relevant institutions, and might lead to changes in regulations. However, the interviews suggested that accident reports were less frequently used as a learning tool by other shipping companies (i.e., other than the companies directly involved in the event) or seafarers. This is in line with research by Mallam et al. (2022) who found that officers rarely used accident reports as a way of learning, but preferred to learn in other ways, for instance by sharing personal experiences (see also Sellberg and Wiig, 2020, on storytelling in connection with debriefing of simulator exercises). Further, as also noted by Lundberg et al. (2009, 2010), accident analyses normally incorporate an accident model, which both guides what causes are identified and what measures are taken in the aftermath. This might hinder effective learning (Schröder-Hinrichs et al., 2012).

In sum, the pre-study suggests that individuals and organisations use several strategies for learning from events. A formal structure for how to learn from accidents, incidents and near-misses is normally available through the mandatory Safety Management System. However, how to learn from successes and from what works, as well as from what worked despite an adverse outcome, are often missing.

Moreover, the results underline that the communication between individual crew members and the shore office is essential to enable organisational learning, i.e., the incorporation of lessons learned by a particular individual or crew into the body of organisational knowledge and practices (Olsson & Praetorius, 2021).

6.3.4. Mental health

SAR operations may not only be technically difficult and risky, but difficult or traumatic experiences can also have an impact on crew members' mental health. SAR situations involving children, triage situations, and/or situations where it is only possible to recover bodies were mentioned as especially difficult for rescuers.

In previous studies on seafarers' mental health, the focus has been on individuals' mental health and their ability to endure under adverse conditions. Selecting individuals with the "right" personality traits, such as "hardiness" and "psychological resilience", has often been advocated as the main solution for increasing the resilience of individuals and, consequently, of crews (Rozanov, 2020; Saus et al., 2012). More recently research has started to explore an alternative perspective, which highlights the role of a good work environment in preventing or reducing mental health problems, and in mitigating their negative effects (Lefkowitz and Slade, 2019; Pauksztat et al., 2022b; Sampson and Ellis, 2021; Tang et al., 2022). Moreover, it is important to remember that a crew is an interdependent team, rather than a set of unconnected individuals (Pauksztat, 2023) - hence crew resilience cannot simply be equated with the sum of individual crew members' psychological resilience.

The pre-study highlighted the importance attached to crew members' mental health by the organisations that were involved in SAR operations in the Mediterranean, and the measures taken for that purpose. This included peer support systems, an open and supportive culture, as well as the systematic use of debriefing and defusion sessions. These sessions allowed crew members to express

and process their thoughts and feelings in reaction to their experiences during the mission. This "mental first aid" was intended to reduce the risk of mental health problems (e.g., PTSD) later on (Diagne et al., 2021; Teperi et al., 2019). Interviewees noted that their organisations' experiences with mental health support in the Mediterranean subsequently also led them to pay more attention to these issues in their work at home.

While there is a lack of research on the effectiveness of mental health interventions in the context of commercial shipping (for an exception, see McVeigh et al., 2020), the pre-study suggests that debriefing / defusion and onboard peer support may be beneficial. Enabling crews to take action themselves may be especially important because fellow crew members are physically present and thus able to interact face-to-face. By contrast, communication with shore-based professional psychologists is dependent on a reliable and fast internet connection, which may not always be available. While onboard peer support may be helpful in reducing or mitigating mental health problems, the results of the pre-study suggest that mental health related issues are only addressed in a relatively superficial way in current maritime education and training (see also Abila and Acejo, 2021).

In sum, the results of the pre-study highlight the need to prevent mental health problems in the aftermath of SAR operations, which may involve difficult and potentially traumatic experiences. This might include a stronger emphasis on teaching debriefing and defusion during maritime education and training. Moreover, more research is needed to understand how to promote seafarers' mental health, for instance through interventions and/or characteristics of the work environment.

6.3.5. Insights and lessons learned concerning commercial shipping

As discussed above, SAR training as provided today is mostly characterised by exercises and onboard drills focused on specific technical skills, rather than on the non-technical skills that may be needed for a successful mission. The focus is on the own vessel and scenarios such as "man over board" or the evacuation of one's own vessel, rather than on the rescue of a large number of people (e.g., migrants) from the water or from lifeboats. Training scenarios, especially during drills on board, are characterised by what is required based on the company's Safety Management System (SMS), but usually do not consider more complex and evolving scenarios.

As emphasised in the resilience engineering literature (e.g., Woods, 2018), adaptability and flexibility arise through the redistribution of resources in evolving situation, or when systems or teams "gracefully extend" when faced with stressors. This focus seems to be lacking from current training approaches and might be worthwhile exploring.

Furthermore, current training for SAR operations focuses primarily on prevention, and thereafter on procedures for handling an emergency, but does not address the aftermath of emergency situations. As emphasised in the interviews with the NGOs, the rescue itself might not be as demanding for the crew as the accommodation of migrants on board over several days, or dealing with the mental impact of SAR operations. Moreover, knowledge and skills specific to the SAR of migrants are not provided (e.g., how to prevent commotion and panic on a migrant vessel when approaching it and disembarking people onto one's own vessel). Thus, training needs with regard to the potential effects of participating in SAR and other high stress scenarios should be explored further. Training for resilience is another area that needs to be explored further. Ongoing research has started to explore resilience as an alternative to generic non-technical skills and CRM/BRM training (Griffioen et al., 2021; Praetorius et al., 2020; Wachs et al., 2016), but there is not yet any empirical evidence of the effectiveness and efficiency of such training.

Support from the shore organisation, such as providing a sounding board, decision making support, dealing with media inquiries and providing additional resources, is relevant and requires a deep understanding of how crews may be affected by participating in SAR operations. Based on the current

body of research, this area seems not well developed and companies today base their measures mostly on previous experiences. Thus, questions regarding how best to support crews during SAR operations involving migrants and other high stress situations should be explored further. Moreover, from a resilience perspective, it is noteworthy that current SMS regimes provide procedures for specific types of emergencies. Here it might be worthwhile to consider what types of resources (such as additional equipment, organisational functions, work procedures, etc.) would be required to allow crews to remain flexible and adapt to different emergency situations. A starting point for this might be found in Westrum's (2006) typology of resilience situations, or in the work of Provan et al. (2020) who provide practical guidance on how to complement centralised safety management system approaches with organisational measures and structures promoting resilience, or Safety-II.

The interviews further suggested that to access mental health support, crew members had to get into contact with shore-based health care services either directly or through the shipping company's shore office. Given the lack of knowledge about mental ill-health and the stigma still attached to mental health problems, it is possible that not everyone who would need support will actually seek support. Alternatively, the Master can step in to encourage crew members to seek support, and/or arrange support for one or more crew members if needed. The Master's ability to "read" their crew members and recognise problems is based on knowing their crew members, as well as on crew members' trust and willingness to confide in the Master. As in section 6.3.1 and 6.3.2., this again emphasises the need for leadership skills as well as the need for mutual trust.

Further, in light of the importance of organisational learning to be able to develop and monitor potential and actual responses in high stress situations, such as SAR, it is important to consider how briefing and debriefing can become tools to enable and support an effective learning culture, both among crew members on board and between ship and shore. In maritime education and training programmes, debriefings are already well-established as occasions for learning, and are used in this way for instance in connection with simulator exercises (Sellberg, 2018; Sellberg and Wiig, 2021). By contrast, the use of defusion seems less widespread. It is generally not included in maritime education and training curricula, and it is not generally used in the aftermath of SAR and other emergency situations on board. Given the usefulness of defusion as "mental first aid" to prevent more serious mental health problems later on, its use might be explored further.

6.4. Recommendations and directions for future research

As discussed in sections 6.1. to 6.3., this pre-study led to a number of suggestions and recommendations for improving training and support related to high-stress, high-risk operations such as SAR in general, and SAR of migrants more specifically. In addition, relevant directions for future research were identified. This final section summarises some of the key recommendations and suggestions for future research.

General recommendations

1. Preparedness and resilience require procedures and resources that enable the crews (both on NGO and commercial vessels) to adapt and act flexibly in evolving complex and uncertain situations, such as SAR. Training of standardised technical and non-technical skills needs to be complemented by team building and by continuous learning at the individual, crew and organisational level.
2. To promote resilience, close attention should be paid to practices and structures for organisational learning that allow the incorporation of lessons learned by particular individuals or crews into the body of organisational knowledge and practices. This should include learning from successes and from what works, as well as from what worked despite an adverse

outcome.

3. Communication, coordination and collaboration during emergency situations, as well as learning from such events are essential for successful SAR and other high-stress situations. To enable this, a working environment characterised by mutual trust, social support and psychological safety should be created.
4. Crew members should have access to fast and reliable means of communication between ship and shore. This is essential for enabling communication, coordination and collaboration between the vessel and others involved in emergency situations. It is also vital in the aftermath of emergencies to allow crew members unimpeded access to informal social support (e.g., from family and friends) and/or professional support.

Recommendations for SAR NGOs

1. To ensure the effectiveness and efficiency of training, decisions about training development should be based on systemically assessed training needs.
2. Individual crew members have extensive knowledge and experience, for instance regarding training methods (i.e., how to train a particular topic). Incorporating this into organisational knowledge and practices (e.g., by documenting best practices and well-working procedures) is important to maintain training quality standards and to avoid the loss of valuable knowledge when individuals leave the organisation.
3. To reduce overload during onboard training, only the most necessary topics should be included. Topics should be selected based on (1) their necessity for crew members' and passengers' safety and well-being, and (2) whether the topic can only be trained on board.
4. Different training modalities (e.g., synchronous or asynchronous e-learning) can be used to spread out training over time, for topics that can be trained online. This will reduce the overload during the onboard training week, especially for volunteers.

Recommendations for commercial shipping

1. There is currently little attention to preparedness for mass rescue situations and SAR of migrants, for instance with regard to equipment for taking people on board from the water or from a lifeboat, and with regard to training. In particular, there is little attention to the aftermath of mass rescue situations, such as how to interact with and accommodate rescued migrants.
2. To achieve resilience, measures taken should go beyond the commonly practiced drills and consider how to reconfigure work processes in high-stress situations such as SAR, and what additional training and resources will be needed to that end.
3. Ways of incorporating a stronger focus on mental health in MET programmes should be explored. This should include training on ways of reducing mental health-related risks in connection with difficult or traumatic situations.
4. Peer debriefing and defusion, especially in the aftermath of high-stress situation can provide "mental first aid" and as well as a way of learning from SAR operations and emergency situations. Suitable structures and processes for conducting peer debriefing and defusion on board and for incorporating them into MET programmes should be explored.
5. Collaboration, communication and coordination both within and across organisations should be supported by organisational structures, procedures and resources.

Directions for future research

1. A deeper understanding of the relationship between individual-level, team-level and organisational-level resilience is needed to shift the focus from preparedness for specific

scenarios to resilient behaviour in complex, dynamic situations such as SAR.

2. How training can contribute to preparedness and resilience in complex, dynamic situations with a high degree of uncertainty is still an under-researched topic. In particular, a better understanding of the effectiveness of different training approaches with regard to retention (i.e., retention over time and in stressful situations), real-world transferability and extensibility of knowledge and skills to new situations is needed.
3. More research is needed on what types of resources (e.g., equipment, procedures, etc.) would be required to allow crews to remain flexible and adapt to different emergency situations.
4. Mutual trust, social support and psychological safety provide the basis for resilience. More research is needed to explore how these can be promoted, for instance through the work environment on board or through human resource management (HRM) measures (e.g., types of contracts).
5. While attention to seafarers' mental health has increased over the past few years, we still know little about the effectiveness of mental health interventions and the contributions of particular aspects of the work environment in promoting seafarers' mental well-being.

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*Note: * indicates articles identified in the literature search, see section 2.1.*

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ABOUT VTI

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