Original Article

Enhancing Health and Wellness at Sea: Assessing the Need of Physical Therapy Services on Cruise Ship Staff to Improve Crew Well-Being

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Abstract

Cruise ship employees often work long, exhausting hours in physically demanding environments, yet they have limited access to proper healthcare. While the cruise industry prioritizes passenger comfort and safety, far less attention has been given to the health needs of the crew. This research explores whether onboard physical therapy (PT) services could address the growing problem of musculoskeletal disorders (MSDs) among cruise ship workers. A quantitative survey was conducted among 208 employees using structured questionnaires to assess the frequency and severity of musculoskeletal pain, work-related health concerns, and the availability of medical support on board. Descriptive statistics were used to analyze the responses. Results revealed a strikingly high incidence of MSDs. Lower back pain was the most common complaint (80.77%), followed closely by shoulder pain (77.88%). Many crew members (72.12%) reported working 10 or more hours each day, and 63.94% noted that their lower back pain worsened during work. Although more than two-thirds (66.7%) had been advised by physicians to undergo physical therapy, no onboard PT services were available to them. These findings highlight a clear and urgent need for accessible physical therapy on cruise ships. Long working hours, repetitive tasks, and poor ergonomics contribute signifi-cantly to MSDs, ultimately reducing worker productivity and increasing absenteeism. Imple-menting PT services could improve crew well-being, reduce injury rates, and support more efficient ship operations. Future studies should explore cost-effective strategies for integrat-ing physical therapy into onboard health systems to better support the workforce that keeps the cruise industry running.

***Keywords**:* physical therapy, cruise ship, musculoskeletal pain, crew health

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Introduction

According to Kulik (2024), a cruise ship is a big vessel mostly used for leisure cruising. In contrast to the past, when cruises were typically taken on ships designed for other purposes, like mail delivery ships or ocean liners intended for transportation, modern cruise ships are essentially floating vacation spots with multiple dining options, entertainment options, and sports facilities. According to Cruise Industry News (n.d.), due to the high demand for work in the cruise tourism industry and market projections through 2027, cruise companies must hire an additional 80,000 officers and crew members annually for the next ten years. Per the Maritime Labour Convention, 2006 (2024), seafarers can only work for 11 months. However, some individuals who signed up for 3- to 4-month contracts have spent up to 18 months on board due to the extended restrictions preventing them from changing crew. Workers put in up to 12 hours a day, seven days a week, and have become mentally and physically weary.

Roberts et al. (2020) posits that occupational therapy places a unique and immediate focus on patients' functional and social needs, which can be important drivers of readmission if they are not addressed. By addressing activities of daily living, instrumental activities of daily living, functional cognition, psychosocial needs, vision, fear of falling, and safety, physical therapy practitioners can be a valuable addition to the effort to keep people out of the hospital and participating in their lives. Having a ship's doctor on board is standard, but the ship does not carry any medical specialists. It should be stated whether there is an increase in the need of therapies for specific diseases or injuries, as well as whether crew members are treated more frequently in certain occupational groups (work areas on board) and countries of origin.
Miller (2024) states that numerous injuries and accidents might happen when operating at sea. A few of the more common ones are falls, trips, and slips. These are common because of the vessel's tight spaces, slick surfaces, and constant motion. Musculoskeletal Strains: These injuries, which affect the limbs, shoulders, and back, are brought on by prolonged physical exertion, heavy lifting, and repetitive activity. Falls Overboard: These are very dangerous mishaps often occur when individuals move between vessels or work on open decks. Numerous injuries sustained on a cruise ship may necessitate continuous medical care, medicine, and physical or occupational rehabilitation. These consequences may be debilitating and disheartening the financial effects. It could also deny the person the pleasure of living his/her everyday life. Tolera et al. (2023) also report that the incidence of MSDs in the world among sanitary workers is 40.52% and solid waste collectors have the highest incidence of 45.12%.

Sanchez-Rodriguez et al. (2023) report that hotel housekeepers and cleaners experience MSDs the most in the lower back (53.9%), shoulders (41.4%), and wrists/hands (40.1%). These findings show the prevalence rates of MSDs in different careers, which leads to the necessity of ergonomic and further research to solve this international health issue in the occupation. The cruise ship workers are people that work in different capacities and are vital to the maintenance, running, and the service of the cruise ship. Although the cruise industry acknowledges the importance of crew wellbeing, little research has been done on the benefit of Physical Therapy (PT) treatments in this group. The current studies often address the demands by the passengers, or the care responding to the injuries, but they do not adopt the possible advantages of the early intervention and preventive physical therapy interventions to the crew members. Such a gap in research does not help in formulating evidence-based intervention to meet the various musculoskeletal needs and risks faced by employees in the cruise ships.

Objectives

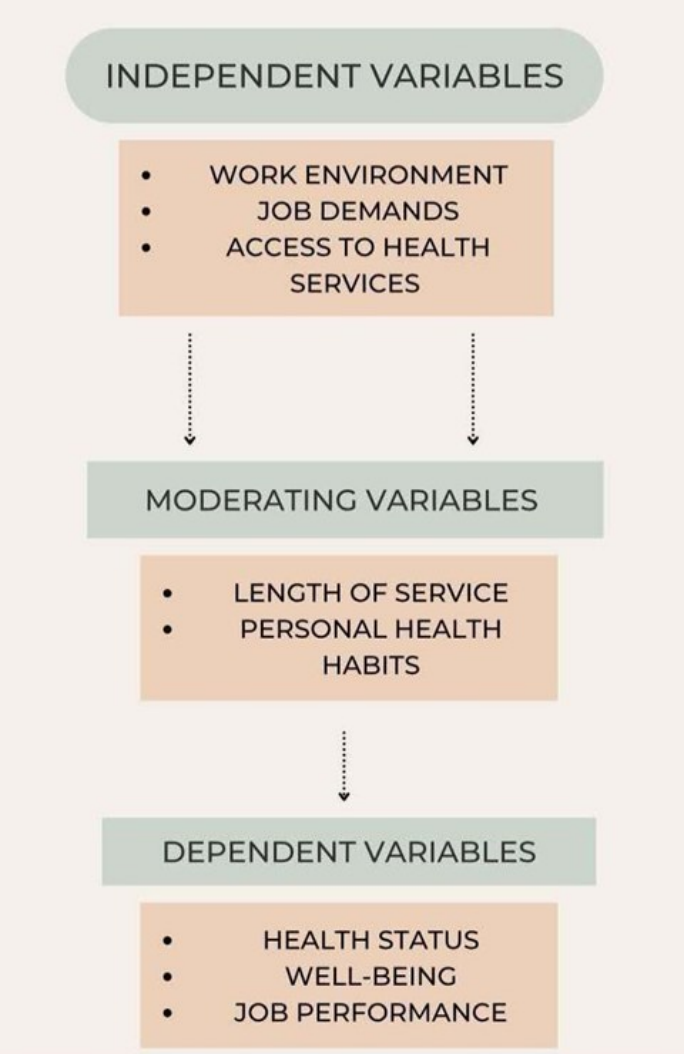
The paper evaluates the musculoskeletal pain and other health issues among cruise ship workers in terms of prevalence, impact, and management to establish the necessity of physical therapy services on the ship. In particular, this research will set the following objectives:

1. To characterize demographic and work-related aspects among cruise ship employees and study the most prevalent musculoskeletal pain they have onboard.

2. To measure the effect of musculoskeletal pain on the work performance and general well-being of the employees including the alterations in the pain levels during and after work shifts and after rest.

3. To establish the prevalent medical diagnoses, prescription drugs used, and medical advice provided to the employees especially the referral to the physical therapy services.

Conceptual Framework



The conceptual framework offers an organized way to explore the issue of factors contributing to the necessity of physical therapy among the staff of the cruise ships and work out the successful strategies to enhance their health and well-being.

Methodology

Research Design

This quantitative study examines and gathers information on the responses of the participants. Quantitative research involves application of numerous statistical techniques such as survey. In our research, we employed surveys as the method of receiving feedback of the cruise ship employees regarding the necessity and quality of physical therapy on the ship or the prevalence of muscular issues.

Participants

The number of crew was 400. The sample was estimated at 200 employees of cruise ships using the Yamane Formula at 5% margin of error. Demographic profile information (age, gender and years of service) was gathered before the survey.

Sampling Technique

Purposive and convenience sampling technique was used. The sample size was a pre-selection based on some pre-specified factors that were associated with the study such as having physically demanding jobs in cruises. The convenience sample was used as the method of sampling because it was convenient with the participants to be used being available and willing.

Instrument

The main tool of the research was a questionnaire constructed in the form of a Google Form, including the items of the survey of the Canadian Centre of Occupational Health and Safety on work-related musculoskeletal disorders (WMSDs). It involved questions on the job details, type, and location of the pain and influence on daily functioning.

Data Gathering

The researchers sent the survey to the cruise ship employees through Google Forms. The questionnaire included sections on individual and professional data; musculoskeletal pain in specific areas (neck, shoulder, elbow, wrist/forearm, hand, upper back, lower back, and foot); pain development during the working process, after, and between shifts; medication usage; current medical coverage on board; and physical therapy referrals by doctors. The collected data were securely stored and prepared for analysis.

Data Analysis

The predominance of musculoskeletal pain and demographic data summaries were completed using descriptive statistics. Cross-tabulations were used to investigate the correlations between the severity of pain, the work-related factors and the effect of the same on well-being. The analysis of the findings was done to determine the dynamics of health concerns and need of physical therapy services on board. The data on various measures such as the rate of injuries, absenteeism, employee satisfaction, and operation performance before and after deployment of physical therapy services would likely be required to measure the impact of proactive physical therapy services on the health and productivity of employees working in cruise ships. Subsequently, statistical analysis would be implemented to determine whether these areas have noticed a significant improvement since the services were initiated. Qualitative data, including staff

suggestions and comments, can also bring insight on how the participants perceive the benefits of the program.

Results and Discussion

The result of the research is based on the feedback of 208 qualified employees of the cruise ships who responded to the survey. The findings were tabulated into three parts to give a wholesome picture of the musculoskeletal pain among cruise ship employees. Part I elaborates the demographic and work-related characteristic of the employees, and the most frequently reported body pains during work on board. The second part examines how they consider musculoskeletal pain to have impacted their life and work performance. Finally, the last part shows the other medical requirements of the cruise ship employees as they work in the ocean. These findings can be used as a basis to assess the need of physical therapy services on board.

Table 1

Summary of the Demographic and Work-related Characteristics of Selected Cruise Ship Employees

Demographic Profile and Body Pain Experienced by Cruise Ship Employees

Demographic Variable	Count	Percentage
Gender		
Female	32	15.38
Male	174	83.65
Prefer not to say	2	0.96
Age group		
25- 30 years old	31	14.9
30 - 35 years old	54	25.96
35 - 40 years old	82	39.42
40 - 42 years old	22	10.58
45 years old and up	19	9.13
Work hours per day		
Less than 8 hours	18	8.65
10 hours	150	72.12
12 hours or more than	40	19.23
Job Tenure		
Less than 3 months	3	1.44
3 to 12 months	30	14.42
More than 1 but less than 3 years	37	17.79
3 to 5 years	62	29.81
More than 5 years less than 10 years	56	26.92
More than 10 years	20	9.62

Table 1 provides a summary of the demographic and work-related variables of the 208 cruise ship employees who were surveyed. Most of the respondents were men (83.65%) and female employees were only 15.38% of the sample but a low percentage (0.96%) chose not to disclose their gender. With respect to age, the majority of employees were between the age group of 35-40 years old (39.42%), and the sec-

ond age group of 30-35 years old (25.96%). The percentage of employees aged 25-30 years (14.9%) and aged 40-42 years (10.58%) was the lowest and represented the least proportion of the employees. These data indicate that the workforce is concentrated in the mid-adult age range, with comparatively fewer employees in the youngest and oldest age groups.

When it comes to the work hours, most of the cruise ship employees were found to work 10 hours a day (72.12%), 19.23% worked 12 or more and only 8.65% worked less than eight hours. This implies that one of the characteristics of employment on board is that of extended working hours. Concerning the tenure of employment, almost a third of the respondents (29.81%) had worked in 3 to 5 years, and 26.92% in 5 to less than 10 years. A lower percentage of employees had over one year to less than three years of experience (17.79%), and only 9.62% had over 10 years of experience. The least percentages were recorded in the employees with 3 to 12 months (14.42%) and less than 3 months (1.44%) job tenures. The results indicate that although a high percentage of employees have a stable work history at board, there are also significant short-term employees, which may be a symptom of staff turnover or new staffing patterns.

Figure 1

Most Common Body Pain Types Experienced by Selected Cruise Ship Employees

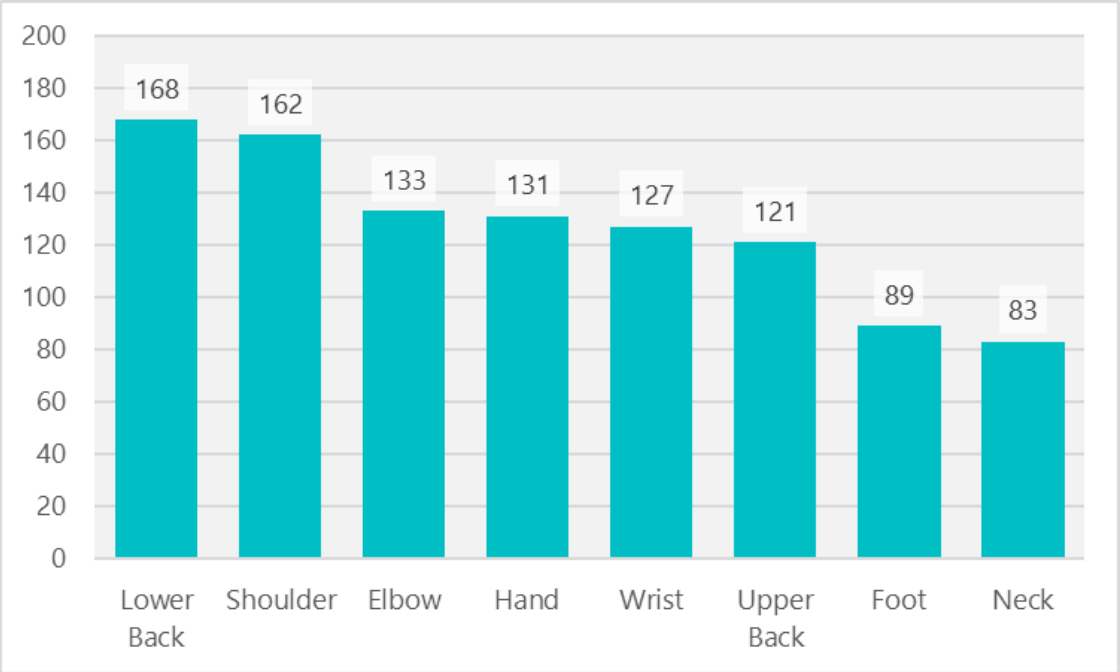


Figure 1 shows the prevalent forms of body pain among employees of a cruise line. The most reported was lower back pain with 80.77% (168 out of 208) respondents indicating that they experienced it. Pain in the shoulder was also very prevalent with 77.88% (162 out of 208) employees reporting the same. Elbow (63.94%), hand (62.98%), and wrist (61.06%) pain were also experienced, and this is very indicative of a high load of discomfort in the upper limbs. The issue of upper back pain among the employees was rated at 58.17%, which once again highlighted strain on the back area. The presence of pain in these regions is high, which is why it is possible that the physical requirements of working on a cruise ship (repetitive work, long-term standing, and heavy lifting) are some factors that cause musculoskeletal stress.

Lower limb pain was less prevalent with 42.79% of the employees reporting foot pain and 39.90% of the respondents reporting neck pain. The fact that these percentages are less than the upper body pain, does not mean that they do not signal significant discomfort that may be attributed to prolonged standing and walking. In general, the results indicate that musculoskeletal pain is a common issue among the employees of the cruise ship, which can adversely affect their work performance and quality of life. These findings demonstrate the role played by ergonomic factors in the workplace, prevention, and the possibility of physical therapy services on board to help in the management and mitigation of these conditions.

Effects of Body Pain at Work

Table 2

Experiencing Pain and Discomfort During Work of Selected Cruise Ship Employees

Body Pain	Less	Same	Worse
Neck	100 (48.08%)	69 (33.17%)	53 (25.48%)
Shoulder	38 (18.27%)	90 (43.27%)	106 (50.96%)
Elbow	59 (28.37%)	101 (48.56%)	78 (37.50%)
Wrist	62 (29.81%)	100 (48.08%)	69 (33.17%)
Hand	68 (32.69%)	77 (37.02%)	86 (41.35%)
Upper Back	63 (30.29%)	81 (38.94%)	89 (42.79%)
Lower Back	34 (16.35%)	55 (26.44%)	133 (63.94%)
Foot	96 (46.15%)	75 (36.06%)	54 (25.96%)

Table 2 provides the changes in pain and discomfort that have been reported among cruise ship employees in the course of working on board. Shoulder pain was reported to have significantly increased most commonly, and 50.96% of the participants reported that the pain had become more uncomfortable. Likewise, the evidence of the lower back pain revealed a pronounced aggravation where 63.94% of the employees reported that their pain aggravates during their work. The high proportion of employees who reported the worsening condition was also recorded in upper back pain (42.79%). These results indicate that occupations involving prolonged standing, lifting, or doing repetitive upper body activities could be the cause of such discomfort especially in the back and shoulders.

On the other hand, some employees reported experiencing relief from certain types of pain while performing their work. For example, improvements in neck pain were noted by 48.08% of respondents. Foot pain also showed substantial improvement, with 46.15% of employees reporting reduced discomfort compared with previous levels. Decreases in hand pain and wrist pain were similarly observed in 32.69% and 29.81% of respondents, respectively. These findings suggest that specific work conditions or modifications—such as variations in job tasks, adequate rest periods, or ergonomic adjustments—may have contributed to reductions in pain in several body regions.

For elbow pain, 48.56% of respondents reported experiencing the same level of discomfort, indicating that for many employees, this pain neither improved nor worsened. On the same note, the same pat-

tern was observed in relation to the wrist pain with 48.08% of the employees showing no change in the level of pain. These findings indicate that though there are forms of musculoskeletal pain that can be exacerbated by work practices, there are also those that cannot be alleviated by time, implying that specific efforts are required to control and prevent aggravated states, e.g., workplace ergonomics, stretching exercises, or physical therapy services provided on board.

Table 3

Experiencing Soreness and Discomfort after Shift of Selected Cruise Ship Employees

Body Pain	Less	Same	Worse
Neck	95 (45.67%)	77 (37.02%)	48 (23.08%)
Shoulder	36 (17.31%)	90 (43.27%)	104 (50.00%)
Elbow	49 (23.56%)	104 (50.00%)	83 (39.90%)
Wrist	58 (27.88%)	104 (50.00%)	72 (34.62%)
Hand	53 (25.48%)	94 (45.19%)	80 (38.46%)
Upper Back	59 (28.37%)	79 (37.98%)	92 (44.23%)
Lower Back	31 (14.90%)	57 (27.40%)	134 (64.42%)
Foot	89 (42.79%)	86 (41.35%)	59 (28.37%)

Table 3 shows the experience of soreness and discomfort on the workers after their most recent shifts in the cruise line. Lower back pain showed the greatest increase, with 64.42% of employees reporting that their discomfort worsened after their shift. On the same note, shoulder pain followed a similar trend, as 50.00% of the respondents indicated that their shoulder pain worsened. Increased upper back pain was also escalating a serious percentage among the workers (44.23%). The results indicate that the physically stressful activities, standing for long periods, and motion repetitions provoke the increase in the frequency and intensity of back and shoulder pain, which implies the necessity to enhance workplace ergonomics and introduce physical therapy provision on board.

In the case of the elbow pain and the wrist pain, the highest response was that the amount of discomfort had not changed as the 50.00% of employees reported that their levels of pain had not changed after their shifts. On the same note, hand pain was also persistent, with 45.19% of employees reporting no changes or aggravations. These findings imply that some musculoskeletal pains do not disappear during the working shifts, which implies that the strain on the upper limbs could occur rather than improve or deteriorate acutely. Unless correct rest, ergonomic, and physical interventions are provided, these conditions could continue and even result in chronic pain or chronic musculoskeletal problem.

Conversely, neck pain showed notable improvement, with 45.67% of employees reporting reduced discomfort after their work hours. Foot pain also recorded significant improvement where 42.79% of the employees reported that they felt less pain post-work. These results indicate that some types of discomfort can be reduced either by taking a rest or altering the work activity patterns following the shift. Nevertheless, as a significant proportion of employees also mentioned an increasing pain in various body parts, the

findings demonstrate the significance of such prevention measures as workplace stretching exercises, better work posture, and on-board rehabilitation services to address the musculoskeletal pressure.

Table 4

Experiencing Soreness and Discomfort after a Week Off from Work of Selected Cruise Ship Employees

Body Pain	Less	Same	Worse
Neck	93 (44.71%)	86 (41.35%)	43 (20.67%)
Shoulder	38 (18.27%)	96 (46.15%)	94 (45.19%)
Elbow	52 (25.00%)	95 (45.67%)	80 (38.46%)
Wrist	47 (22.60%)	111 (53.37%)	65 (31.25%)
Hand	50 (24.04%)	99 (47.60%)	77 (37.02%)
Upper Back	50 (24.04%)	91 (43.75%)	86 (41.35%)
Lower Back	24 (11.54%)	72 (34.62%)	125 (60.10%)
Foot	87 (41.83%)	83 (39.90%)	55 (26.44%)

Table 4 displays the experiences of the employees of soreness and discomfort upon having a week off work with the emphasis on whether their musculoskeletal pain has improved, remained unchanged, or worsened. The most frequent answer was the lower back pain, where 60.10% of the respondents said that their pain did not disappear or got worse despite the break. Likewise, shoulder pain intensified for 45.19% of employees, while upper back pain also remained a serious issue, with 41.35% reporting increased discomfort. These findings indicate that despite the rest, pain in such areas does not completely go away, and it may be because of the accumulated strain caused by the earlier work shifts or active musculoskeletal conditions that require interventions beyond temporary rest.

In some forms of musculoskeletal pain, the most common reaction was that the symptoms remained unchanged. The highest percentage of employees who reported no improvement after a week off work experienced wrist pain (53.37%), followed by hand pain (47.60%) and elbow pain (45.67%). Such results suggest that in a number of employees the pain in these areas may be chronic and not materially alleviated by time out of work. This may be a result of repetitive strain injury or long-term musculoskeletal problems that demand specific remedies, including physiotherapy, ergonomic modifications, or structured rehabilitation programs.

On the other hand, the most common ones were neck pain and foot pain where most employees, 44.71 and 41.83 percent respectively, indicated that they experienced less discomfort after a week of rest. These findings indicate that there are certain musculoskeletal pain types that could be reduced with proper rest, which might be caused by the decreased load and increased circulation. Nonetheless, due to the substantial percentage of workers who still reported the presence of unremitting or progressive pain in various parts of the body, these results highlight the importance of proactive organizational measures, such as ergonomic adjustments and guided physical therapy sessions, as well as pain control measures to mitigate the development of long-term musculoskeletal problems in cruise ship employees.

Table 5

Perceived Effects of Body Pain on the Cruise Ship Employee's Work

Body Pain	No interference	Some interference	It affects me every night	Had to take time off work due to pain	Had to stop enjoying activities due to pain
Neck	80 (38.46%)	89 (42.79%)	11 (5.29%)	20 (9.62%)	8 (3.85%)
Shoulder	42 (20.19%)	72 (34.62%)	18 (8.65%)	52 (25.00%)	24 (11.54%)
Elbow	44 (21.15%)	85 (40.87%)	23 (11.06%)	35 (16.83%)	21 (10.10%)
Wrist	44 (21.15%)	99 (47.60%)	15 (7.21%)	37 (17.79%)	13 (6.25%)
Hand	38 (18.27%)	99 (47.60%)	23 (11.06%)	41 (19.71%)	7 (3.37%)
Upper Back	32 (15.38%)	82 (39.42%)	15 (7.21%)	59 (28.37%)	20 (9.62%)
Lower Back	28 (13.46%)	50 (24.04%)	22 (10.58%)	66 (31.73%)	42 (20.19%)
Foot	64 (30.77%)	85 (40.87%)	12 (5.77%)	38 (18.27%)	9 (4.33%)

Table 5 shows the perceived impacts of body pain to the work of cruise ship workers, and it shows the level to which musculoskeletal pain disrupts the daily work of the workers. The most frequent reaction of all body pains except lower back pain was to have some interference meaning that a significant number of employees had moderate level of disruption of their work by pains. This was especially the case with wrist pain (47.60%), hand pain (47.60%), and upper back pain (39.42%), indicating that manual labor and standing or lifting up could be the cause of discomfort in relation to work performance. Similarly, neck pain (42.79%) and foot pain (40.87%) showed high percentage of employees who reported some amount of work interference, which supports the effect of working long hours and physical stress.

In a more severe effect, lower back pain recorded the highest percentage of employees who were forced to take a leave of work because of pain (31.73%), upper back pain (28.37%), and shoulder pain (25.00%). These data suggest that the back and shoulder pain can be very disabling, resulting in workplace absenteeism and possible loss of productivity. Also, lower back pain (20.19%), was the most prevalent percentage of employees who had to stop the things they enjoyed because of pain demonstrating its high effect on working and the overall quality of life. The pain in the shoulders and upper back was also in the range of the leading causes of employees being forced to cease activities outside of work.

Regarding the aspect of chronic pain, the most reliable responses were the elbow, hand pain (11.06%) and lower back pain (10.58%) indicating that the employees experience pain in the same areas every night, which could be a manifestation of persistent strain that cannot be eliminated even after work. Persistent pain indicates the probable necessity of active intervention in the workplace, such as physical therapy, ergonomic modifications, and adequate rest. Generally, the outcomes of the study also reveal the significant implications of musculoskeletal pain on the staff members in a cruise ship in terms of work effectiveness, health care, and in certain instances, absenteeism or less quality of life. The findings also contribute to the relevance of physical therapy services and changes in the workplace environment to reduce pain and improve the well-being of employees.

Table 6

Perceived Effects of Body Pain on the Cruise Ship Employee's Life Outside Work

Body Pain	No Interference	Some interference	Had to stop enjoying activities due to pain
Neck	86 (50.29%)	62 (36.26%)	29 (16.96%)
Shoulder	47 (29.56%)	60 (37.74%)	34 (21.38%)
Elbow	51 (32.28%)	61 (38.61%)	41 (25.95%)
Wrist	53 (31.93%)	75 (45.18%)	28 (16.87%)
Hand	51 (28.98%)	75 (42.61%)	24 (13.64%)
Upper Back	40 (23.12%)	63 (36.42%)	24 (13.87%)
Lower Back	30 (20.13%)	45 (30.20%)	40 (26.85%)
Foot	76 (41.53%)	70 (38.25%)	20 (10.93%)

Table 6 provides the perceived impacts of the pain on the lives of the cruise ship employees when they are not at work and the effect that the pain has about their daily life. Some interference was the most resounding answer of most of the forms of body pain, which implies that musculoskeletal pain does not entirely deprive employees of activity but has an impact on their quality of life. This occurred most commonly on wrist pain (45.18%), hand pain (42.61%), upper back pain (36.42%), and foot pain (38.25%), which means that pain in these parts can also restrict mobility and dexterity that could impact individual chores, leisure activities, and overall mobility without work. Moderate interference was also caused by neck pain (36.26%) and shoulder pain (37.74%), which also supports the idea that work-related physical strain is transferred to the personal life of the employees.

In case of more severe effects, the highest percentage of employees who reported the necessity to stop having recreational activities because of pain were those experiencing elbow pain (25.95%) and lower back pain (26.85%). This implies that such musculoskeletal issues in these areas can significantly hinder individuals from exercising, socializing, and engaging in other leisure activities. Shoulder pain (21.38%) and upper back pain (13.87%) also emerged as major contributors to activity restriction, which proves the substantial impact of upper body pain in daily life. Even though there were less workers who said they had ceased operations because of foot pain (10.93%) and wrist pain (16.87%), these results nonetheless indicate that preventive measures and after-work pain management methods should be employed.

Although these were seen to be the challenges that were reported by a considerable percentage of employees, it was seen that there was a significant proportion of employees that said their pain did not affect their daily activities. The majority of pain-free participants were observed in the neck pain category (50.29%), then foot pain (41.53%), which indicates that these pain types are less disabling outside of employment or can be reduced by rest. Nevertheless, with such conditions as lower back pain (20.13%) and upper back pain (23.12%), the percentage of the employees who stated no interference was not that high, which means that these forms of pain are more chronic and significant. On the whole, the results indicate that even though some workers are able to cope with their musculoskeletal problems in their personal lives, a considerable number of them still report the restrictions, which implies that even their extended

physical treatment, the pain management education, and ergonomic changes at the workplace and at home should be considered.

Table 7

Perceived Effects of Body Pain on the Cruise Ship Employee's Sleep Patterns

Body Pain	No Interference	Some interference	It affects me every night
Neck	94 (47.47%)	49 (24.75%)	55 (27.78%)
Shoulder	49 (26.34%)	47 (25.27%)	90 (48.39%)
Elbow	52 (28.89%)	54 (30.00%)	74 (41.11%)
Wrist	54 (29.35%)	61 (33.15%)	69 (37.50%)
Hand	55 (29.89%)	56 (30.43%)	73 (39.67%)
Upper Back	31 (17.13%)	56 (30.94%)	94 (51.93%)
Lower Back	25 (14.45%)	38 (21.97%)	110 (63.58%)
Foot	75 (40.11%)	58 (31.02%)	54 (28.88%)

Table 7 shows the perceived impacts of body pain on sleep pattern of employees in cruise lines. Lower back pain emerged as the most influential factor, with 63.58% of employees reporting that they experienced it every night. This was followed closely by upper back pain (51.93%) and shoulder pain (48.39%) suggesting that discomfort in these areas is a major contributor to sleep disturbances. These results indicate that musculoskeletal stress due to physically challenging work still persists among workers even during rest that may cause chronic sleep disorders, fatigue, and inability to recover for daily work activities.

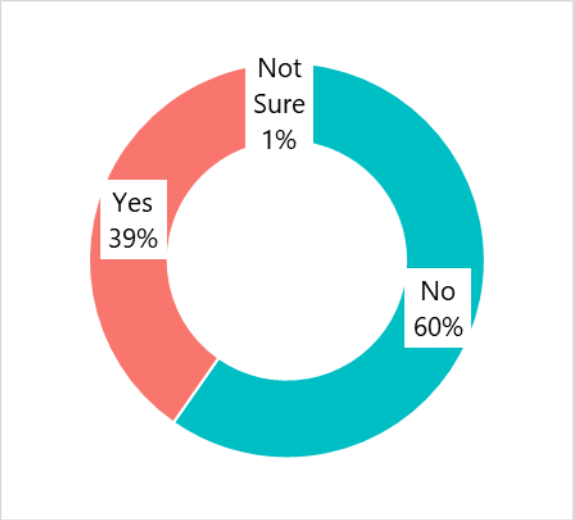
In the case of other forms of pain, it was reported that the pain that significantly affected sleep every night was the elbow pain (41.11%), hand pain (39.67%), and wrist pain (37.50%). It implies that the chronic pains in the upper limbs, which might be a result of monotony and overhead lifting, are factors that make the patients experience pain even when not in the workplace. In the meantime, foot pain (28.88%) and neck pain (27.78%) were slightly lower in percentages of employees reporting nightly disturbances, so they are not as disruptive, as back and shoulder pain, but still they disrupt restful sleep of a large number of employees.

However, these disruptions did not affect the employees as others claimed not to be bothered with sleep with the neck pain (47.47%) and the foot pain (40.11%) proving to be the most manageable. Nevertheless, the proportion of employees that experienced no consequences after having lower back pain and upper back pain was 14.45 and 17.13 percent, respectively, thus stressing the idea that these kinds of pain have the most drastic effects on the quality of sleep. Based on these results, it is clear that musculoskeletal pain has a severe impact on the capability of cruise ship employees to attain restorative sleep, which may influence their job execution, general wellness, and health. It indicates that preventive measures with regard to good ergonomics, pain management techniques, and physical therapy availability need to be taken to diminish the chronic pain impact on sleep and recovery in the long run.

Medical Needs on Board

Figure 2

Presence of Other Health Problems at Work



As shown in Figure 2, employees of cruise ships have other health issues present during work. Most of the respondents (60%) said that they did not have any other health-related problems other than musculoskeletal pain. Nevertheless, a considerable percentage (39%) reported that they experienced other health issues during their shifts, which implies that a considerable number of the employees have other health-related problems that can affect their health and work performance. Only a small proportion (1%) of the respondents were in doubt of other existing health issues. These results demonstrate that a more in-depth strategy of health management of the workplace, comprising medical assistance and preventive health care services on board, should then be provided to consider the overall health of the cruise ship workers.

Table 8

Most Common Medical Diagnosis on Board

Other Diagnosis	Count	Percentage
Injuries	78	37.86
Hypertension	74	35.75
Arthritis	60	29.27
High Cholesterol	41	20
PTSD	38	18.45
Diabetes (Type II)	32	15.53

Table 8 shows the most frequent medical reports among cruise ship employees aboard. The most common diagnosis was injuries, with 37.86% of the workers having injuries, which means that the physical stress of the job, as well as work accidents, are common in this workplace. The second most prevalent diagnosis was hypertension with 35.75% of the respondents reporting to have it implying that workplace stress and other lifestyle habits can be the reasons behind increased blood pressure. Another health issue to note was arthritis with a prevalence rate of 29.27% of the employees and this could be attributed to the repetitive motion and the long periods of physical activity that the employees had to go through during their work. High cholesterol (20%), post-traumatic stress disorder (PTSD) (18.45%), and Type II diabetes (15.53%) were also some of the other medical conditions reported, which means that some workers also experience chronic health problems that have to be managed over an extended period. Such results highlight the need to have convenient healthcare services on board, comprising of preventive services, medical examinations, and support programs to manage occupational and chronic health conditions among the cruise ship workers.

Table 9

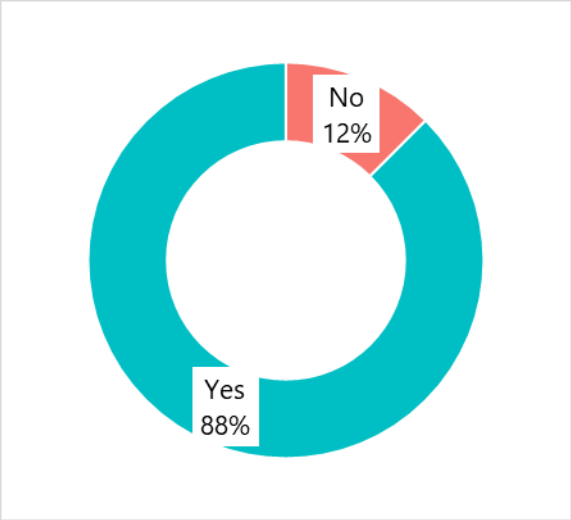
Most Common Medicines Taken on Board

Medicines Taken	Count	Percentage
Pain Killers	170	81.73
Maintenance medication	79	37.98
Antidepressants	58	27.88

Table 9 shows the most widespread medicines that employees of the cruise ship use on board. The most commonly used medication was painkillers, and it is important to note that 81.73% of workers admitted to taking them which points at the high incidence of musculoskeletal pain and other pain-related disorders among this group of employees. The number of employees taking maintenance medication was 37.98% which means that a considerable segment of the work force is in need of sustained treatment due to chronic health related conditions i.e. hypertension, diabetes, or high cholesterol. Moreover, 27.88% of the respondents have used antidepressants, which indicates that the issue of mental health, such as stress, anxiety, and depression, could be widespread among cruise ship employees. These results highlight the importance of having a holistic healthcare provision on board, access to medical care, pain management measures, and mental health services as a way of taking care of the health of employees who are operating in stressful maritime conditions.

Figure 3

Recommended to Seek for a Physical Therapist



The percentage of cruise ship employees who were recommended by a doctor or a nurse to consult physical therapy services outside the cruise line is depicted in Figure 3 concerning their health issues. Most of the respondents (88%) said they were given a recommendation of physical therapy so it is possible that the musculoskeletal pain and other physical conditions were serious enough to warrant professional rehabilitation and intervention. Conversely, 12% of the workers were not advised to get physical therapy, which means that their illnesses might have been deemed as treatable without any special intervention. These results suggest that the on-board physical therapy services may be necessary as relatively large percentage of employees have had health problems that require rehabilitation, which might be hard to access during their employment at sea.

Conclusion and Recommendations

The findings indicate that musculoskeletal disorders (MSDs) are very widespread among employees on the cruise ships and the most widespread ones were lower back pain (80.77%) and shoulder pain (77.88%). Their work is very physical and the working hours coupled with the absence of ergonomic support has also added to the cause of chronic pain and health complications. Although a significant part of the employees (88%) had been prescribed physical therapy, there was no onboard PT offering, and the workers were to manage the symptom by using pain medication. The results highlight the pressing nature of the necessity to introduce physical therapy services in the cruise ships. Onboard PT can lead to the better well-being of employees, less absenteeism, and general productivity. Also, the long-term effects of MSDs could be alleviated by incorporating ergonomic interventions, wellness programs, and medical assistance. The next study must examine how physical therapy services can be implemented in a cost-saving way at sea to make the working space of cruise ship employees healthier and more sustainable.

The fact that musculoskeletal pain is very common among cruise ship workers indicates that there is an urgent need to enhance healthcare measures in the shipping industry. Employees should decrease the

risk of musculoskeletal pain through prevention, especially by performing exercises that involve stretching and building strength. Early intervention and pain management would be supported through the use of available healthcare services, including ergonomic consultations, and physical therapy. Employees should also promote better working conditions by reporting physical discomfort to managers and requesting necessary changes, while also fostering a culture of peer support and awareness to motivate the crew in prioritizing their health and well-being.

In addition, in order to lessen musculoskeletal diseases, cruise companies should introduce physical therapy services on board. This could be done by establishing wellness centers staffed with trained physical therapists to allow quick recovery, prevent long-term complications, and enhance employee productivity. Cruise lines should also implement ergonomic training programs that teach employees about injuries, proper body mechanics, and correct working positions. Workplace adjustments such as adjustable workstations and anti-fatigue mats can further reduce physical strain, along with organized wellness programs including stretching, fitness activities, and regular rest breaks. Companies must also ensure that they have enough medical personnel and healthcare facilities to address musculoskeletal issues in a timely manner. Physical therapists should perform routine check-ups to detect early signs of musculoskeletal pain and provide individualized care that includes rehabilitation exercises, flexibility training, and posture correction. They should also conduct learning activities on injury prevention, ergonomic awareness, and self-management, along with regular monitoring of crew health and the effectiveness of physical therapy programs.

Although guests do not directly experience the physical demands faced by the crew, they can still help create a healthier workplace by showing awareness and offering support. They are expected to acknowledge how exhausting the crew's work is, avoid violating rest time, and treat employees decently during service interactions. By participating in awareness campaigns on crew welfare, guests can contribute to a more ethical and sustainable cruise industry. Future researchers, meanwhile, should conduct longitudinal studies on the long-term consequences of musculoskeletal disorders among cruise ship employees. Comparing cruise lines that offer physical therapy services with those that do not, may reveal more effective approaches to crew healthcare. Further research on the psychological effects of musculoskeletal pain—such as its impact on job satisfaction, employee retention, and workplace morale—would help provide a more holistic understanding of crew welfare. Studies on the regulation of onboard healthcare should also be conducted to ensure that cruise companies comply with occupational health standards. Proactive strategies to address musculoskeletal issues will not only benefit employees but also improve service quality and overall operations within the cruise industry.

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