

Occupational Stress and Fatigue at Sea: A Gender Perspective of Spanish Seafarers

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ABSTRACT: With less than 2% of women seafarers, it is undeniable that the maritime industry, and specifically work on board, is a sector historically dominated by men. Ships are hard workplaces where stress and fatigue are commonly present. Psychosocial risk factors related to the performance of tasks, work organization, and interpersonal relationships could trigger health problems related to stress, such as depression, anxiety, burnout and even suicide. Despite gender differences in the risk of suffering from occupational diseases and accidents in relation to work stress are widely documented internationally in several sectors, research exploring the correlation between gender and stress in the maritime field is scarce. This paper focuses on the perception of stress and fatigue of Spanish women working at sea, making a comparison with their male colleagues. For this purpose, a survey on stress and fatigue is distributed to seafarers, from which 236 valid responses are obtained, these are analyzed and cross-checked using the SPSS data analysis program. The results show that there is a clear difference between genders in the perception of stress, since 37.04% of women and 23.33% of men refer to a high level of stress in the last campaign on board. In the case of fatigue, the difference is greater, with 44% of women versus 21.05% of men reporting a high level of fatigue during the last period on board. The percentages of reported stress symptoms also show important differences: 41.92% of women very often experience “tendency to eat, drink or smoke more than usual”, compared to 22.65% of men who experience this symptom; 30.91% of women also suffer from migraines or headaches, while only 8.29% of men report experiencing them.

1 INTRODUCTION

In much of the world, women are in the least valued jobs, both professionally and economically, due to the unavailability of education, training and recruitment aimed at the female workforce. Women do not receive equal pay for their jobs and are more likely to suffer both domestic violence and violence at work. For all these reasons, the World Women's Day Conference held in Beijing in 2015 highlighted all these problems suffered by women, and established an agenda to promote equality between women and men and the empowerment of women.

It is undeniable that the maritime industry, and specifically work on board, is a sector historically dominated by men. This is confirmed by the data from the Women in Maritime Survey [1] and the BIMCO/ICS 2021 Seafarer Workforce [2] by establishing that, currently, and for more than 20 years, less than 2% of the people who work on board are women.

The IMO has been making a great effort to incorporate women in the sector since it launched the “IMO women in development programme” in 1996 [3]. Today the IMO maintains a gender program that, under the three lines of action Training–Visibility–Recognition, represents a strategic approach to

increase the contribution of women as key participants in the maritime sector, in their commitment to helping the Members States to meet the UN's 2030 Agenda for Sustainable Development Goals (SDGs), particularly Goal 5 "Achieve gender equality and empower all women and girls."

However, and despite growing awareness of gender equality in the maritime sector, where male representation is extremely high, gender equality is often considered a women's issue. Data collected from Kitada et al. [4] indicates a lack of understanding of the technical and social links in maritime matters, as well as a lack of gender awareness, which contributes to hegemonic and complicit masculinities. This article argues how resistance to change may be related to the power and privileges of men backed by hegemonic, complicit, and industrial masculine values, while ecological masculinities are observable in the new initiative called "Just Maritime Transition".

On the other hand, Romero [19] examines the implementation and evolution of institutional policies on gender equality and women's empowerment at the World Maritime University (WMU). Through a longitudinal analysis of enrollment and employment statistics, as well as institutional documents and academic publications covering the period 1983–2017, the findings reveal steady progress in integrating a gender perspective into the university's academic and administrative activities.

Also the ILO is playing an important role in helping women and men to equalise their social and labour protection, to be able to take care of their family members, to be able to fulfil their work obligations and to end occupational segregation [5]. Despite a 45.8% increase in women working as seafarers in 2021 compared to the 2015 BIMCO (Baltic and International Maritime Council) report, it is still a long way from matching the male gender engagement [2].

Furthermore, the ship is a confined, mobile and floating workplace that is also living quarters for the crew. The short turnaround, the reduction of crews, the increase of multicultural and multilingual crews, the rigid work hierarchy, labor mobility and isolation, are common characteristics of work on board, and have, in general, a negative impact on social life on board. This circumstance, added to the fact that women are a minority in this sector, makes it particularly difficult for them to find work and makes these women more exposed to facing and suffering situations of workplace discrimination, bullying and sexual harassment [6] [7] [8]. The presence of these psychosocial risk factors related to the performance of tasks, work organization, and interpersonal relationships could trigger health problems related to stress, such as depression, anxiety, burnout and even suicide. Also, it is documented that high levels of stress can cause accidents of varying severity, including death [9] [10].

Gender differences in the risk of suffering from occupational diseases and accidents in relation to work stress are also widely documented internationally in several working sector [11] [12] [13] [14] [15] [16] however research exploring the correlation between gender and stress in the maritime field is scarce [17].

The difficulties in finding employment on board, the obstacles to promotion, the inequality in work demands, the difficulties in conciliation, the probability of suffering discrimination, bullying and harassment as well as the lack of support inside and outside the ship when facing these situations are considered not only as the main causes of early withdrawal from the profession but also as the causes of the lack of maritime vocations [8]. Although improvements have been made over the years, it is still necessary to establish measures for the employability of women in the maritime sector, so that women in this field have the same possibilities as their male colleagues [18]. Therefore, it is important to invest in training and that shipping companies should prioritise the establishment of clear policies to fight discrimination and workplace and sexual harassment. Also institutions should provide the necessary regulations to punish these situations in a forceful manner, and so that equal opportunities to gain access to the labour market become a reality [8].

The purpose of this article, based on the results of a survey in which 236 Spanish seafarers participated, is to explore how harsh working conditions on board can be perceived differently as a source of fatigue and stress by men and women. These differences in the perception of fatigue and stress are reflected in the reporting of different levels of health consequences by both genders. The survey process and the results obtained are detailed below.

2 MATERIALS AND METHODS

For the purposes of this study, a 34 question survey is designed, validated and distributed. Almost all the questions in this survey are closed-ended, allowing the survey participants to select, from a series of (previously assigned) categories, the response that best fits or approximates their experience [20]. The 34 questions are distributed as follows: 14 are related to identification, 10 are related to the perception of stress and the other 10 are related with fatigue. The questionnaires were distributed between December 2017 and April 2018, both in English and Spanish, and a total of 236 valid responses were obtained, allowing us to affirm that the sample is representative. For the study and comparison of the different variables, the statistical analysis program SPSS and the spreadsheet EXCEL were used.

Personal identification data are collected on respondents, such as age, sex, whether they are married or living as a couple, supporting dependents and nationality. The purpose of collecting these data is to obtain a profile of the sample to help us understand the perceptions and experiences of individuals who have common personal characteristics and/or circumstances.

The aim of the questions on work situation is to prove if there are substantial differences between the perceptions of individuals with different work situations within the same maritime environment, i.e., to establish whether work characteristics are determining factors in experiencing stress or fatigue at work. Given that the objective of this article is to give a

gender perspective, the data on sex was included in the identification of the participants [21].

3 RESULTS AND DISCUSSION

3.1 Personal data

The vast majority of respondents are male (76.69% compared to 23.31% female) (n=236). Although more women have been attracted to seafaring in the last decade, the number of female seafaring workers is still far lower than the thousands of male officers. According to the 2021 BIMCO report the percentage of STCW certified female ratings is estimated to be 1.28% of the global seafarer workforce and there appears to have been a significant increase in the number of STCW certified female ratings and female ratings mainly in the cruise and passenger ferry sectors. The number of female officers is more evenly distributed across sectors [2].

Given the low presence of women at sea, in early 2020 the ITF and IMO came together and committed to boosting the presence of women in the maritime community by offering training opportunities, scholarships for postgraduate studies, more management positions and a greater number of jobs at sea.

On the other hand, leadership style and teamwork or organisational culture were considered as occupational risk factors related to discrimination and harassment of women [22].

According to the survey conducted and as shown in Figure 1, there is a great difference between the age of the crew members in terms of gender, women are concentrated between the ages of 31 and 40, while men are more evenly distributed across all age ranges. This could be related to the fact of being mothers and the consequent abandonment of their profession, since women's career paths are not as easy as men's in any work culture [23]. Although men have the same family responsibilities and the same number of children, this situation often does not affect their career progression, in fact a study by Ojwala et al. [23] shows that 80% of men never take parental leave. One of the reasons is that it is still ingrained in the culture that women play the primary role in care work, such as childcare, pregnancy and childbirth seem to be some of the challenges women face throughout their careers, concluding that women are not only the lowest paid but also occupy the least protected positions at sea [24].

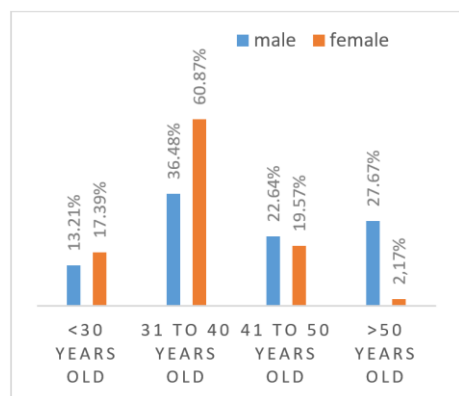


Figure 1. Age

As shown in Figure 2, 76.10% of male respondents and 67.39% of female respondents are married or living in a couple.

The complexity of the family and social life of seafarers has been studied previously. According to Frosyth and Bankston [25] the seafarer becomes a visitor in his own family. The restrictions on personal relationships, the well-defined hierarchical structure on board and the cyclical social isolation inherent in the seafarers' life cause them to be far away from most shore-based workers. A sense of isolation develops not only between seafarers and their families, but also between seafarers and their friends, and between seafarers and society at large. In fact, it was found that seafarers' lifestyle is mainly characterized by marginality, which leads them to express a sense of helplessness and abnormal loneliness from society and culture [26].

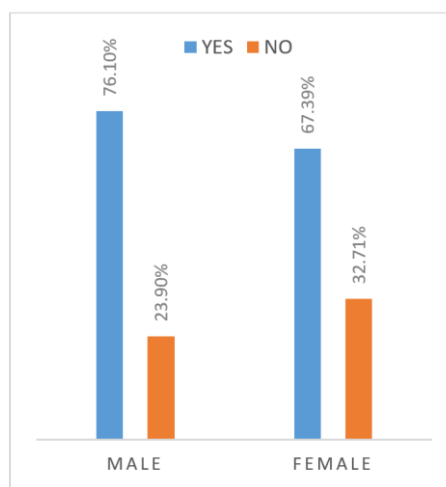


Figure 2. Married or living with a partner

The seafarer's job is developed at sea and consequently the seafarer's family must function within the context of separation, actual or potential, throughout his professional life [27]. Forsyth [28] says that the longer the seafarer has been at sea, the less integrated he is with his family.

Figure 3 shows that 58.49% of the males and 52.17% of the females have dependents (they may be children or other dependents).

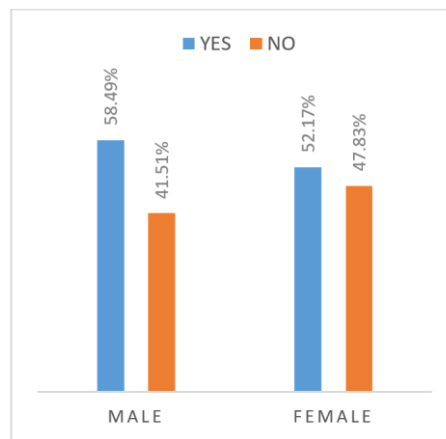


Figure 3. Dependents

Regarding the time spent on board, again a notable difference is observed, as show in Figure 4, 47.83% of

women have less than 5 years of experience, and 47.80% of men have an onboard experience of more than 10 years.



Figure 4. Time worked on board

3.2 The workload

The study by Fernández et al. [29] analyses the workload of a sample of 8892 workers looking for the difference in workload exposure between women and men. Analysis of the survey shows that men report a lower mental workload than women in relation to the pace of work, as the prevalence of "High pace of work" was 0.65% in women compared to 0.63% in men. Men reported a lower mental workload due to "overwork" than women. Women more often than men are fatigued by overwork (0.37%, 0.35% respectively). The results of this survey do not corroborate the authors' initial hypothesis that women are exposed to a greater mental workload than men, although by analysing different components of mental workload, women are exposed to a greater pace of work and greater fatigue as a consequence of the amount of work [29]. In the research carried out for this article, as shown in Figure 5, both men (74.03%) and women (76.36%) consider that they have been assigned a high workload in the last period at sea, with no significant differences between the two sexes on this point.

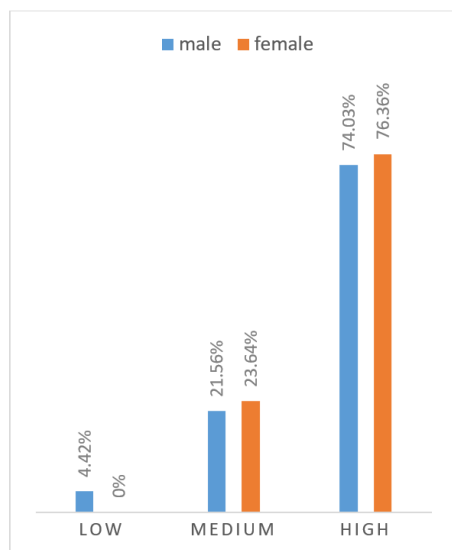


Figure 5. Gender and workload

3.3 Command on board

Men represent 98% of seafarers at the international level (all positions). Of these, 42% occupy command positions. Since the majority of the survey participants in this article are Spanish, a comparison by gender of the positions held by these participants will give us an idea of the distribution of Spanish men and women in command positions.

Therefore, it is considered necessary to look at the positions held on board by both men and women at an international level. In 2013 [30] of the 2% of women working in the maritime sector internationally, only 7% held command positions, however in the data collected by BIMCO in 2021 the estimated global supply of STCW certified women is 24,059, of which approximately 7,289 are officers and 16,770 are seafarers. This is an increase of 45.8% since the 2015 report, although there remains an imbalance in women's access to these positions.

As shown in Figure 6, 36.95% of the women were second and third deck officers and 25.15% of the men were captains.

It is evident that women occupy lower ranking positions than men, probably due to the fact that they sail less time, their professional life is less long-lasting. This is why the work of the Women in Shipping and Trade International Association (WISTA International), an international network organization whose mission is to attract and support women at management levels in the maritime, trade and logistics sectors, is so important. This partnership falls within the framework of the IMO Strategic Plan that contributes to promoting diversity, inclusion and empowerment of women [31].

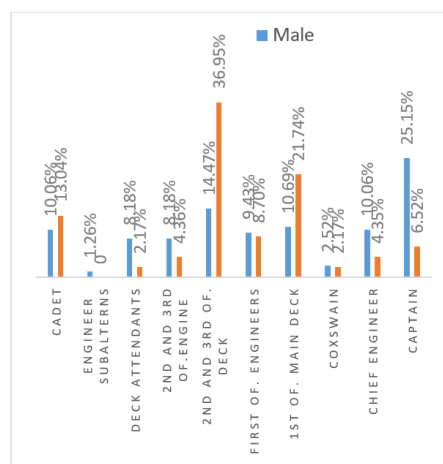


Figure 6. Gender and command on board

3.4 Type of navigation

Male respondents are more involved in high seas navigation than female ones who sail on coastal navigation. For future research, it would be worthwhile to study in depth the reason for this (whether it is personal preference or a decision of the contracting company).

Figure 7 shows that men have done a higher percentage (37.02%) of deep-sea sailing, while women have done 40% of domestic coastal sailing.

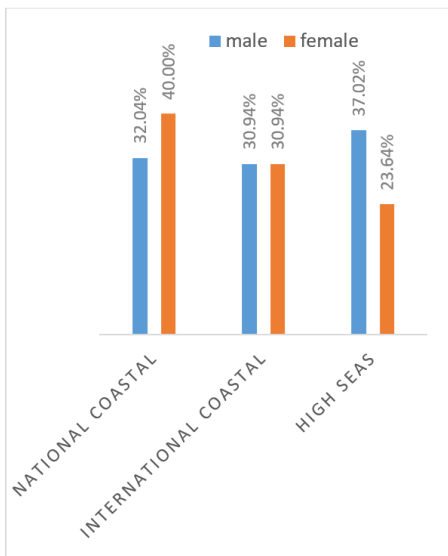


Figure 7. Gender and type of navigation

3.5 Stress

Stress has numerous definitions but this paper will focus on the one defined by Selye [32] as the adaptive response of the organism to various stressors.

Among the many causes that can cause stress, this study highlight those that are commonly present in work on board such as hierarchy, nutrition, rest and shift works, work-family balance, job satisfaction and intimidation and harassment. This last point is especially important given the low representation of women, who may feel intimidated or even mistreated on board [30].

Reference is made here to the study by Jordão and Ramos [33] which shows that when gender and stress are related, the differences are more reflected in the elements that cause stress and the coping mechanisms. In the case of the perception of occupational stress, the results obtained in this study reflect that rather than differences between men and women in terms of the experience of stress, the gender differences focus on the causes of stress and the forms of response to this experience, confirming the results obtained by authors such as Martocchio and O'Leary [34] and Makhbul and Hasun [35].

Given the paucity of previous studies in the field of gender and occupational stress, work on this issue has found that gender differences are limited to the fact that for men the elements causing occupational stress are, "lack of control over working conditions", "achievement and career development possibilities", while for women it is, "the high position in the hierarchical structure" and "the relationship between domestic and work responsibilities" [31] [36] [37] [38] [39].

Gu et al [40] in their study of 294 Chinese seafarers indicate that appropriate group activities on the ship are important in alleviating fatigue and stress and thus reducing the desire to change jobs.

Within the stress experienced on board, several topics to be taken into account are studied, such as the perceived level and symptoms of stress. In this regard, Baumler and Carrera-Arce [41] develop a matrix of risk factors for maritime suicide, organized into five parts

(i.e., the experience of being at sea, the distinctive nature of maritime society, health systems, community dynamics on board, and the impact of close and distant relationships) to guide the analysis on stress experienced on board. This tool allows for a systematic exploration of the complex interaction between seafarers and their natural and social environments.

Figure 8 shows that 46.11% of men report a low level of stress while 44.45% of women consider that the level of stress they suffer is high.

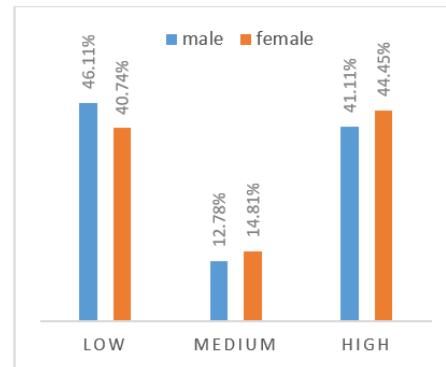


Figure 8. Gender and stress level

Stress has a series of effects on the physical and mental state of those who suffer from it, and in the maritime field it can trigger, in extreme cases, the consumption of drugs and alcohol, and even suicide.

The symptoms of stress most commonly reported by the survey participants were the following ones:

Tendency to eat, drink or smoke more than usual: This is the most frequently reported stress symptom. Figure 9 shows that this tendency occurs "very often" for 22.65% of men and for 41.82% of women.

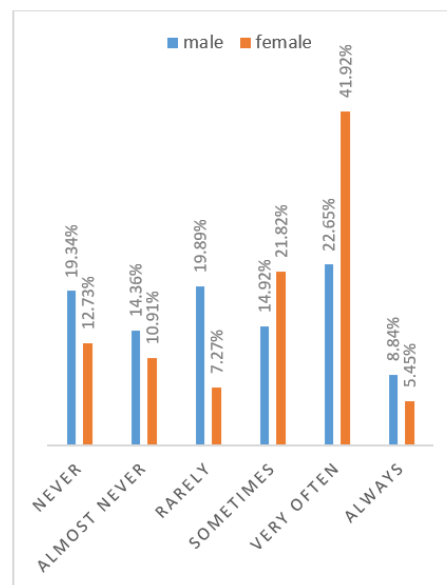


Figure 9. Gender and tendency to eat, drink or smoke more than usual

Migraines and headaches: Figure 10 shows that 25.97% of men almost never report suffering from "migraines and headaches", while 30.91% of women participants report suffering from these symptoms very often.

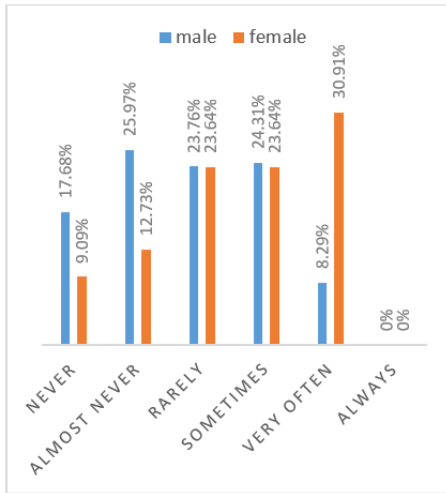


Figure 10. Gender and migraines and headaches

Inability to fall asleep: Figure 11 shows that both men (28.18%) and women (30.91%) report sometimes suffering from this symptom.

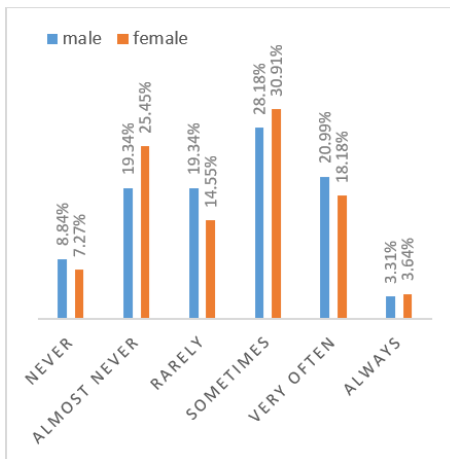


Figure 11. Gender and inability to fall asleep

Feeling of extreme tiredness or exhaustion: Figure 12 shows that both men (29.28%) and women (36.36%) reported that they sometimes suffer from "feeling extremely tired or exhausted". It should be noted that 55.25% of men and 74.54% of women have experienced this symptom from sometimes to regularly.

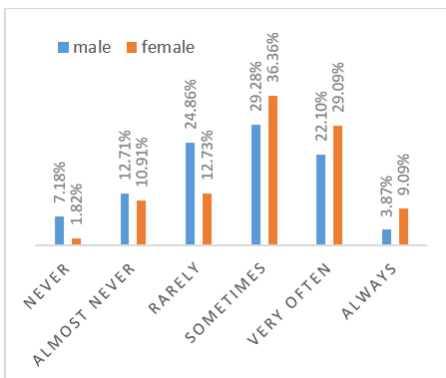


Figure 12. Gender and feeling extremely tired or exhausted

3.6 Fatigue

Fatigue alone is not considered an occupational disease in Spanish legislation [42]. Work fatigue is a

consequence of excessive activity and monotonous work, and can be alleviated with reasonable schedules, adequate rest periods and sufficient time for sleep, recreation and food. Fatigue, therefore, is presented as a decreasing aptitude to perform a job. Long periods of work are inevitably associated with fatigue; in these cases, the sensation of fatigue acts as a protective device of the organism, which serves to prevent total exhaustion.

The factors that lead to fatigue on board are personal conditions, for this reason personal data are analyzed in the survey of this study, socioeconomic conditions and work organization, for which the workload on board is of interest. In addition, the hours of sleep and leisure are considered crucial, and whether these are considered sufficient.

As is the case with stress, within fatigue it is worth highlighting data such as perceived level, rest hours, hours available for sleep, time available for leisure, and the consequences of fatigue.

Figure 13 shows that 23.39% of men report a low level of fatigue while 44% of women consider that the level of fatigue experience in the last trip is high.

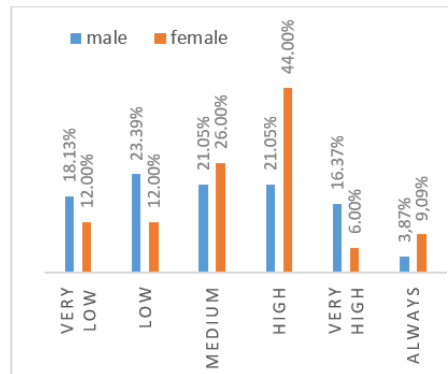


Figure 13. Gender and level of fatigue

The reference standard is the ILO Convention on hours of work and rest and on the other hand the STCW Convention on minimum crew depending on the tonnage of the vessel.

The Convention on work regarding working hours indicates that these shall not exceed 14 hours for every 24 hours, nor 72 hours for every 7 working days, on the other hand, the number of hours of rest shall not be less than 10 hours for every 24 hours nor 77 hours for every 7 days, it includes that the safety drills proposed on the ship and of mandatory compliance, shall be made so as not to disturb as far as possible the hours of rest of the crew and thus not to cause fatigue of the same [43].

Men and women are different in many ways, and the way they sleep is one of them, being a basic physiological need. Men need less sleep than women, women need on average 20 minutes more rest than men and this is because women have a multitasking brain, so the more the brain is used during the day, the more it needs to recover and, consequently, the more hours it needs to recover. Women suffer more health problems from sleep deprivation than men, and sleep deprivation in women is strongly associated with high levels of psychological stress and increased feelings of hostility, anxiety, depression and anger; feelings that were not associated to the same degree with sleep disruption in men [44].

More than 20% of the population is affected by Major Depressive Episode (MDE), causing impairment in the performance of important life tasks [45] [46] [47] [48].

Sleep is the central symptom of MDE, and according to Kuehner in 2003, women at the age of 65 are at greater risk of suffering from MDE than men [49].

In a 2022 study analysing the sleep of 205 Croatian male seafarers, 39% of the participants had sleep-related problems on board. The seafarers reported short, frequently interrupted sleep periods, night-time awakenings, daytime sleepiness, difficulties in concentration and a weak sleep schedule. This led to slower reaction times, impaired reasoning and poor mood stability. The result is physical problems such as constant fatigue, migraines and inability to sleep, where in many cases seafarers try to alleviate these ailments with medication and excessive coffee consumption [50].

Both men and women have 6 hours or more available to sleep. Figure 14 shows that 38.89% of the female respondents have 6 hours to sleep, and on the other hand, 33.33% of the male respondents recognize that they have 8 hours available to rest.

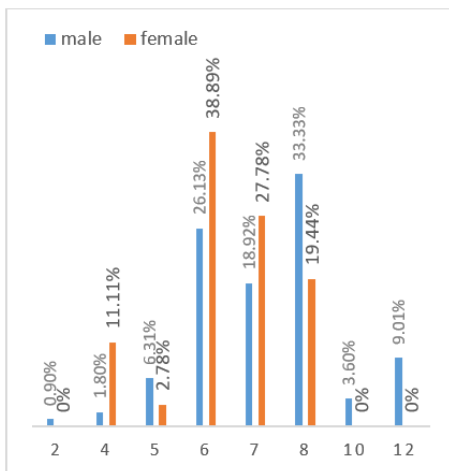


Figure 14. Consecutive hours available for sleeping

Asking if they consider the time they have to sleep as sufficient, in Figure 15, both 43.59% of men and 37.59% of women consider that the time available for sleeping is not enough.

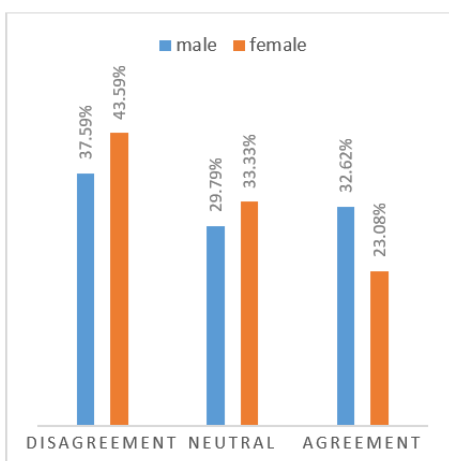


Figure 15. The time I have available for sleeping is sufficient

According to the responses of this survey, Figure 16 shows, 22.86% of women have 2 hours available for leisure, and 23.33% of men have 4 hours.

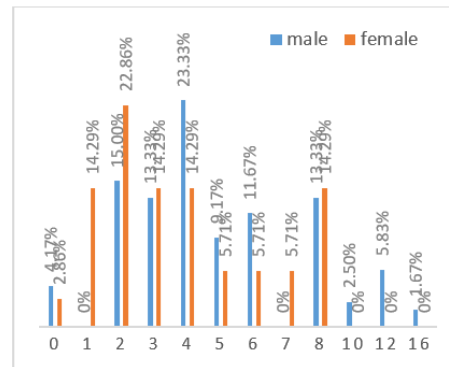


Figure 16. Hours at a time available for leisure

Following on from the previous question, Figure 17 shows that 44.68% of men and 46.15% of women consider that the time for rest is not enough.

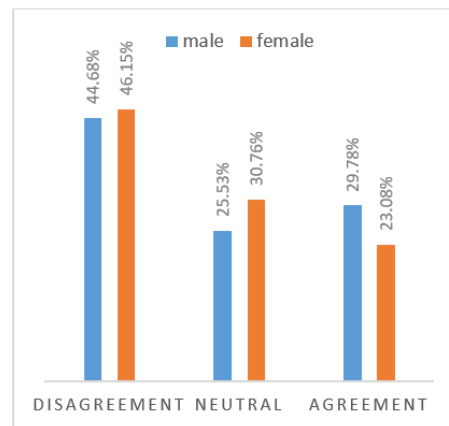


Figure 17. The time I have available for leisure is sufficient

According to the IMO in the “Guidance on Fatigue Reduction and Management” [51], when fatigue affects a crewmember's alertness, the crewmember's productivity can be significantly reduced. This reduction manifests itself in physical, emotional and mental traits, such as decision-making, quick reactions, perception, coordination between movement and vision, and countless other faculties. It is difficult for workers to appreciate the degree of fatigue they are experiencing, and fatigue can be dangerous. The following are some of the effects of fatigue on performance:

- Fatigued crewmembers have difficulty maintaining attention and may suffer memory lapses.
- Fatigue can affect an individual's ability to react to, perceive, interpret and understand stimuli and may require more time to deal with them.
- Fatigue also affects the ability to solve problems, which is an integral part of performing new or novel tasks. So the consequences will not be the same for the seafarer as for the officer on watch, because the role played also plays an important role.

The most commonly reported symptom of fatigue is “difficulty in concentration”.

Figure 18 shows that 29.89% of men and 32.00% of women reported to suffer difficulty concentrating,

which means that this problem is present in almost a third of workers.

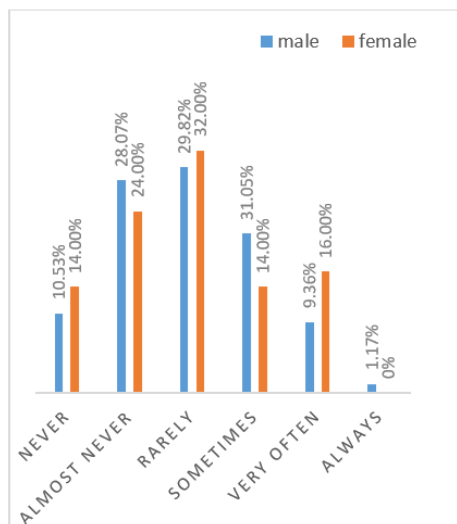


Figure 18. Gender and difficulty concentrating

3.7 Other factors affecting fatigue and stress

A research on the occupational health of 668 Chinese seafarers, shows that they seem to be satisfied with their wages and the quality of the food on board, but they are less satisfied with the long voyages, excessive daily working hours, environmental stress and isolation from their families leading to numerous physical and emotional problems, with psychological problems coming second (7% of respondents). Chinese seafarers call for improved communication with family and friends, good medical care and enriched psychological counselling services (28% of respondents acknowledged a need for psychological counselling) [52].

In relation to the study carried out, the results obtained for the parameters “food on board”, “communication” and “isolation” are shown next.

We can observe a difference between men and women, the Figure 19 shows that 41.14% of men think that the food on board is healthy while only 28.20% of women think so.

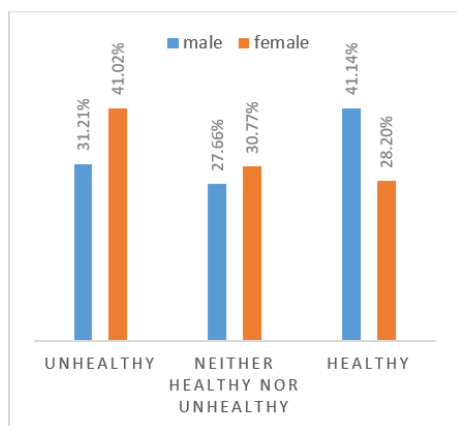


Figure 19. I consider the food on board to be healthy

Figure 20 shows that 47.37% of men and 44% of women acknowledge that they communicate with your family and friends by telephone or internet.

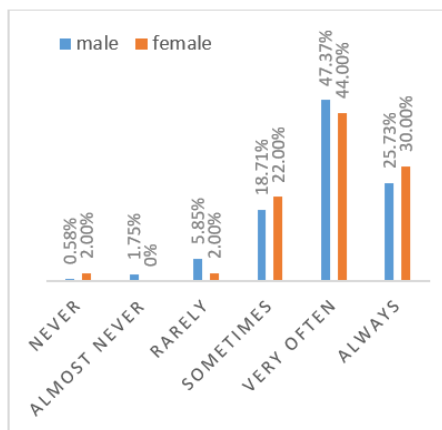


Figure 20. Gender and frequency with which you can communicate with your family and friends by telephone or internet

Although seafarers are increasingly able to communicate regularly with family and friends thanks to technological advances, crew members report feeling isolated on board.

Figure 21 shows that 43.27% of men and 36% of women acknowledge that they ‘sometimes’ feel isolated during the trip.

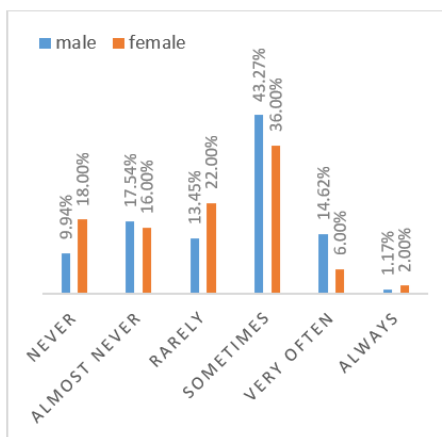


Figure 21. Gender and frequency with which you feel isolated during the trip

4 CONCLUSIONS

The results show that a relationship between the seafarers’ gender and the perception of both stress and fatigue can be established. This conclusion is reached through the analysis of personal characteristics and how the results vary depending on gender. Several variables have been compared to determine if differences between men and women perception can be established. The first important difference is the average age of gender groups, although both are between 31 and 40 years old (the age at which most of their working life is spent), 27.67% of men continue working on board beyond the age of 50, while only a meager 2% of women do so. This is probably related to the fact that women have less than five years of experience and most men have more than 10 years of experience working at sea. In addition, most of women sail in coastal navigation vessels, whereas men prefer deep-sea navigation, this could point out a relationship between the crew members’ personal conditions and

the type of navigation. Next, it should be noted that while 25.15% of men are captains only 6.52% of women occupy commanding positions. Something very similar happens in the engine section, while more than 10% of men occupy the position of chief engineer a scarce 4% of women do so. According to this data it could be established that the fact of women sailing less time makes it difficult for them to manage to reach the highest positions on board. The reasons may be that if they do not work on board long enough they do not really acquire the professional qualification to be a captain or a chief engineer, or they do not acquire enough stability within the company to be assigned to these positions.

With regard to the symptoms of stress, although more than 30% of the participants suffer from migraines or headaches, there is a notable difference between genders: 26% of men say they “almost never” suffer from migraines or headaches and almost 31% of women say they suffer from them “very often”. With regard to “tendency to eat, drink and smoke more than usual”, differences are also observed since 42% of female seafarers suffer from it “very often” compared to 22.65% of male seafarers who report this. In addition, 74.54% of female seafarers suffer from a “feeling of extreme tiredness or exhaustion” compared to 55.25% of male seafarers who suffer from this symptom.

As for the level of fatigue, there is a significant difference, with 24% of men reporting a “low” level of fatigue and 44% of women a “high” level.

As for the hours of sleep and whether this time is enough, although both sexes tend to say that this time is not enough, in the case of women the percentages are higher, probably because women need more hours of deep sleep and rest to recover mentally.

There are other factors that can influence stress and/or fatigue, such as food, 51.02% of the women consider it to be unhealthy, while 31.21% of the men think so. Other important data is that despite being able to communicate with their loved ones often while on board, 43.27% of men and 36% of women feel isolated during the trip.

The results obtained in this study show that men and women have different ways of perceiving and coping with stress and fatigue and that several topics such as the gender differences in job promotion, influence of family conditions on job performance and how living conditions on board can affect male and female welfare differently, need further and in depth research.

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