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Review Article

Mental Health in Fishing Communities: An Overview of Current Knowledge and Information Gaps for Fisheries

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Fishing depends on unstable natural water resources and changing socioeconomic dynamics within and beyond the fishing environment. Changes in the aquatic and socioeconomic environments have effects on the physical and mental health of fishers and the sustainability of fisheries. This scoping review aimed to: a) identify the breadth of mental health aspects in fisheries literature, b) establish the geographic focus of fisheries mental health literature, and c) examine the factors responsible for the global disparity in fisheries mental health literature. Eighty-three mental health studies, dominated by research from Europe, North America, Africa, Latin America, Australia, and Asia, were noted from over 7,452 fishing community health studies. The literature is lopsided towards the physical rather than the mental health of fishers. The paucity of mental health literature for fishers emanates from the complexity of assessing the mental health of a specific group, which encompasses confounding, associated, and risk factors. With prevailing climate change, economic uncertainty, and post-COVID-19 effects, mental resilience is important for the recovery and sustainability of fisheries. There is a need for the development and integration of fisheries-specific mental psychometrics into broader schematic health, scientific, and social well-being frameworks for fishing communities to enhance mental resilience to environmental, economic, and health challenges.

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Introduction

Fishing, both small-scale and commercial, is a hazardous industry, as evidenced by the international workforce injury data which indicates that injury and fatality rates are much higher in the fishery sector than the national averages for all workers in several countries (International Labour Organisation, 1999). Roberts (2002; 2010) and (McGuinness et al., 2013) indicated that fishing involves ergonomic, physical, chemical, and biological risks as fishers work for long hours in extreme weather using heavy machinery, which contributes to high mortality and injury rates. Fishers endure long working hours in water and continue to work even in the face of bodily pain, ailments (including musculoskeletal disorders), and illness (Roberts, 2010). Fishing-related workplace physical injuries and chronic health problems, including HIV/AIDS (Allison and Seeley, 2004; Speir et al., 2020), are well documented. However, there is limited emphasis on the mental health aspects in global fishing communities (Woodhead et al., 2018; Speir et al., 2020; King et al., 2021). Mental health includes the emotional, psychological, and social well-being of an individual or society (Abas et al., 2014; Speir et al., 2020). It affects how we think, feel, and act and helps determine how individuals handle stress, relate to others, and make choices (Abas et al., 2014). Thus, any mental health disorders in an individual have negative effects on the mental health of the community, a prevalent case in

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high-risk occupations such as fishing (Woodhead et al., 2018).

High chronic job insecurity, concerns over tenure security of fishing concessions (e.g., licences, permits, and quotas), and severe anxiety over changing environmental conditions leading to a mental health crisis and high rates of suicide and violence have been reported among small-scale and large commercial fishers (King et al., 2015, 2021). Mental health problems such as anxiety, stress, fatigue, and depression are prevalent among fishers dependent on shared or common and open-access natural fisheries and water resources (King et al., 2015, 2021). Associated and risk factors predetermining mental health in fishers include the high costs of fishing licences, restricted access to fishing zones, unstable and vague government policies on fisheries, market volatility, postharvest perishability, and large by-catch volumes (Kilpatrick et al., 2014; King et al., 2015, 2021). Antecedent factors impacting mental health disorders in (and among) inland fishers relate to the erratic water supply, disproportionate water allocation and water governance disparities, and natural climatic variability, alcoholism, smoking, and poor diet (Addis and Mahalik, 2003; King et al., 2021). Regardless, risk, associated, and antecedent factors inducing mental health disorders vary in fishing communities depending on other socioeconomic, cultural, and political factors in an area (Speir et al., 2020).

Despite a significant proportion of the global human population being artisanal and commercial fishers, and the attendant high health risks involved in their work activities, there are still only a few studies on the mental health aspects of fishers (Woodhead et al., 2018). It is imperative to note that physical health is also affected by mental health, and in turn, physical health also affects the mental health of an individual (Abas et al., 2014). Thus, a review of the mental health of fishers may help determine the factors to explain the resilience and sustainability of fisheries. This scoping review examines existing literature on mental health in global fishing communities. The aims were to: a) identify the breadth of mental health aspects in fisheries literature, b) establish the geographic focus of the fisheries mental health literature, and c) examine the factors responsible for the global disparity in fisheries mental health literature.

Materials and methods

This research used a scoping review, a synthesis-based approach to build new knowledge on the mental health of fishers from an examination of existing literature (Gough et al., 2012). We started by formulating the research question: What is the state of knowledge on the mental health of fishers on a global scale? Afterwards, we generated a protocol and carried out a logical selection of relevant information, critical appraisal, and dissemination of results. We conducted our exploratory search in Google Scholar, Scopus, Bing, and GiveWater, and the Boolean search engines in order to combine the words AND, NOT, OR, and the commonly used ISI Web of Knowledge (ISI WoK) databases with no historical cut-off dates. The search engines were chosen based on their extensive coverage and high recognition as standardized databases for conducting meta-analyses.

We searched for studies focusing on health and fisheries with further searches for mental health in all coupled (using AND, NOT, OR) subgroups which comprised: ''limnology-fish", ''water resources conservation-human health", ''fisheries-mental health", ''aquatic health-mental health", ''aquatic resources-human health", and fisheries researches including ''fishers-health", ''fisherfolk-mental health", ''fishermen-human health", ''fisherwomen-human health", ''fishing sector-human health", and ''fishermen-mental health", ''fishers-depression", ''fisherfolk-anxiety", ''fishermen-distress", ''fishers-trauma", ''fisherwomen-depression" together with technical reports on ''human health in fisheries worldwide"; see Arksey and O'Malley (2005) and Woodhead et al. (2018). We found that some of the coupled terms, e.g., ''fisherfolk-anxiety", ''fisheries-trauma", and ''water resources conservation-human health", produced a lot of background noise and conjoined other non-relevant information for the study and discarded them. We did not discover additional terms that relate to the mental health of fishers in global fisheries. The final search terms used were as follows: ((((fisheries, fishers, fisherfolk, fishermen, fisherwomen, anxiety, trauma, distress, stress, and depression AND ("mental health in fisheries and fishers*").

Document selection

For item and document selection, we used the keyword search methods in the same search engines above, limited to the title, abstract, and keywords. From an initial list of 7,452 articles, the abstracts were screened for relevant items that could be classified or mentioned mental health in fisheries and among fishers in the world. The rationale was to screen the data set to manageable and relevant sizes. After thorough screening, a total of 83 items were used to reflect the breadth of the context citing mental health in fisheries and fishers. An article was included if it met the following criteria: (a) it was published in a reputable journal, international organisation technical report, or a book, (b) relevant conference proceedings on the mental health of fishers, and (c) credible mental health reports in citable technical

reports of reputable organisations. The review excluded media reports as they are not citable.

Data analysis

Thematic cluster analysis

The Analysis of Qualitative Data (AQUAD 7) was used to come up with the main topics or thematic clusters for discussion in this study. From the analyses, there was a significant frequency of recurrence (Friedman ANOVA, $p<0.05$) for the following clusters related to the mental health of fishers: Geographical location, Ignorance of mental health of fishers, Paradigm shifts in fisheries, and Human health and behaviour. The theoretical clusters were subsequently discussed whilst the geographical influence on the availability of mental health data on fishers was analysed as explained below:

Hotspot mapping of geographical distribution of available literature

We conducted a hotspot analysis to determine the geographical disparities in the numbers of published articles related to the phenomenon using a combination of two indicators of spatial association, the Moran I index and the Getis-Ord technique. Spatial statistics distinguish two different kinds of spatial effects, that is, spatial interaction (spatial autocorrelation) and spatial structure (spatial heterogeneity). Moran's I, indicated in Equation 1 below, is a correlation coefficient that measures the overall spatial autocorrelation of data sets, in terms of dispersion or clustering (Moran, 1950; Mitchell, 2005; Li et al., 2007).

Equation 1:

$$I = \frac{1}{s^2} \frac{\sum_i \sum_j (y_i - \bar{y})(y_j - \bar{y})}{\sum_i \sum_j w_{ij}}$$

Where: S^2 refers to the variances within the sample, ***i*** and ***j*** are spatial units, ***y*** is the variable of interest, and ***wij*** is the summation of ***i*** and ***j***.

The Getis-Ord in this study used the actual raw values, which were the numbers of relevant published literature on the mental health of fishers and fisheries in each of the regions comprising Asia, Latin America, North America, Europe, Africa, and Australia, as the units for the calculation of Getis-Ord Gi* scores (Z scores). The Getis-Ord Gi* is a distance-based statistic that is usually used to detect hotspots and coldspots of phenomena distributed in space (Getis and Ord, 1992). The Getis-Ord Gi* statistic was computed using the following algorithm in ArcGIS 10.1. The fixed distance band under the conceptualization of spatial relationships and the Manhattan distance method by Mitchell (2005) were used.

Equation 2:

$$G_i^*(d) = \frac{\sum_j w_{ij}(d)x_j - W_i^* \bar{x}^*}{s^* \left\{ \left[\left(nS_{1i}^* \right) - W_i^{*2} \right] / (n-1) \right\}^{1/2}}, \text{ for all } j, x_j \neq$$

Where Gi* (d) is the local G statistic for a feature (i) within a distance (d), and Wij (d) represents the spatial weight for the target-neighbour i and j pair.

To improve the statistical testing, Ord and Getis (1992) developed a z-transformed form of Gi* by taking the statistic Gi* (d) minus its expected value, divided by the square root of its variance. This Z (Gi*) transformation, termed the standardized Gi* statistic, is given by the equation above. A positive Gi* score, as well as a positive Moran I value, will be indicative of clustering of near-similar data. Finally, the narrative analysis and directional recommendations were made in a global context.

Results

From the AQUAD analyses, there was a significant frequency of recurrence (Friedman ANOVA, $p<0.05$) for the thematic clusters related to the mental health of fishers, i.e., geographical location, ignorance of the mental health of fishers, paradigm shifts in fisheries, and human health and behaviour. From eighty-three (n=83) studies mentioning the mental health of fishers, twenty-nine (n=29) were from Europe, seventeen (n=17) in North America, eight (n=8) were done in Latin America, and eight (n=8) were done in Africa, with seven (n=7) done in Australia and three (n=3) done in Asia. Eleven (n=11) studies, mostly review papers, considered the mental health aspects of fishers and fisheries. Thus, the hierarchical order of frequency of publications on mental health aspects of fishers (disregarding the global sources, which were considered neutral as they are cross-cutting continents) comprised Europe, North America, Africa, Latin America, Australia, and Asia.

Most of the literature was published in the last two decades. No studies were detected in the reviews that specifically dealt with measuring or evaluating the mental psychometrics of fishers, their immediate families, and the entire fishing communities on a global scale, except for King et al. (2021) in Australia. This research opted for contiguity-based spatial weights, as the interest lay in understanding spatial interdependence between the number of studies on mental health within fisheries and among fishers and their respective spatial locations. Most studies detailing the mental health of fishers were clustered in North America and Europe (Figures 1 and 2). Despite notable differences in the

number of studies carried out across the different continents, the spatial weights matrix generated indicated that there was low clustering among continents with the greatest distances from each other (Figure 3). The inverse was also true, as conceptualised in the relationship between Africa and Europe (0.225), North and Latin America (0.28), compared to Asia and Latin America (0.1), which were low when compared across the study areas (Figure 3).

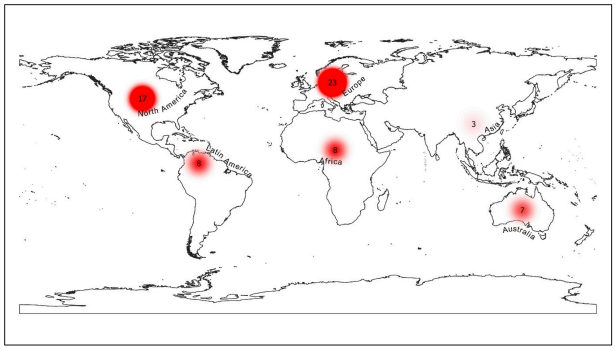

Figure 1. Hotspot analysis of mental health in fishers across the global spectrum.

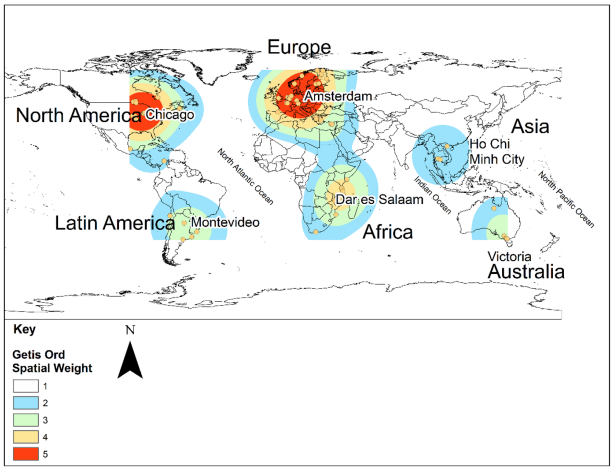

Figure 2. Contiguity-based weighting of global studies on mental health of fishers.

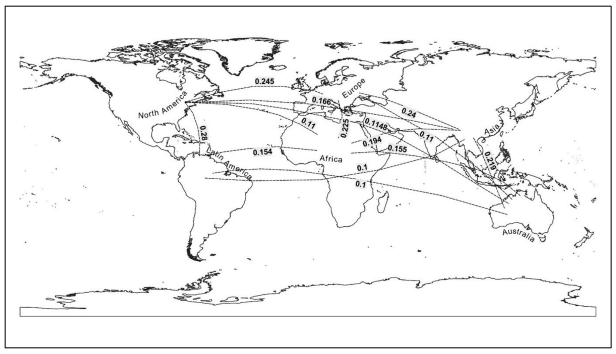

Figure 3. Morista I-index values of global studies on the mental health of fishers.

Discussion

Geographical context and breadth of mental health aspects in fisheries literature

Europe

The mental health aspects, mainly fatigue and psycho-emotional strain, of fishers in European waters were reported by Allen et al. (2010) and á Høvdanum et al. (2014). The mental health aspects were associated with long working hours (24-96 hrs) with little or no restorative sleep among fishers (Committee on Fishing Vessel Safety, 1991; Allen et al., 2010). Sąlyga and Kušleikaitė (2011) in Lithuania found that older fishers in the 35-54 years old category were more likely to experience mental health disorders such as psycho-emotional strains relative to the younger fishers aged 20-34. Mental and physical health complaints of fishers at sea, comprising insomnia, depression, waist, and spinal pain, were related to psychoemotional strain, but sleep disorders were associated with fatigue (Sąlyga and Kušleikaitė, 2011). The same study (Sąlyga and Kušleikaitė, 2011) indicated that demographic data and detrimental factors such as loud engine vibration and sea waves induced psychoemotional strain among fishers and seafarers, indicating that a combination of risk and associated factors affect the mental health of fishers.

Frantzeskou et al. (2012) indicated that stress, depression, and anxiety are prominent risk factors associated with the health of Greek fishers, with a higher prevalence of physical health risks such as excessive weight, cardiovascular incidents, and dermatological, musculoskeletal, respiratory, and hearing problems receiving more attention, with less focus on mental health disorders. Percin et al. (2012) detailed the health problems in Turkish Aegean small-scale fisheries and

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highlighted that most fishers complained of a significant number of physical health problems such as musculoskeletal disorders and have unhealthy lifestyles with high intake of alcohol, rife prostitution, and excessive tobacco consumption. Percin et al. (2012) did not attempt to link the unhealthy lifestyles and the mental health state of the fishers. This masks the psychosocial impact of lifestyles on the productivity of the fishers and their adaptability to the vagaries of the Aegean Sea.

Novalbos et al. (2008) evaluated the health status, safety, and working conditions in the Andalusian fishing section in Spain and recorded a high prevalence (87% out of 247 responses) of self-reported medical problems, mainly diabetes, angina, depression, anxiety, and stress, poor on-board dietary intake, and frequent smoking. The high levels of self-reported medical conditions reflected a potential failure of health checks and a complete absence of pre-employment checks for the fishers (Novalbos et al., 2008). The high prevalence of mental health disorders indicated high levels of stress among the fishers, which may be related to the high competition for access to fishing zones, fatigue related to the long working hours (Poulsen et al., 2014), and economic upheavals in Europe, which severely depressed the market prices of fish, leading to massive job layoffs among fishers in Spain and other surrounding countries (Novalbos et al., 2008; Frantzeskou et al., 2012; Percin et al., 2012). Shapovalov (1992) indicated the high levels of traumatism associated with fatalities, fatigue, depression, and anxiety associated with long working hours at sea, and alcohol use and abuse among fishers in the Northern Water Basin in Russia. This study resonates with studies elsewhere within European waters, which indicate the high levels of trauma, alcohol abuse, and fatality that can be associated with mental health disorders in fishers (Novalbos et al., 2008; Pollnac and Poggie, 2008; Frantzeskou et al., 2012; Percin et al., 2012).

Fishing communities share some similarities with farming communities, where high levels of mental health problems have been identified in the United Kingdom (Hounsome et al., 2013). Similarities between these resource-dependent communities include high levels of self-employment and income uncertainty (Matheson et al., 2001); living in locations that are remote from basic services and amenities (Heenan, 2006; Lungu and Hüsken, 2010); and being male-dominated industries where hegemonic masculinity norms may reduce the likelihood of acknowledging mental health concerns and help-seeking behaviour (Addis and Mahalik, 2003; Roy et al., 2013). Westaway et al. (2007) and Roy et al. (2014) warned against stereotyping health-related behaviours in the fishing and farming sectors. Turner et al. (2018) indicated the prevalence of mental health disorders among fishers in the Cornwall area, southwest of the United Kingdom. However, Turner et al. (2018) indicated that

the incidences of health issues associated with mental health, such as fatigue, stress, and lack of sleep, were low and are less widely reported among the fishers. Mental health disorders among fishers tend to be location-specific and resonate with the unique environmental conditions and socioeconomic factors prevalent within the fishing community and its surrounding communities in Europe (á Høvdanum et al., 2014).

North America

In North American fishing communities, mental health and the ability to cope have been viewed from the perspective of events such as unexpected fishing access restrictions (Smith and Jepson, 1996; Smith et al., 2003). The stress of bans on fishing nets and their impacts on more than 1500 fishers and their families in the state of Florida in the United States of America were documented by Smith et al. (2003). In the aftermath of the net bans, there were higher incidences of alcohol and drug abuse, domestic violence and conflict, neurosis, anxiety, depression, suicidal thoughts, anger, hostility, and aggression within the fishing community (Smith and Jepson, 1996; Smith et al., 2003). The study by Smith et al. (2003) showed risk factors such as age, educational levels, and gender disparity associated with anxiety and depression among the affected fishers and their families. Brewin et al. (2006) and Cherry et al. (2015ab, 2017) showed that high prevalences of depression (>48%) and anxiety (>36%) due to large-scale environmental destruction caused by the BP Deepwater Horizon oil spillage in the US Gulf Coast and the effects on fishing families outlasted the event itself. Cherry et al. (2017) highlighted the effects of pre- and post-event trauma on coping behaviour, which tends to affect and accentuate anxiety and depression levels in fishers and their families.

Threats to mental health and physical well-being for commercial fishers directly affected by the Exxon Valdez oil spill (EVOS) and indirectly affected community residents are well documented (e.g., Picou et al., 1992; Palinkas et al., 1993; Gill et al., 2012). Palinkas et al. (1993) reported high prevalence rates for generalized anxiety disorder (20.2%), post-traumatic stress disorder (PTSD) (9.4%), and symptoms of depression (16.6%) in Alaskan residents of 13 communities one year after the EVOS oil spill. Previous research on the EVOS oil spill disaster also documented the length of distress for those whose livelihoods depend on renewable natural resources, with elevated symptoms of intrusive stress observed at least three and a half (3.5) years after the disaster (Picou and

Gill, 1996). Further, symptoms of depression, PTSD, and anxiety were observed six years after the disaster (Arata et al., 2000). Harville et al. (2018) further indicated the high levels of depression and mental health disorders emanating from the cumulative effects of the Gulf Oil Spill among women of reproductive age in the predominantly fishing community of the Gulf Coast. However, Harville et al. (2018) did not specifically analyse the mental health of fisherwomen, as it was a cross-sectional study targeting women with other livelihoods besides fishing. In most studies on the mental health of fishers in North America, except Cherry et al. (2015a, b), evaluation of the mental health psychometrics and the coping mechanisms for the fishers and their dependent families was not done. Regardless, the studies show a research suggestion towards developing mental health psychometrics and possible coping mechanisms for fishers reliant on stochastic natural environmental resources (Cherry et al., 2015a; Lyon et al., 2015).

Latin America

Within Latin America, a notable finding from the literature is the lack of attention to mental health issues in fisheries, mainly depression and anxiety. Zeigelboim et al. (2014) carried out an otoneurologic analysis of fishers in Santa Catarina State in Brazil using an anamnesis, otorhinolaryngological evaluation, and vestibular exam through the vector electronystagmography. Zeigelboim et al. (2014, 2015) indicated that the most evident clinical symptoms which can be associated with mental disorders among fishers were: fatigue (46.1%), depression (23.0%), anxiety (15.3%), insomnia (7.7%), and agitation during sleep (7.7%). These clinical symptoms are typical signs of mental disorders among patients in a clinical setup (Abas et al., 2014). Though this study was a medical examination, its scientific importance is based on its highlighting of mental disorders among fishers in a region considered the capital of fishing in Brazil (Moreno et al., 2010). The dependence on seasonal fisheries resources, heavy competition among fisheries, climate change, and socioeconomic pressure documented in Santa Catarina expose the fishers to high anxiety and depression (Rodrigues et al., 2004; Salas et al., 2007; Bastos et al., 2010). Müller et al. (2016) analysed the physical and mental quality of health life among artisanal fisherwomen/shellfish gatherers in Saubara Municipality in Bahia, Brazil, and found that artisanal fisherwomen reported, on average, significantly different, lower scores for the physical domains of health compared to the mental domain. This reflected that the physical health of the fisherwomen was more affected than the mental health (Rodriguez-Romero et al., 2013). The main implication is that the type of fishing may have higher effects on physical or mental health, or both (Rodriguez-Romero et al., 2013; Pena et al., 2016).

Africa

In Lake Victoria, Fiorella et al. (2017) indicated that the physical health component significantly altered the sustainability of fishing practices relative to the mental health component. Regardless, few studies have actually mentioned mental health, depression, or anxiety among African fishers and fisheries (Fiorella et al., 2017). Many of them, e.g., Allison and Seeley (2004), Asiki et al. (2011), and Smolak (2014), indicated the consequences of HIV/AIDS and its impact on African fisheries and fishers, with a special focus on reduced labour, income, and role shifting as women and children fill the gap left by the deceased male fishers. Mental health disorders in fishers are mentioned as an afterthought in most African literature, which mainly dealt with reducing the HIV/AIDS pandemic among fisheries (Ngwenya and Mosepele, 2007; Smolak, 2014), maximising productivity, and reducing poverty (Béné et al., 2016), and maintenance of physical health (Fiorella et al., 2017). Little, if any, focus has been on mental health disorders in African fishers, which is normally taken for granted and shrugged off by most males (Addis and Mahalik, 2003). The missing gap is an analysis of the integrative effects of physical and mental health disturbances on poverty reduction and enhancement of food nutrition and security in African fishers and fisheries sustainability (Béné et al., 2016).

Australia

Fishers are susceptible to a range of mental health issues linked to the fundamental characteristics of fishing as a resource-dependent occupation, government licensing policies for fisheries, tenure insecurity, and uncertainties beyond the daily fishing operation in Australia (King et al., 2015, 2021). Moreover, King et al. (2015, 2021) indicated that in comparison with farmers, fishers are exposed to "modern uncertainties" unique to fishing that are linked to mental health problems such as depression, anxiety, self-harm, and suicide. In recent years, inshore fishers have faced increasing resource tenure insecurity and greater risk and uncertainty associated with top-down and unforeseen changes to licensing and policy (King et al., 2015, 2021). Kilpatrick et al. (2012a, b) and Roy et al. (2013, 2014) indicated that active male fishers have a tendency to delay seeking medical help relative to other nature-dependent livelihoods such as farming. This exacerbates the mental health disorders, which are expressed as stress in most cases (Addis and Mahalik, 2003; King et al., 2015). The brunt of the mental disorders is borne by the fisher's spouses, wives, or partners, mainly through reduced incomes and abusive behaviour

by the depressed fishers (Kilpatrick et al., 2014). The intimate partners or wives of fishers, in turn, express behaviour associated with mental disorders such as anxiety, withdrawal from social life, drug abuse, and depression, leading to the total neglect of the family and thus destabilising the social structure within fishing communities (Jentoft, 2000). Kilpatrick et al. (2012a, b) and King et al. (2015, 2021) showed that the situation for fishers has been largely ignored and emphasised a real need to separate health research in the agriculture and fishing industries.

Asia

Recorded mental health cases from Asia included an assessment of the overall mental health of fishers affected by the methylmercury spillage contamination disaster in Minamata Bay, which encompasses the Minamata City of Kumamoto Prefecture and Izumi City of Kagoshima Prefecture in Japan (Sugisawa, 1994). This study by Sugisawa (1994) aimed to focus on the overall health conditions measured through four aspects (i.e., activities of daily living, presence of chronic illnesses, subjective symptoms, and depression). However, the study examined three aspects and merely glossed over depression as the final expression of the combined total without an in-depth examination of the different levels of stress, depression, and anxiety among fishers involved in the Minamata Bay Disaster. Within the limits of the study by Sugisawa (1994), the association between mental health and fish intake was not clear at all for fishers in Minamata City, rendering deductive inferences on the effects of fish diet on the mental health effects of the fishers impossible.

Jiang et al. (2018) examined pathways of influence between work stress, depressive symptoms, nicotine dependence, expressive suppression, and cognitive reappraisal in fishers with smoking habits in Qionghai, Hainan province, China. They suggested that it is advantageous to examine the need for work stress, nicotine dependence, and cognitive reappraisal when attempting to understand depressive symptoms in fishers with a smoking habit (Jiang et al., 2018). A limitation of this study was the targeted selection of fishers with smoking habits and the complete exclusion of non-smoking fishers who are equally prone to depression from the unpredictability associated with fishing environments (Woodhead et al., 2018; King et al., 2015, 2021).

Nisar et al. (2004) determined the prevalence of depression and its associated risk factors among adult women in a fishing community. The prevalence of depressive disorder among adult women in the fishing community was 7.5%, which is at a higher magnitude relative to the prevalence rates in the region and the global estimates, which are below 5.6% (Nisar et al., 2004). Mental depression in women in the fishing community was significantly associated with risk factors such as increasing age, being married, having more than four children in the family, high illiteracy rates, and financial difficulties at home (Nisar et al., 2004). The study highlighted a different perspective towards risk and associated factors for depression among women in fishing communities, which is mainly related to the social roles played by women in the fishing community. Most of the women in fishing communities play peripheral roles such as fish gleaning, gutting, packaging, and trading relative to the actual fishing (Matsue et al., 2014). Thus, women in fishing communities tend to be dependent on the male fishers for income and psychosocial support, and they ultimately bear the brunt of the family and transmitted or translated stress from fishing issues (Nisar et al., 2004).

Drivers and challenges for global disparity in mental health literature in fisheries

Studies on the mental health of fishers are more concentrated in high-income European and North American continents, with fewer studies in lower-income continents such as Africa and Asia. The disparity in the number of mental health studies in the fisheries sector is related to global patterns in social, ecological, economic, institutional, and health dynamics (World Health Organization, 2017; Woodhead et al., 2018). The paucity of mental health studies of fishers in Africa, Asia, and Latin America relates to the lack of appropriate human resources and expertise for service delivery; the lack of culturally appropriate screening tools and interventions; and difficulties integrating services with the existing mental health systems (Nisar et al., 2004; Béné et al., 2016; Jiang et al., 2018). For all the continents, there is a lack of mental health literacy, gendered mental health participant engagement, and uptake within the fishing communities (Addis and Mahalik, 2003; Coulthard and Britton, 2015). Similar to physical health, there are no onboard flexible mental health providers for most fisheries across all continents (NHS, 2014; Turner et al., 2018). This review revealed relatively few examples of comparative research on mental health aspects of fishers, with notable continuous studies in Australia (Patrick et al., 2012, 2014; King et al., 2017) and North America (Cherry et al., 2015, 2017; Frantzeskou et al., 2012). With the exception of studies mainly in Europe, North America, and Australia, there was no development, adaptation, or use of psychometric tools for improving

screening, monitoring, and evaluation of the mental health of fishers.

The main driver facilitating the cultural adaptation of mental health detection, treatment, promotion, and preventative approaches in fisheries in developed continents such as Europe and North America was the adoption of formative research and the general cultural shifts towards tackling mental health challenges (Hounsome et al., 2012; Lyon et al., 2015; Cherry et al., 2015, 2017), relative to less developed continents such as Africa, which is battling with poverty, malaria, bilharzia, HIV/AIDS, and food insecurity in the fisheries (Allison and Seeley, 2004; Bartley et al., 2015; FAO, 2015; Béné et al., 2016).

Examining the available literature from the different continents, the drivers and barriers for the paucity of mental health studies appear relatively similar, although unique subtle and salient variations in the risk, antecedent, and associated factors affecting the fisheries differ among the continents. This implies a need to develop generic but locally adaptable social well-being assessment frameworks anchored on valid and reliable mental health psychometrics for fisheries (Speir et al., 2020). The post-COVID-19 fish export economic market shifts and other inherent challenges such as climate change and diseases threaten the survival of fisheries in Asia, Africa, and Latin America. This is already impacting the mental health of fishers in these continents and necessitates more studies on mental health aspects.

Conclusion

There is a disparity in the number of mental health studies for fishers, with more studies in high-income European and North American countries relative to low-income Asian and African countries. This disparity is mainly due to the differences in the level of mental health awareness and the availability of human and financial resources to conduct research across continents. Regardless, the main mental health aspects of fishers in developed countries relate to the healthy lifestyles of the fishers and mental resilience to unexpected fishing access restrictions caused by human activities such as oil spills. The key insight is that in Europe and North America, there is an active effort to adapt existing mental health psychometrics for evaluating the mental health of fishers. This is spurred by the current focus on the mental health of humans on a global scale, and we envisage more quantitative and qualitative studies on the mental health of fishers in the high-income continents. For low-income African, Asian, and Latin American countries, few studies have actually mentioned mental health, depression, or anxiety but skew largely towards the physical health of fishers. As long as mental health studies are not stand-alone and funded locally in low-income continents, the number of studies for fisheries will not increase significantly. Australian studies on the mental health of fishers have tended to be longitudinal and hence more credible, with the main driving aspect of mental health disorders being insecurity of tenure because of changes to licensing and policy of access and ownership of water resources.

The present review is not exhaustive; however, it has indicated that there is a paucity of studies on the mental health aspects of fishers on a global scale. Conflation of mental and physical health aspects in studies masks the importance of mental health disorders in fishers. It is important for fisheries and social scientists and mental health experts to conduct stand-alone mental health assessments. This is even more pertinent in light of prevailing climate change and post-COVID-19 socioeconomic challenges affecting and threatening fisheries sustainability and survival.

Declaration of Competing Interest

The authors certify that they have NO affiliations with or involvement in any organization or entity with any financial interest (such as honoraria; educational grants; participation in speakers' bureaus; membership, employment, consultancies, stock ownership, or other equity interest; and expert testimony or patent-licensing arrangements), or non-financial interest (such as personal or professional relationships, affiliations, knowledge, or beliefs) in the subject matter or materials discussed in this manuscript.

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