



## RESEARCH ARTICLE

# A bibliometric analysis of mental health and wellbeing of seafarers

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### ABSTRACT

The present study aims to analyse the output of mental health and wellbeing studies on seafarers. The necessary data from the Web of Science database was retrieved and processed using the visualisation and mapping programme VOSviewer 1.6.19. The study maps seafarers' mental health and wellbeing research published from 2004 to 2023. The findings indicate that the most common topic of seafarers' mental health and wellbeing was the International Maritime Health Journal was the most prominent. The United States of America was the most productive country. The outcomes of this present study can assist researchers in conducting more effective studies on the mental health and wellbeing of seafarers by providing insights into potential journals for reference, contributing authors, emerging patterns, nations, and relevant keywords.

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### Introduction

World Health Organisation (WHO) defines health as “a full condition of physical, mental, and social wellbeing, not only the absence of sickness or disability”. Mental health is an essential component of overall health; in fact, there is no health without mental health. One significant matter is that a variety of social, biological, and environmental factors have an impact on mental health (WHO, 2023). The physical and psychological environmental conditions of workers while working and their mental health interact (Belloni et al., 2022). Specifically, seafarers can be vulnerable because of the nature of the

profession for mental health. The ship is a working environment where the conditions of the working and living environment are intertwined with noise, vibration exposure, long work hours, trouble sleeping, contract length, long time away from the family and social environment, isolation supervisor demands and intense workload (International Labour Organization, 1997; Blackburn, 2020).

In the context of seafarers' mental health studies, it is apparent that seafarers' mental health and wellbeing are associated with variables such as stress (Nielsen et al., 2013; Akamangwa, 2016), workplace violence and mobbing (Mayhew

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& Chappell, 2007; Sampson et al., 2018, 2019; Uğurlu et al., 2022), fatigue (Bal et al., 2015; Lefkowitz & Slade, 2019), job satisfaction (Yuen et al., 2018), wellbeing (Stannard et al., 2015; Slišković, 2020; Brooks & Greenberg, 2022), depression and suicide (Mayhew & Chappell, 2007; Sampson et al., 2018, 2019; Uğurlu et al., 2022), fatigue (Bal et al., 2015; Lefkowitz & Slade, 2019), job satisfaction (Yuen et al., 2018), wellbeing (Brooks & Greenberg, 2022; Slišković, 2020; Stannard et al., 2015), and similar with other fields. Anxiety, disruptive thinking and behaviour, and addiction to alcohol and drugs are also defined as elements compromising the mental health of seafarers (ISWAN, 2015). Although research concerning seafarers' mental health is arising but limited in the literature, Lefkowitz and Slade's study holds great significance for the findings: It shows that 17% of the seafarers who participated in the study reported generalised anxiety disorder, 20% reported having suicidal ideation and 25% reported symptoms of depression (Lefkowitz & Slade, 2019).

A bibliometric study of publications from time period is required in order to help us arrange enormous amounts of data, evaluate the state of a particular research subject state-of-art, and offer suggestions or guidance for future research (Han et al., 2019). In the study, it is used a bibliometric analysis to analyse the development of research for mental health of seafarers and wellbeing. This study aims to provide insight into the subject of seafarers' mental health and wellbeing. The

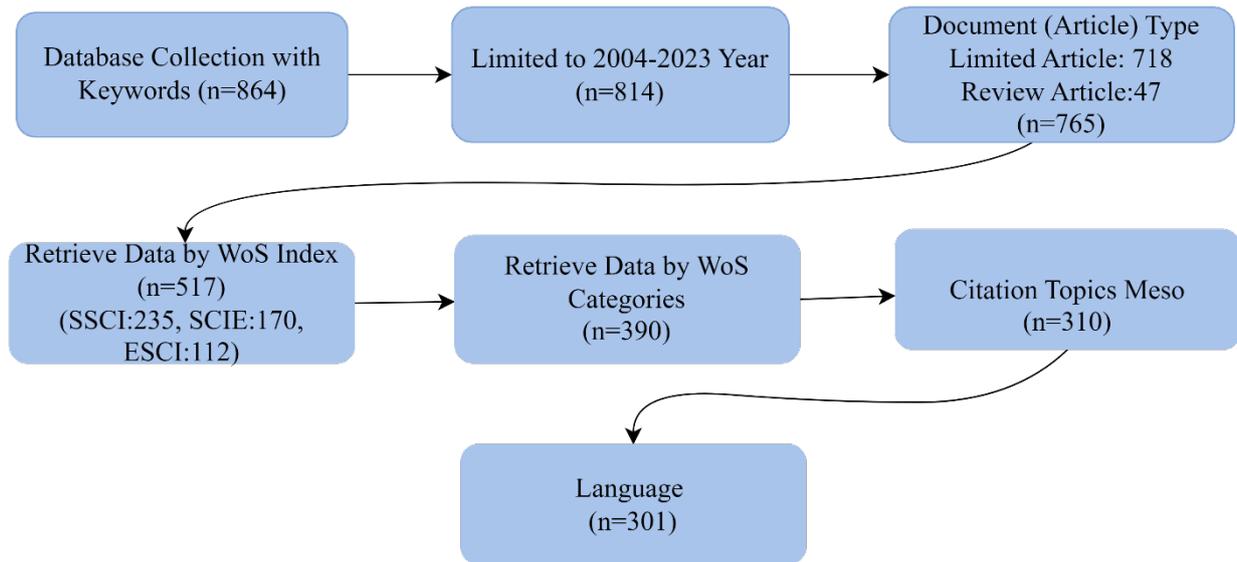
purposes of this study are to (1) identify the contributing countries and the most influential journals, (2) determine the most frequently appearing keywords on the topic; (3) to identify the distribution of contributing affiliations, (4) co-cited authors.

### Materials and Method

Bibliometrics analysis is a study methodology called academic outputs quantitatively and statistically. Further, network analysis of keywords, texts, citations, authors, institutions, and their relationships is part of this methodology (Liang & Liu, 2018). Well-executed bibliometric studies can lay the groundwork for advancing a field in fresh and significant ways by giving scholars the ability to (Donthu et al., 2021): (1) obtain a comprehensive overview; (2) identify knowledge gaps; (3) derive fresh ideas for research; and (4) put their planned contributions to the area of study. There are bibliometric studies on different subjects in the maritime field such as maritime transport literature (Solak Fiskin & Güldem Cerit, 2019), maritime accidents (Cao et al., 2023; Yurt & Cenk, 2023), oil spill (Buber & Koseoglu, 2022a, 2022b), inspection analysis (Bicen & Celik, 2023), safety management (Rinaldy, 2023), seafarers' health research (Jiang et al., 2023), Automatic Identification System (Meyers et al., 2021).

**Table 1.** Searching Strategy for seafarers' mental health and wellbeing research in the WoS database

Categories	Applied Filters
1 Keywords	(Mental health or wellbeing or well-being or depression or suicidal ideation or suicidal thoughts or anxiety or stress* fatigue or burnout* or aggression* or sense of isolation* or substance misuse or alcohol misuse or alcoholism or hazardous drinking or problematic drinking* or bullying or harassment or workplace violence or mobbing*) and (seafarer* or seafaring or navy personnel or mariners or maritime personnel or sailor* or seamen*)
2 Publication Time	2004-2023
3 Document Types	Articles and review articles
4 WOS Index	Social Sciences Citation Index (SSCI), Science Citation Index Expanded (SCI-E), and Emerging Sources Citation Index (ESCI).
5 WOS Categories	Public Environmental Occupational Health; Psychiatry; Psychology Multidisciplinary; Psychology Clinical;; Transportation; Psychology; Engineering Marine, Engineering Industrial; Psychology Applies; Oceanography; Ergonomics; Engineering Ocean; Operations Research Management Science; Psychology Experimental; Psychology Social; Engineering Civil; Management; Psychology Developmental; Engineering Mechanical; Industrial Relations Labour; Women S Studies; Behavioural Science; Business; Psychology Educational; Psychology Psychoanalysis.
6 Citation Topics Meso	Safety and Maintenance; Psychiatry and Psychology; Psychiatry; Sleep Science and Circadian Systems; Management; Social Psychology; Substance Abuse; Gender and Sexuality Studies; Operations Research and Management Science; Health Literacy and Telemedicine; Healthcare Policy, Communication.
7 Language	English



**Figure 1.** Data collection process

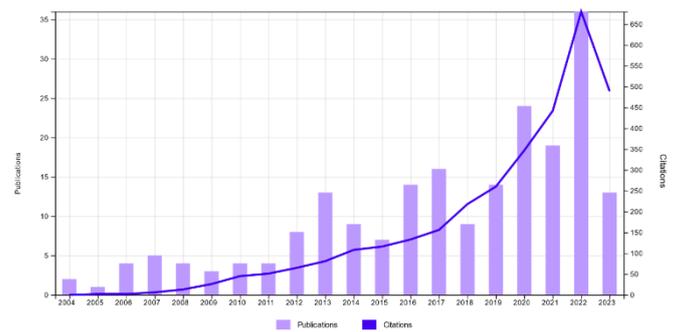
In order to have comprehensive data we used the Clarivate Analytics ISI Web of Science (WoS) website served as the major source of worldwide research data for this article. The dataset was created using the WoS database and analysed using visualisation and descriptive statistics in this article. The data used in this study was retrieved on 22nd November 2023 with search strategy shown in Table 1:

The data collection process is illustrated in Figure 1. Initially, a database query was conducted using specific keywords. The search was initiated from publications dating back to 1981. Subsequently, the time frame was restricted to the years 2004–2023, and proceedings papers were excluded from the dataset. Only articles and review articles were considered for inclusion. Following this, the data was retrieved from publications indexed in SSCI, SCIE, and ESCI. The Web of Science (WOS) database was then filtered by categories and topics. Lastly, the language was restricted to English only. A total of 301 articles were retrieved by employing this searching strategy. The titles, keywords, and abstracts of the studies included in the databases were examined first, manually. Then, the studies that were outside the scope of the search were eliminated from the results. Finally, 209 articles were found to be relevant to seafarers’ mental health and wellbeing.

## Findings and Results

From 2004 to 2023, all review and research articles on seafarers’ mental health and wellbeing were examined as follows. The data of 209 articles were evaluated according to the

number of articles and citations by years and the journals that accepted the publications. Figure 2 depicts the scientific production of papers with citation analysis from 2004 to 2023, in total 209 articles.



**Figure 2.** Publications and times cited over time

As seen in Figure 2, there have been fluctuations in the number of publications and citations in the last 20 years. For instance, there is only one publication in 2005, while in 2022, 22 publications are produced. In this period (2004-2023), the number of citations has experienced fluctuations over time. In 2004, no studies were cited, whereas 2022 marked the most cited year with 680 citations. There are 20 publications addressing the mental health and wellbeing of seafarers that have yet to receive citations. Among these uncited studies, the oldest dates back to 2017, while the rest are relatively recent, published in subsequent years after 2017.

The journals that have published the highest number of articles publishing the highest number of articles mental health and wellbeing of seafarers are summarized in Figure 3.

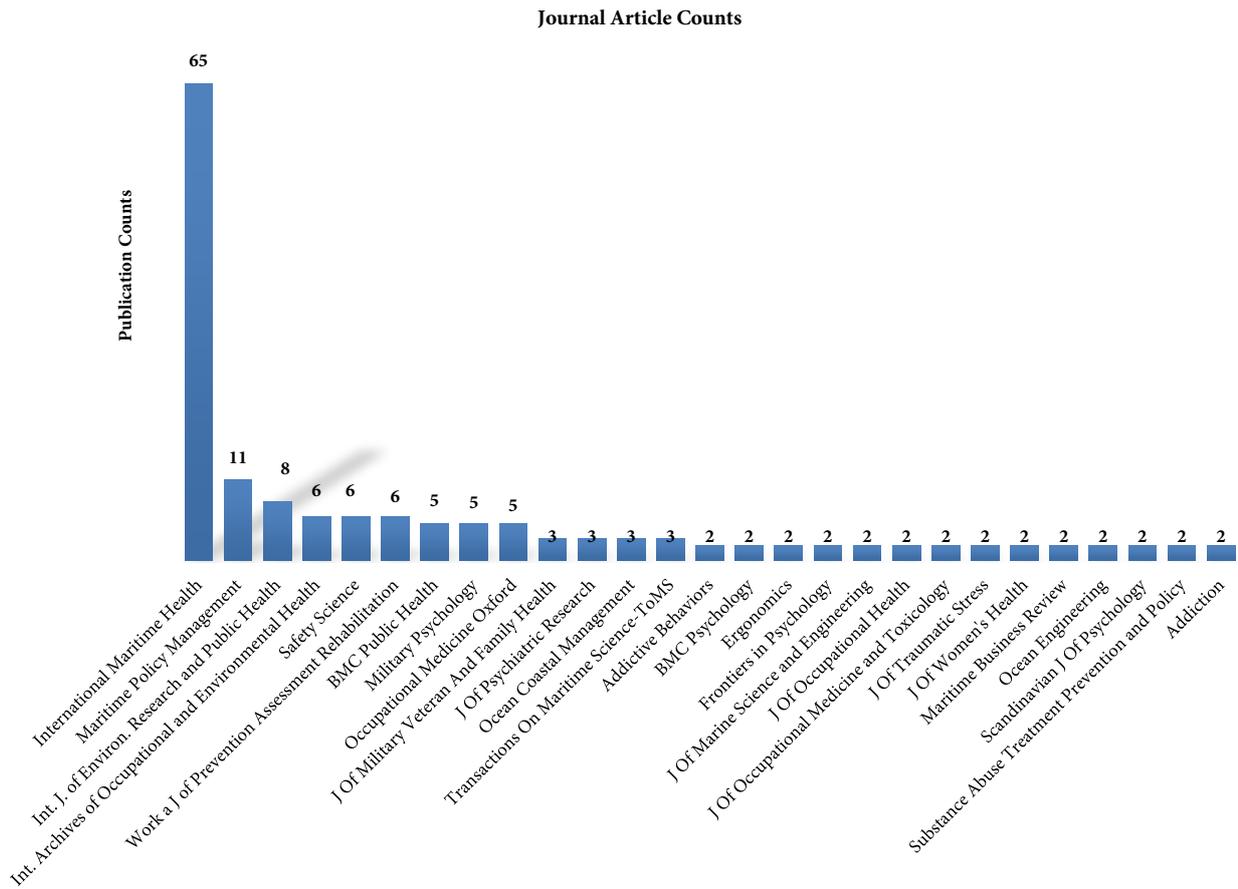


Figure 3. Most productive journals for mental health and wellbeing of seafarers’

Table 2. Most impactful articles for seafarers’ mental health and wellbeing

Rank*	Authors	Journal	Doc. Type	Times Cited, WoS Core	Times Cited, All Dbs	Pub. Year
1	Hetherington et al. (2006)	J. of Safety Research	Review	411	421	2006
2	Oldenburg et al. (2010)	J. of Occupational Health	Review	138	141	2010
3	Carotenuto et al. (2013)	Int. Maritime Health	Review	118	127	2013
4	Iversen (2012)	Int. Maritime Health	Review	88	91	2012
5	Jepsen et al. (2015)	Int. Maritime Health	Review	80	85	2015
6	Rohsenow et al. (2007)	Addictive Behaviors	Article	73	78	2007
7	Hystad & Eid (2016)	Safety And Health at Work	Article	73	76	2016
8	Oldenburg et al. (2013)	Int. Archives of Occupational and Environmental Health	Review	68	72	2013
9	Nielsen (2013)	Scandinavian J. of Psychology	Article	68	70	2013
10	Wadsworth et al. (2006)	American J. of Industrial Medicine	Article	47	51	2006

Note: \*Ranking by Times Cited All Databases; Doc. Type refers to Document Type; Times Cited, All Dbs refers to Times Cited All Databases; Pub. Year refers to Publication Year.

A total of 81 journals, each with a minimum of two publications, were examined based on the number of articles. “International Maritime Health” (n= 65, 31.10%), “Maritime Policy and Management” (n=11, 5.26 %), and “Journal of Environmental Research and Public Health” (n= 8, 3.83%) were the most productive journals. The top 5 journals with the highest number of publications represent 56% of total publications. The highest number of the research areas in the publications are respectively Public Environmental Occupational Health (n=123, 58.85%), Psychology (n=33, 15.79%), Engineering (n=22, 10.53%), Psychiatry (n=20, 9.57%), and Transportation (n=14, 6.70%). Table 2 summarizes the most cited articles related to seafarers’ mental health and wellbeing between 2004 to 2023.

As seen in Table 2, there are 6 Review articles in the top 10 most cited publications. We can infer that the review article is prominent among the most cited publications. The most cited article (421 total citations) is by Hetherington et al. (2006), that individual factors such as fatigue, health and stress may have a role in accident causation (Hetherington et al., 2006). The second (141 total citations) is Oldenburg et. al (2010) that primary and secondary prevention of work-related hazards, psychological stress and lifestyle risks, and all factors contributing to fatigue and isolation have been expressed as the most fundamental approach to reducing the occupational health risks of seafaring (Oldenburg et al., 2010). The third one (127 total citations) is by Carotenuto et al. (2013) who evaluated the 162 seafarers by The Psychological General Well-being Index. Engineer officers expressed a great deal more anxiety than the deck and engine crew did (Carotenuto et al., 2013).

The most cited articles are also most leading ones in the topic of research. The highest number of citation topics meso in the publications are respectively Safety & Maintenance (n=118, 56.46%), Psychiatry & Psychology (n=39, 18.66%), Sleep Science & Circadian Systems (n=15, 7.18%), Management (n=13, 6.22%), and Social Psychology (n=7, 3.35%). Likewise, the highest number of citation topics micro in the publications are respectively Safety climate (n=112, 53.59%), post-traumatic stress disorder (n=38, 18.18%), insomnia (n=15, 7.18%), job satisfaction (n=12, 5.72%), and alcohol, maritime safety, and subjective well-being (n=4, 1.91%).

Co-citation analysis is a science mapping technique that presupposes those articles frequently cited together share similar thematic content (26). The co-citation networks of references are visualised in Figure 4. A co-citation analysis of 209 references with at least 20 citations between 2004 and 2023 revealed 28 authors and four clusters. The four main clusters

and related themes are denoted by orange, green, blue, and yellow. The number of publications connected to seafarers’ mental health and wellbeing by corresponding writers is shown by the size of the nodes in Fig. 4, and the thickness of the connecting lines reflects the closeness of the ties between the authors. The colour of the lines and nodes represents the author’s topic similarity. Oldenburg et al (2010) was the most co-cited article in these 4 clusters (Oldenburg et al., 2010). In the article, seafaring is characterized by several occupational risks, including high stress levels, fatigue, and isolation.

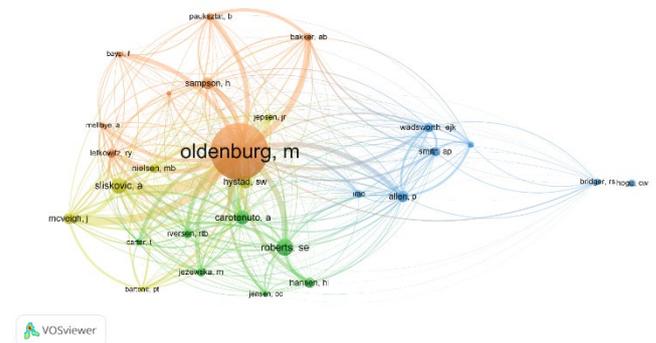


Figure 4. Network map of co-cited references

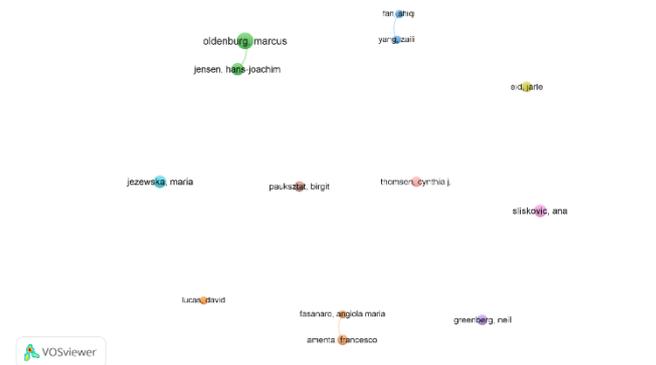


Figure 5. Co-authorship network among the authors

Figure 5 depicts a network of co-authorship author analysis related to the mental health and wellbeing of seafarers. As seen in Figure 5, there is no network connecting all available authors. There is limited collaboration between authors with at least 4 papers, with many authors publishing their papers as single authors. To produce better quality publications, there is a need for collaboration between authors with different methods and different perspectives.

The most frequently used keywords and the relationship between the keywords are shown in Figure 6. “seafarers”, “stress”, “mental health”, and “fatigue” are the most commonly used keywords. This study shows that the studies on seafarers’ mental health and wellbeing are mostly done on stress, mental health, and fatigue. The colours blue, orange, green, and yellow

represent the four major clusters of co-cited articles and connected themes. The keywords stress, fatigue, sleepiness, sleep quality, job satisfaction, maritime industry, seafaring, seafarers, mental health, Covid-19 and wellbeing are in Cluster 1 (orange colour) and Cluster 2 (blue colour). The top ten words with the highest number of co-occurrences, each repeated at least five times, were identified. With the keywords in the Cluster 1 and 2, anxiety, depression, military, military personnel, navy, resilience, wellbeing, maritime, and seafarer in Cluster 3 (green colour) in Cluster 4 (yellow colour) keywords clearly indicate that they stand for the main conceptual frameworks in the literature on the mental health and wellbeing of seafarers.

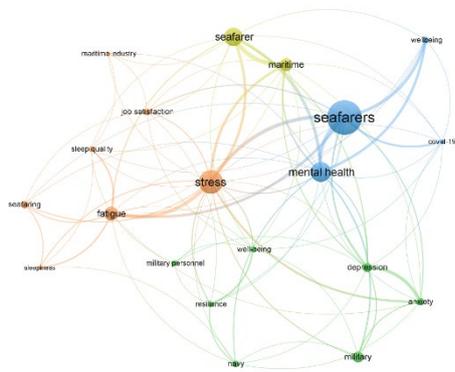


Figure 6. Keyword co-occurrence network visualization

Table 4. Countrywide citation

Country	Total Articles (TA)	Total Citations (TC)	Citation Impact
1 USA	35	483	13.80
2 England	30	395	13.17
3 Norway	17	331	19.47
4 China	15	232	15.47
5 Denmark	14	221	15.79
6 Wales	14	141	10.07
7 Germany	12	301	25.08
8 Australia	11	248	22.55
9 Türkiye	11	90	8.18
10 Sweden	10	159	15.90
11 France	10	48	4.80
12 Italy	10	197	19.70
13 Croatia	8	106	13.25
14 Poland	8	90	11.25

Figure 7 shows the collaboration network on the country based. The most effective countries are the United States of America (USA), England, and Norway, as in Table 4. When the four clusters are investigated, the most effective and

collaborative countries are the US, China, and Wales which are shown in yellow. And second order, England, Norway and Türkiye are effective and collaborative countries which are shown in green colour. The US has the highest number of articles with 35 publications, followed by the England and the Norway with 30 and 17 publications. There are several reasons USA and the England have the highest publicity. USA has civil and military research institutes, and England and Norway have universities with maritime research centres. In Figure 8 and Table 5 show the network of affiliations and distribution.

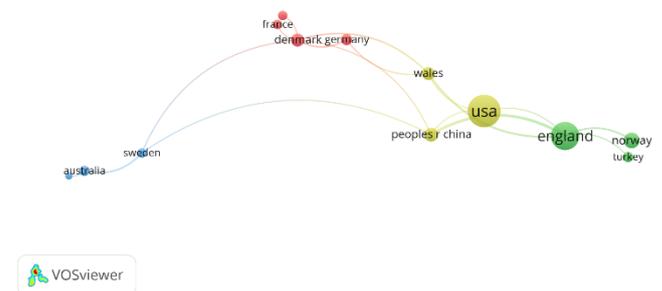


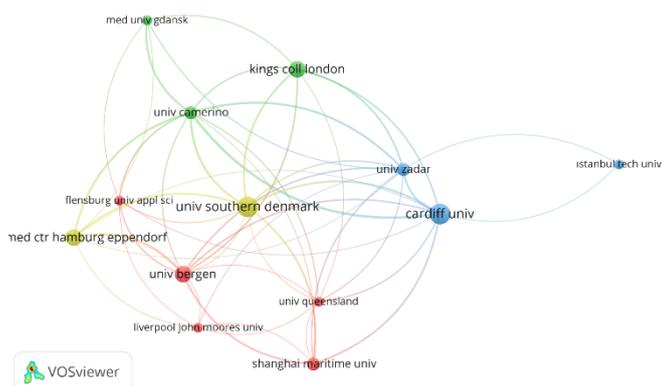
Figure 7. Country Collaboration Network

The 209 articles identified come from 42 different countries. Two articles were produced in 35 countries, three articles in 25 countries, four articles in 18 countries, and five articles in 14 countries. USA has the highest number of publications (30 articles) and a citation impact of 13.8. On the other hand, although Germany and Australia have 12 and 11 publications respectively, their citation impact is quite high with 25.08 and 22.5.

As seen in Table 5, University of Southern Denmark and Cardiff University are the institutions with the highest number of publications and collaborative (13 articles). Figure 8 shows the affiliation networks, providing a visual representation of the articles. The blue, red, yellow, and green colours indicate the four primary clusters. Cluster 1 (blue colour) includes 23 publications from Cardiff University, İstanbul Technical University and University of Zadar. 23 publications produced at University of Bergen, Shanghai Maritime University, Liverpool John Moores University, University of Queensland and Flensburg University Applied Science in Cluster 2 (red colour). Cluster 3 (yellow colour) comprised of 22 publications by University of Southern Denmark and University Medical Centre Hamburg Eppendorf. Cluster 4 (green colour) includes 19 publications produced at Kings College London, Medical University Gdansk, University of Camerino.

**Table 5.** Affiliation distribution

Affiliations	Total Articles (TA)	Total Citations (TC)	Citation Impact
1 University of Southern Denmark	13	218	16.77
2 Cardiff University	13	128	9.85
3 University of Bergen	9	242	26.89
4 Kings College London	9	127	14.11
5 Naval Health Research Center	9	123	13.67
6 University Medical Center Hamburg Eppendorf	9	73	8.11
7 University of Camerino	6	165	27.50
8 University of Zadar	6	102	17.00
9 Shanghai Maritime University	6	43	7.17
10 Liverpool John Moores University	4	60	15.00
11 Istanbul Technical University	4	56	14.00
12 University of Queensland	4	54	13.50
13 Leidos	4	50	12.50
14 Medical University Gdansk	4	23	5.75
15 Flensburg University Applied Science	4	11	2.75



**Figure 8.** Affiliation network visualization

209 articles were produced by 275 different institutions. In total, 275 institutions produced only one article, 69 institutions produced two articles, 37 institutions produced three articles and 15 institutions produced only four articles. The University of Southern Denmark and Cardiff University had the most publications and collaborations (13 articles). Their citation effects are 16.77 and 9.85, respectively. On the other hand, “University of Bergen” has 9 publications, but very high number of citations.

**Conclusion**

This study presents the findings of a bibliometric analysis of articles on seafarers’ mental health and wellbeing. In this study, which analyses search queries on mental health and wellbeing of seafarers, some significant worldwide research trends were gathered from publications from WoS from 2004 to 2023,

November. This study evaluated the publications related to searching query, maps of the author and citation, linkages of co-occurrence and author keywords, country and affiliations network and the most impactful journals and articles. We discovered that the most influential publication was International Maritime Health journal. The country with the highest level of production was USA. This is because in the USA, not only universities but also the leading institutions such as the Department of Defence, the Navy and the Naval Health Research Centre, and Naval Medical Research Centre focused on the mental health and well-being of seafarers. These institutions are considered pioneers not only in terms of civilian seafarers, but also in prioritizing the health and well-being of naval personnel.

We found that the most frequently used keywords are “seafarers”, “stress”, “mental health”, and “fatigue” are the most used keywords. Dr. Marcus Oldenburg emerged as the most co-cited author. Occupational risks and challenges of the maritime profession are presented in the article (Oldenburg et al., 2010). The article focussed on fatigue, isolation, multinational crews, limited possibilities for recreation and environmental stress. It is thought that this is a result of the fact that it contains the most used keywords that revealed in the present study, which correspond to the occupational risk and challenges discussed in the Oldenburg’s article.

It has been identified which countries have undertaken comprehensive research on the topic of seafarer’s mental health

and wellbeing around the world. In addition to its contributions to the field, the study has certain limitations. Since English-language publications were filtered, the words used in the query and the findings overlap with each other. Another limitation is that the bibliometric research was conducted only on the Web of Science database. In addition, only articles were analysed in the study. In future research, all types of publications can be expanded by including different databases and languages other than English.

### Compliance With Ethical Standards

#### Conflict of Interest

The author declares that there is no conflict of interest.

#### Ethical Approval

For this type of study, formal consent is not required.

#### Funding

Not applicable.

#### Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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