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**WORLD MARITIME UNIVERSITY**

Dalian, China

**AN EMPIRICAL RESEARCH ON DEVELOPING  
THE FRAMEWORK FOR MANAGING SEXUAL  
ABSTINENCE ISSUES OF THE CHINESE MALE  
SEAFARERS**

By

**BIN DONG**

**The People's Republic of China**

A research paper submitted to the World Maritime University in partial  
fulfillment of the requirements for the award of the degree of

**MASTER OF SCIENCE**


**(MARITIME SAFETY AND ENVIRONMENTAL MANAGEMENT)**

2021

## Declaration

I certify that all the material in this research paper that is not my own work has been identified, and that no material is included for which a degree has previously been conferred on me.

The contents of this research paper reflect my own personal views, and are not necessarily endorsed by the University,

Signature: 

23 June 2021

## **Acknowledgement**

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## **Abstract**

Title of Research Paper: An Empirical Research on Developing the Framework for Managing Sexual Abstinence Issues of the Chinese Male Seafarers

Degree: **Master of Science**

Sexual abstinence refers to the complete lack of sexual relationships during a period of time. This thesis investigates the influence of sexual abstinence on the psychological health of the Chinese male seafarers, and identifies its impacts on their behaviors, work performance and participation of the risk sexual activities. Meanwhile, the correlation between job satisfaction and the toleration level of the seafarers on sexual abstinence will be tested.

A mixed methods approach is applied with five semi-structured interviews and survey-based quantitative research involving 617 Chinese male seafarers. It is proved that the psychological health problems induced by sexual abstinence can lead to inadequate work performance for the seafarers and stimulate them to participate in commercial sex activities. Meanwhile, sexual abstinence can indirectly cause the problem of fatigue for the seafarers on board. Based on multiple liner regression analysis, the seafarers' overall job satisfaction, perceived working environment, ability constraints for the other jobs, own choice for working as a seafarer and perceived friendliness of the co-workers were positively correlated with their toleration level of sexual abstinence, while the perceived job responsibility had a negative correlation. Hierarchical cluster analysis, divided the respondents into four clusters, namely, 'Saint' cluster, 'Adapter' cluster, 'Average people' cluster and 'Sufferer' cluster based on the 14 items that indicating the influence of sexual abstinence on the psychological health of the seafarers. It is noticed that the seafarers

in the Sufferer cluster, who had lower education level, longer contract period on board, less holiday duration and limited shore leave opportunities were more easily to be influenced by sexual abstinence. The working experience with the female seafarers also had an impact on the influence level of sexual abstinence.

Since the sexual abstinence issue violates the basic needs of the seafarers and interferes the operating safety of the ship, appropriate management framework is proposed through this research for the consideration of the ship company as well as the relevant industry stakeholders. With such a management framework, the rights of the seafarers can be better protected and the operating safety can be enhanced.

Keywords: Sexual abstinence, Chinese male seafarers, Cluster analysis, Psychological health, Job satisfaction, Safety

## Table of Contents

<b>Declaration</b> .....	2
<b>Acknowledgement</b> .....	2
<b>Abstract</b> .....	3
<b>List of Figures</b> .....	7
<b>List of Tables</b> .....	8
<b>Chapter 1 Introduction</b> .....	10
1.1 Research Background .....	10
1.2 Research Purpose and Objectives.....	12
1.3 Research Methodology .....	12
1.4 Research Significance.....	13
1.5 Thesis Structure.....	14
<b>Chapter 2 Literature Review</b> .....	15
2.1 Sexuality, Sexual Health and Sexual Abstinence .....	15
2.2 Psychological Health .....	16
2.2.1 Sexual abstinence and psychological health.....	17
2.2.2 Psychological health and inappropriate behaviors.....	18
2.2.3 Psychological health and work performance.....	18
2.2.4 Psychological health and risk sexual behaviors.....	19
2.3 Fatigue.....	20
2.4 Job Satisfaction.....	21
2.5 Research Conceptual Framework.....	22
<b>Chapter 3 Methodology</b> .....	24
3.1 Research Objectives and Research Questions.....	24
3.2 Research Methodology .....	26
3.2.1 Stage 1: Semi-structured interviews with the Chinese male seafarers.	27
3.2.2 Stage 2: Survey with the Chinese male seafarers .....	28
<b>Chapter 4 Research Results</b> .....	38
4.1 Qualitative Research Results.....	38
4.2 Quantitative Research Results.....	42
4.2.1 Demographic, job and company characteristics .....	42

4.2.2 Perceived job satisfaction .....	53
4.2.3 Toleration level and perceived attitude on sexual abstinence .....	53
4.2.4 Perceived psychological health issues, inappropriate behaviors, inadequate work performance and risk sexual behaviors due to sexual abstinence .....	57
4.2.5 Availability of the facilities and support .....	64
4.2.6 Perceived effectiveness of the potential methods for overcoming the negative influence of sexual abstinence .....	65
4.2.7 Multiple liner regression analysis .....	68
4.2.8 Hierarchical cluster analysis .....	69
<b>Chapter 5 Discussion</b> .....	104
5.1 Overall Influence of Sexual Abstinence on Psychological Health, Behaviors, and Work Performance .....	104
5.2 Overall Attitude on Sexual Abstinence.....	110
5.3 Cluster Differentiation Analysis .....	111
5.3.1 Cluster differentiation analysis on the risk sexual behaviors .....	111
5.3.2 Cluster differentiation analysis on the demographic characteristics...	113
5.3.3 Cluster differentiation analysis on the job characteristics .....	115
5.4 Correlation Analysis between the Job Satisfaction and the Toleration Level of Sexual Abstinence .....	119
<b>Chapter 6 Conclusion</b> .....	125
6.1 Research Significance .....	125
6.1.1 Theoretical contribution .....	125
6.1.2 Practical implication.....	127
6.2 Research Limitations and Future Research Directions .....	130
<b>Bibliography</b> .....	132
<b>Appendix</b> .....	145
Appendix I Interview Questions and Interview Transcripts .....	145
Appendix II Online-survey Questionnaire.....	161



## List of Figures

Figure 2.1	Research conceptual framework-----	23
Figure 4.1	Age -----	43
Figure 4.2	Education level-----	44
Figure 4.3	Marriage status -----	44
Figure 4.4	Years of working as a seafarer -----	45
Figure 4.5	Nature of the company -----	45
Figure 4.6	Ship types -----	46
Figure 4.7	Current position levels -----	47
Figure 4.8	Working places on the ship -----	47
Figure 4.9	Colleague’s nationality on the ship-----	48
Figure 4.10	Working experience with female seafarers -----	48
Figure 4.11	Average monthly salaries when working on board -----	49
Figure 4.12	Single contract period requirement -----	50
Figure 4.13	Holiday duration requirement between each working period-----	50
Figure 4.14	Average length of working time on the ship every year during the last three years (excluding the pandemic period) -----	51
Figure 4.15	Longest single working period on the ship during the last three years (excluding the pandemic period) -----	52
Figure 4.16	Frequency of the shore leave opportunity during the last three years (excluding the pandemic period) -----	52
Figure 4.17	Experience of the commercial sex activity at the ports of call -----	64
Figure 5.1	The overall agreement level on the perceived psychological health issues-----	106
Figure 5.2	The overall agreement level on the perceived inappropriate behaviors -----	107
Figure 5.3	The overall agreement level on the perceived inadequate work performance-----	108

## List of Tables

Table 4.1	Basic background information of the interviewees -----	39
Table 4.2	Agreement level of the variables indicating job satisfaction -----	54
Table 4.3	Toleration level and perceived attitude on sexual abstinence -----	56
Table 4.4	Perceived psychological health issues due to sexual abstinence -----	59
Table 4.5	Perceived inappropriate behaviors due to sexual abstinence -----	61
Table 4.6	Perceived inadequate work performance due to sexual abstinence---	62
Table 4.7	Perceived risk sexual behaviors due to sexual abstinence -----	63
Table 4.8	Availability of the facilities and support -----	65
Table 4.9	Perceived effectiveness of the potential methods for overcoming the negative influence of sexual abstinence -----	66
Table 4.10	Correlation between the job satisfaction and the toleration level of sex abstinence -----	68
Table 4.11	Excluded variables from the multiple liner regression test -----	69
Table 4.12	Perceived psychological health issues due to sexual abstinence by clusters -----	71
Table 4.13	Toleration level and perceived attitude of sexual abstinence by clusters -----	74
Table 4.14	Perceived inappropriate behaviors due to sexual abstinence by clusters -----	75
Table 4.15	Perceived inadequate work performance due to sexual abstinence by clusters -----	76
Table 4.16	Experience of commercial sexual activity at the ports of call by clusters -----	77
Table 4.17	Perceived risk sexual behaviors due to sexual abstinence by clusters	78
Table 4.18	Agreement level of the variables indicating job satisfaction by clusters -----	80
Table 4.19	Respondents' age by clusters -----	82

Table 4.20	Respondents' marriage status by clusters -----	83
Table 4.21	Respondents' education level by clusters -----	84
Table 4.22	Years of working as a seafarer by clusters -----	85
Table 4.23	Nature of the company by clusters -----	86
Table 4.24	Respondents' ship types by clusters -----	87
Table 4.25	Respondents' current position levels by clusters -----	88
Table 4.26	Respondents' working places on the ship by clusters -----	89
Table 4.27	Colleague's nationality by clusters -----	89
Table 4.28	Respondents' working experience with female seafarers by clusters	90
Table 4.29	Respondents' average monthly salary when working on the ship by clusters -----	91
Table 4.30	Single contract period requirement by clusters -----	93
Table 4.31	Holiday duration requirement between each working period by clusters -----	93
Table 4.32	Average length of working time on the ship every year by clusters -	94
Table 4.33	Longest single working period on the ship by clusters -----	95
Table 4.34	Frequency of the shore leave opportunity on the ship by clusters ----	96
Table 4.35	Availability of sex-related education by clusters -----	97
Table 4.36	Availability of various entertainment facilities by clusters -----	98
Table 4.37	Availability of high quality internet by clusters -----	98
Table 4.38	Availability of psychological consultation by clusters -----	99
Table 4.39	Availability of high quality meals by clusters -----	99
Table 4.40	Availability of comfortable living environment by clusters -----	100
Table 4.41	Perceived effectiveness of potential methods for overcoming the negative influence of sexual abstinence by clusters -----	101

## **Chapter 1 Introduction**

This introductory chapter briefly introduces the key concepts and structure of this thesis. Specifically, Section 1.1 will outline the background of the research topic, and the research objectives will be discussed in Section 1.2. Section 1.3 describes the research methodology and Section 1.4 points out the significance of this research. Finally, the thesis structure will be outlined in Section 1.5.

### **1.1 Research Background**

With the acceleration of globalization, the international trade becomes increasingly frequent. Due to the competitive price and extremely large transportation volume, the shipping industry significantly contributes to the international logistics and is vital to the world economic development. Currently, more than 80% of the world cargo is transported by sea (IMO, 2020). Because of the market stimulation, the ships are gradually becoming larger, faster and more intelligent. By 2020, there were 98,000 merchant ships with gross tonnage of 100 tons or more (UNCTAD, 2021). However, the safety issues highly constraint the development of the shipping industry. IMO even admitted that the shipping industry is perhaps one of the most dangerous industries in the world. To improve the operational efficiency and achieve the sustainable development, the safety of the ship is recognized as the priority of all the stakeholders.

Currently, most of the literatures discussing the safety management issues of the shipping industry from the perspectives of manning, operating and technology. Human factors is also a popular topic for the existing maritime research. Owing to the fast development of the ship building industry and the application of the cutting-edge technology, the structure of the ship is designed more solid, and the equipment on the ship is more reliable (Galierikova, 2019). However, such improvement did not

significantly decrease the occurrence of the ship tragedy. Human errors become the main cause of the serious incidents, which lead to more than 80% of the marine accidents (Allianz Global Corporate & Specialty, 2017; Xu, 2021). Any unsafe behavior of the seafarers is a potential risk for the operating safety of the ship. These unsafe behaviors are normally caused by the seafarer's carelessness, weak sense of responsibility and violation of rules and regulations (Xu, 2021). It is also proved that the psychological state of the seafarers can also influence the operating safety of the ship. The emotional fluctuations and confusion of thinking decline the seafarers' ability of observation, attention and judgment, thus causing the serious incident (Wang, 2013; Li & Wang, 2020).

After the breakout of Covid-19, how to better protect the rights of the seafarers became another important topic, which strongly caught the attention of the researchers. Most of the current studies focus on discussing the fatigue issues of the seafarers as well as their working and living conditions on board. However, hardly any research cares about the sexual need of the seafarers, which is also a basic physiological need of human beings and is closely related to the psychological wellbeing. Being away from home for a long time, the seafarers all suffer from sexual abstinence. This will significantly influence the psychological health of the seafarers and may have impacts on their behaviors, work performance and participation of risk sexual activities, thus further threatening the operating safety of the ship. Therefore, a research must be conducted to deeply analyse the relationship between the psychological health of the seafarers and sexual abstinence, and understand the factors that contribute to increase their toleration level on sexual abstinence. Meanwhile, a comprehensive management framework is urgently needed, which can effectively address the sex-induced safety issues and better protect the rights of the seafarers.

## **1.2 Research Purpose and Objectives**

Based on the above research background, the overall purpose of this thesis is to deeply investigate the influence of sexual abstinence on the psychological health of the Chinese male seafarers, and identify its impacts on their behaviors, work performance and participation of the risk sexual activities. Meanwhile, the correlation between the job satisfaction and the toleration level of the seafarers on sexual abstinence will be tested. An appropriate management framework will be developed to effectively address such sex-induced safety issues and protect the basic rights of the seafarers. More specifically, the thesis will pursue the following objectives.

Objective 1: Identify the extent to which job satisfaction can influence the toleration level of the seafarers on sex abstinence on board.

Objective 2: Identify the extent to which sexual abstinence influences the psychological health of the seafarers on board, and further influences their behaviors, work performance and participation of risk sexual activities.

Objective 3: Develop an effective management framework that can appropriately address the sex-induced safety issues and protect the basic rights of the seafarers.

## **1.3 Research Methodology**

To address the above research objectives most effectively, methodological triangulation involving both qualitative and quantitative approaches was pursued. Two stages of survey-based primary research were conducted. These involved, first, semi-structured interviews (as the main qualitative component), and then, secondly, a questionnaire-based survey (as the main quantitative component).

Five interviews were conducted with the selected Chinese male seafarers to achieve data enrichment and provide solid support for the questionnaire design. The core component of the research is the questionnaire-based directed to the Chinese male seafarers who were at least 18 years old. The most recent version of the quantitative software IBM SPSS 26.0 was used to analyse the questionnaire data. This initially involved aggregate descriptions of the sample. Hierarchical cluster analysis identified relatively uniform sub-samples of the Chinese male seafarers differentiated by their response patterns to Likert-scaled questions of psychological health issues induced by sexual abstinence. Multiple liner regression analysis was conducted to identify the correlation between the job satisfaction of the Chinese male seafarers and their toleration level on sexual abstinence.

#### **1.4 Research Significance**

This innovative study is a breakthrough for the maritime research, which explored the relationship between sexual abstinence and the psychological health, behaviors, work performance and participation of the risk sexual activities of the seafarers. The correlation between the job satisfaction and the toleration level of the seafarers on sexual abstinence is also identified. Meanwhile, the research proves that sexual abstinence can cause the fatigue problem for the seafarers indirectly. A management framework, which can effectively address the issues of sexual abstinence, is proposed through this research for the consideration of the ship company to better protect the rights of the seafarers and enhance the operating safety of the ship. It is believed that this research can urge the relevant industry stakeholders to pay strong attention to the sexual abstinence issues of the seafarers and stimulate more future studies to focus on this important area.

## **1.5 Thesis Structure**

In chapter 2, a comprehensive literature review was conducted. The relevant researches and studies in relation to sexual health, sexual abstinence, risk sexual behaviors, psychological health, job satisfaction and the work performance of the seafarers were detailedly reviewed. The research conceptual framework is then articulated.

Chapter 3 contextualises the research objectives and research questions. Details of the research methods, especially the hierarchical cluster analysis, are then provided.

Chapter 4 describes the quantitative and qualitative research results. Subsequently, Chapter 5 analyses and discusses these results and considers their theoretical and practical implications. Chapter 6 points out the contributions of this research as well as the research limitations and future research directions, which serves as the conclusion chapter of this thesis.



## Chapter 2 Literature Review

In this chapter, the relevant concepts in relation to sexuality, sexual health and sexual abstinence will be first reviewed in Section 2.1. Section 2.2 will discuss the relationship between psychological health and sexual abstinence, inappropriate behaviours, work performance and risk sexual behaviours specifically under the context of the seafarers. Section 2.3 will review the literature discussing the fatigue issues of the seafarers, and the theories related to job satisfaction will be analysed in Section 2.4. Meanwhile, the relevant research gaps will be pointed out at the end of each section. Finally, Section 2.5 will propose the research conceptual framework for this study.

### 2.1 Sexuality, Sexual Health and Sexual Abstinence

Sexuality is an important component of life, and is recognized as one of the physiological needs of human beings (Maslow, 1943). Human sexuality *'is constructed through interactions between the individual and wider society, and its development depends on the expression of basic human needs, including intimacy, emotional expression and love'* (World Association for Sexual Health, 1999). The appropriate sexual life is vital for the overall well-being of people (World Association for Sexual Health, 1999).

The World Health Organization (WHO) (2006) defines sexual health as *'a state of physical, emotional, mental and social well-being in relation to sexuality; it is not merely the absence of disease, dysfunction or infirmity. Sexual health requires a positive and respectful approach to sexuality and sexual relationships, as well as the possibility of having pleasurable and safe sexual experiences, free of coercion, discrimination and violence. For sexual health to be attained and maintained, the sexual rights of all persons must be respected, protected and fulfilled'*. Once the

sexual rights of individuals cannot be satisfied, such as suffering from sexual abstinence, many issues will occur, including physical and psychological health problems (World Association for Sexual Health, 1999).

Sexual abstinence refers to the complete lack of sexual relationships during a period of time (Carcedo *et al.*, 2015). If the sexual abstinence occurs without the willingness and intention of individuals, it may violate the basic physiological needs of human beings (Carcedo *et al.*, 2015). Longstanding sexual abstinence not only harms the physical health of people, such as causing endocrine disorder, sexual dysfunction and diseases of the reproductive system, but also leads to psychological health problems (Carcedo *et al.*, 2019). Recognized as the key worker in the world marine industry, seafarers need to be absent from home for a long time without gatherings with their family members and their loved ones. As a result, sexual abstinence is a common issue for the seafarers during the voyage. Most of the existing conventions and regulations in relation to the protection of the seafarers' rights focus on working hours, working protection, and working and living conditions on board. Hardly any of them cares about the sexual needs of the seafarers. So are the academic studies.

## **2.2 Psychological Health**

Psychological health, also known as mental health, is '*a state of psychological well-being or satisfactory of psychological functioning*' (Darity, 2008, p.83). People with psychological health problems normally develop madness, anxiety, unhappiness negative attitude and poor cognition, which may lead to many abnormal behaviors (Darity, 2008). Appropriate psychological state is vital to people's work and life (Darity, 2008; Wright, 2010). Commonly, the psychological health will be evaluated from ten perspectives including interpersonal relationship, mental endurance, adaptability, perceived fairness, emotion, and levels of anxiety, depression, hostility, bigotry and somatization (Wang, Wei & Ding, 2006). Amongst these ten perspectives,

the issues of perceived fairness and bigotry sometimes are difficult to detect, as they fully depend on people's subjective perception (Wang, Wei & Ding, 2006).

Considering the job requirements of the seafarers and their special working environment, the seafarers must maintain a healthy psychological state to achieve the seaworthiness (Wang *et al.*, 2010). Specifically, they should have high adaptability, which allows them to get used to the working and living environment on board. Meanwhile, appropriate mental endurance is essential. Most importantly, the seafarers should be able to maintain positive emotions and feelings, avoid the psychological conflicts and establish good interpersonal relationship with their co-workers (Wang *et al.*, 2010). However, many researches proved that the seafarers are easily to develop the psychological health problems during the voyage and the level of their psychological health is much lower than the average people (Carotenuto *et al.*, 2013; Li, Liu & Li, 2018; Wang *et al.*, 2010; Zhou & Zhang, 2006; Zhu & Ma, 2018).

### **2.2.1 Sexual abstinence and psychological health**

When suffering from sexual abstinence, people have to inhibit their sexual desire. Therefore, the psychological health issue is more likely to occur. The close relationship between sexual abstinence and psychological well-being has been well established in the health and psychology literatures. Strong evidence supported that high levels of sexual satisfaction are associated with high level of psychological health (Fegg *et al.*, 2003; Lau *et al.*, 2005; Mollaioli *et al.*, 2020). However, on the other side, sexual abstinence can lead to anxiety, depression, and even mania (Carcedo *et al.*, 2019; Fegg *et al.*, 2003), which significantly influence the daily life and work performance of individuals (Wong *et al.*, 2007). Currently, the studies discussing the relationship between sexual abstinence and psychology health normally focus on seniors (Cheng *et al.*, 2004; Ma, 2004) and prisoners (Carcedo *et al.*, 2019).

Very limited literature discusses the psychology issues of the seafarers caused by sexual abstinence.

### **2.2.2 Psychological health and inappropriate behaviors**

People's behaviors are closely influenced by their psychological state (Darity, 2008). For example, offensive behaviors are commonly caused by the unstable emotions of the individuals led by the strong stimulation of the external circumstances or events (Darity, 2008). During the voyage, the seafarers may develop some inappropriate behaviors, including the act of violence, verbal violence, social phobia, autism or even suicide. All of these significantly influence the operating safety of the ship (Zhou & Gong, 2013). Strong evidence supports that these inappropriate behaviors of the seafarers are normally caused by the psychological health problems (Zhou & Gong, 2013; Wang, 2014). However, there is no literature that directly investigates the influence level of the sex-induced psychological health issues on the behaviors of the seafarers on board.

### **2.2.3 Psychological health and work performance**

Work performance is a critical variable in organisational behavior. It refers to the degree of an individual's successful completion of task-related behaviors, and is an overall indicator of the individual's performance in the course of working (Carlson *et al.*, 2019). Higher work performance indicates fewer mistakes, which is significantly important for the maritime industry (An *et al.*, 2020). During the voyage, the high work performance of the seafarers means that the ship can be operated efficiently and can maintain a normal working condition as a result of fewer human errors (An *et al.*, 2020). The work performance of the seafarer is associated with safety perception, safety climate and safety performance of the ship operation (Lu & Yang, 2013; Zohar, 2003). Work performance is a critical work outcome that has a close relationship with

the individual factors of the personnel, including loyalty and work attitude, and job satisfaction (Tsai & Liou, 2017). Meanwhile, the psychological state of the employees can also significantly influence their work performance (Darity, 2008; Wright, 2010).

The seafarer is considered as a highly stressful and high-risk occupation in terms of physical and mental exhaustion (An *et al.*, 2020). The work performance of the seafarer will be easily influenced by many psychological stressors and physical stressors (Carotenuto *et al.*, 2012; Oldenburg *et al.*, 2012; Shao, Liu & Wu, 2018). Many literatures deeply discussed the intrinsic and extrinsic factors that influence the work performance of the seafarers including perceived responsibility, family issues, emotional intelligence, job attitude and job satisfaction (An *et al.*, 2020; Kiliç & Tavacioglu, 2015; Yuen *et al.*, 2018). However, very limited researches specifically discuss the extent to which the work performance of the seafarers is influenced by their psychological state, particularly the psychological health issues induced by sexual abstinence.

#### **2.2.4 Psychological health and risk sexual behaviors**

The theory of psychological reactance argues that any form of deprivation may increase the desire of individuals for the deprived object (Brehm & Brehm, 1981). Individuals all prefer having strong freedom on their behaviors to satisfy their needs. Once the freedom is reduced, threatened, or eliminated, individuals will significantly raise their motivation to regain this freedom (Brehm, 1966). Therefore, once the individual suffers the sexual abstinence, he or she will develop the strong desire for the sex activities and may have risk sexual behaviors, such as participating in commercial sex activities. This may cause negative effective on the society (Wong *et al.*, 2007).

Commonly, the problems caused by the risk sexual behaviors of the migrant workers and cross boarder workers, such as the seafarers and flight attendants, are more serious than the average people. Due to the mobile nature of the job, these workers form an inter-sectorial bridge for the rapid spreading of the sexually transmitted infections including HIV (Wong *et al.*, 2007). To satisfy their sexual needs, the seafarers may frequently participate in the commercial sex activities at ports of call. As a result, the infection rate of the sexual transmitted diseases among the seafarers is much higher than the general public (Chen *et al.*, 2008; Zhang *et al.*, 2008). However, limited attention was paid to the risk sexual behaviors of the seafarers. Currently, there is no literature discussing the influence of such behaviors on the daily management and operating of the ship.

### **2.3 Fatigue**

Fatigue is *'a state of physical and/or mental impairment resulting from inadequate sleep, extended wakefulness, work/rest requirements out of sync with circadian rhythms and physical, mental or emotional exertion that can impair alertness and the ability to safely operate a ship or perform safety-related duties'* (IMO, 2019, p.1). Generally, fatigue occurs because of the imbalance between rest and physical or psychological exhaustion of individuals (Wang & Wang, 2017). Different from the tiredness, fatigue is a hazard and cannot be easily recovered through sufficient rest (Wang & Wang, 2017). It poses threat to the life, wellbeing and health conditions of the seafarers, and further influences the operating safety of the ship. Research shows that nearly 50% of the seafarers in China suffered fatigue during their voyage (Wang & Wang, 2017).

Fatigue can induce serious cognitive problems that make people unable to concentrate, diminish their decision-making ability, slow down the cognitive processes and cause poor memory (IMO, 2019). Moreover, fatigue can further cause the performance impairment in the physical and behavioral areas (IMO, 2019). All of these negatively

affect the work performance of seafarers, leading to the near-miss situations or even ship tragedies (Grey, 2015; Lloyds List, 2008).

Inadequate rest and/or poor quality of sleep are commonly recognized as the culprit for fatigue (Akerstedt, 2000; IMO, 2009; Sampson *et al.*, 2017). In addition, there is a close relationship between the psychological health and fatigue. Individuals with distress, anxiety and depression are more likely to suffer fatigue (Pawlikowska, 1994). However, most of the maritime literatures blame fatigue to the high workload and insufficient rest of the seafarers the psychological factors, including the psychological health problems caused by sexual abstinence, are usually ignored.

## **2.4 Job Satisfaction**

Job satisfaction is an emotional variable, which will be influenced by the personal working experience of the employees (Fritzsche & Parrish, 2005). Usually, the job satisfaction is evaluated from five perspectives including the quality of work (i.e. difficulty, responsibility and stress of the work, and work environment), pay (i.e. salary level, personal ability and choice, and recognition from the society and family), promotion (i.e. promotion opportunity), supervision (i.e. effectiveness of supervision) and co-workers (friendliness of co-workers) (Smith, Kendall, & Hulin, 1969). In addition, many researches prove that strong career identify is essential for achieving job satisfaction (Alnak *et al.*, 2012; Weber & Ladkin, 2011).

Specifically for the seafarers, the work pressure, work attractiveness, rewards, and the personality of the seafarers significantly influence their job satisfaction level (Yuen *et al.*, 2018). Meanwhile, other factors, including the ship conditions, route, voyage duration, age and years of working as a seafarer also have some influence on the seafarers' job satisfaction (Yuen *et al.*, 2018).

There is a close relationship between job satisfaction and job performance of the employees. The employees with higher job satisfaction normally demonstrate better job performance (Judge *et al.*, 2001). At the same time, they are more loyal to the organization and have strong work motivation (Judge *et al.*, 2001). Herzberg (1966) argued that only the intrinsic factors, such as recognition, sense of achievement, and advancement can effectively generate the job satisfaction of employees and further motivate their performance.

The theories and concepts in relation to job satisfaction were very well established by the previous researches. However, very limited literature discussed the function of job satisfaction in enhancing the psychological state of the employees. For example, whether or not job satisfaction can minimize the influence of sexual abstinence on the psychological health of the seafarers is worth of study.

## **2.5 Research Conceptual Framework**

Based on the previous literature review and discussion, the conceptual framework of the research was summarized in Figure 2.1. Overall, the research investigates the influence of sexual abstinence on the psychological health of the Chinese male seafarers. Common psychological health problems of the seafarers include anxiety, hostility, depression, poor mental endurance, sensitive interpersonal relationship, inadaptability, bad emotion and somatization. The extent to which these sex-induced psychological health problems further influence the seafarers' behaviors, work performance and participation of risk sexual activities will also be identified. Since all of these issues significantly influence the operating safety of the ship, appropriate management framework must be proposed to minimize the negative impacts of sexual abstinence. To develop the effective management strategies, the relationship between the influence level of sexual abstinence on psychological health and the seafarers' attitude and toleration level of sexual abstinence will be examined. Meanwhile, whether or not the job satisfaction of the seafarers can improve their toleration level



of sexual abstinence is considered as an important hypothesis of this research. Normally, the variables in relation to work quality, pay and career identity, promotion, supervision, work environment and co-workers are used to indicate the level of job satisfaction. It is also worth to understand the extent to which demographic, job and company characteristics of the seafarers, together with the support and facilities that they experienced on board, influence the relationships discussed above.

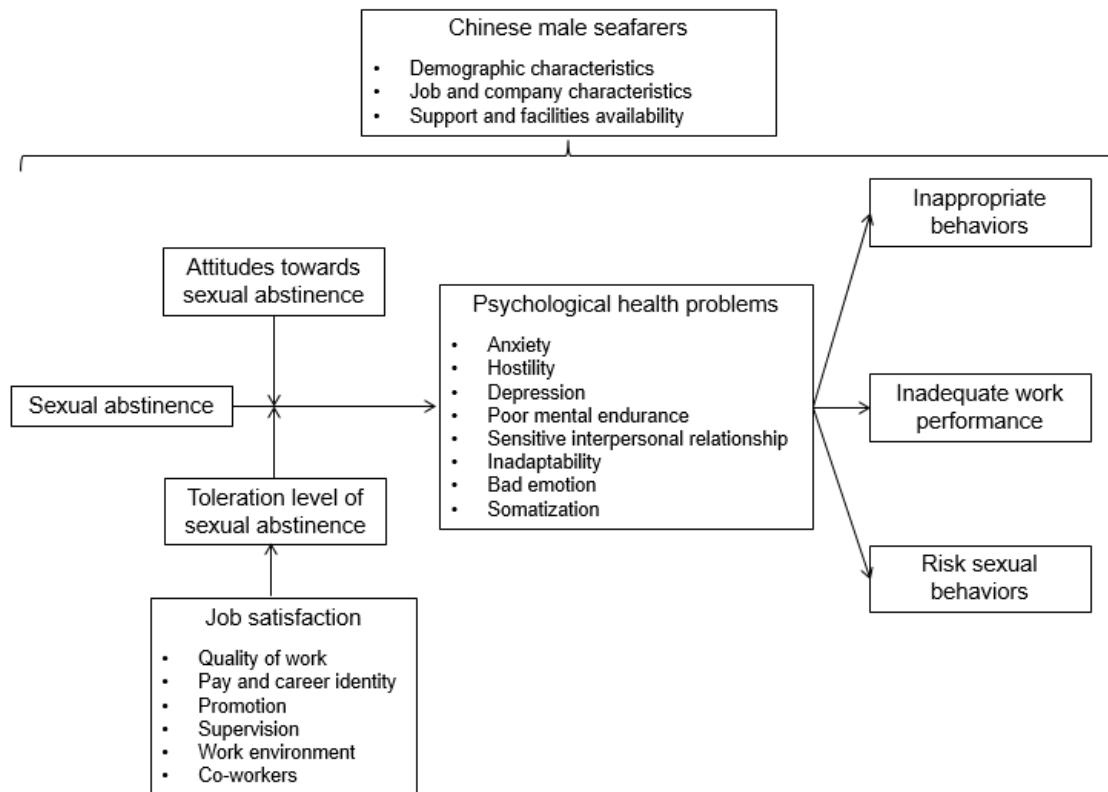


Figure 2.1 The research conceptual framework

## **Chapter 3 Methodology**

Building on the detailed literature review and a critical discussion on the theoretical framework in the previous chapter, the specific research questions are identified and the research methodology is discussed accordingly. Specifically, Section 3.1 reiterates the research objectives and identifies constituent research questions for each. The research methodology will be discussed in Section 3.2, the sub-sections of which detailedly illustrates the quantitative and qualitative approaches of this research with particular focus on the questionnaire design, data collection, and data analysis method.

### **3.1 Research Objectives and Research Questions**

By way of reiteration, the overall purpose of this thesis is to deeply investigate the influence of sexual abstinence on the psychological health of the Chinese male seafarers, and identify its impacts on their behaviors, work performance and participation of the risk sexual activities. Meanwhile, the correlation between the job satisfaction and the toleration level of the seafarers on sexual abstinence will be tested. An appropriate management framework will be developed to effectively address such sex-induced safety issues and protect the basic rights of the seafarers. Specifically, this thesis will investigate the following research questions that arise from the three objectives.

Objective 1: Identify the extent to which job satisfaction can influence the toleration level of the seafarers on sex abstinence on board. Accordingly,

- To what degree does job satisfaction influence the toleration level of the seafarers on the sex abstinence on board?

Objective 2: Identify the extent to which sexual abstinence influences the psychological health of the seafarers on board, and further influences their behaviors, work performance and participation of risk sexual activities. Accordingly:

- To what degree does sexual abstinence influence the psychological health of the seafarers?
- To what extent do such sex-induced psychological issues result in inappropriate behaviors of the seafarers?
- To what extent does sexual abstinence cause risk sexual behaviors of the seafarers?
- To what extent do such sex-induced psychological issues influence the work performance of the seafarers and the operating safety of the ship?

Objective 3: Develop an effective management framework that can appropriately address the sex-induced safety issues and protect the basic rights of the seafarers. Accordingly:

- To what extent can demographic and job characteristics (i.e. contract period, shore leave opportunities and holiday duration) reduce the negative influence of sexual abstinence?
- What kind of support can be provided to the seafarers to reduce the negative influence of sexual abstinence?
- What kind of management strategies in response to the sexual abstinence issues can be implemented to effectively enhance the operating safety of the ship and protect the basic rights of the seafarers?

### **3.2 Research Methodology**

To address the above objectives and research questions, methodological triangulation involving both qualitative and quantitative approaches (that is, a mixed methods approach) was adopted. Although qualitative and quantitative research differs in many ways, they are complementary. Quantitative research can elicit relatively limited information from a large number of informants and subsequently identify basic patterns and differences in the target population through various statistical techniques. Qualitative research, subsequently, can reveal in-depth information about those patterns, based on interviews and focus groups involving a small and carefully selected sample of those informants. Since there is only partial overlap, a study using both methods is more comprehensive and the result is more reliable (Neuman, 2006). Additionally, outcomes from initial qualitative research can provide support for subsequent quantitative research, making the data gained through quantitative research more effective and realistic (Plano Clark & Creswell, 2008).

Initially, the triangulated research involved the collection of secondary resources and desk research including academic research publications, industry journals and official reports. Based on the comprehensive literature review and critical analysis of existing theories, the conceptual framework of the research was developed (see Section 2.5). Also, these secondary resources provided theoretical and empirical support for the formulation of the research objectives and questions.

Subsequently, a linear research path was designed to ensure that the research proceeds in a clear, logical, sequential and well-structured manner. Two stages of survey-based primary research were conducted. These involved, first, semi-structured interviews (as the main qualitative component), and then, secondly, a questionnaire-based survey (as the main quantitative component).

### **3.2.1 Stage 1: Semi-structured interviews with the Chinese male seafarers**

Interviews were conducted with the selected Chinese male seafarers to achieve data enrichment and provide solid support for the questionnaire design. Semi-structured interviews were used for the qualitative research. Interview questions focused on identifying the challenges for the seafarers when at sea, the shore life missed by the seafarers, the overall feeling for being as a seafarer, the emotion and feeling changes of the seafarers on board, and the attitude towards sexual abstinence (see Appendix I).

According to Jennings (2010), semi-structured interviews can effectively achieve the research objectives and attain sufficient information. As the potential interview questions were designed before the interview, the researcher was able to control the discussion topic and direct the response of the interviewees to the key points. During the interview, open questions were used to avoid simple answers (i.e. Yes or No). Also, the researcher tried to encourage the interviewees to talk more by continuing asking relevant questions but avoid interfering considering the research reliability (Jennings, 2010). Additionally, the researcher paid attention to the voice, speed and the tone of the interviewees in order to identify more relevant information based on their ways of response (Neuman, 2006).

Five Chinese male seafarers, who are the friends of the researcher, were approached face to face for the interview during their holidays. With the permission of the participants, each interview was tape-recorded to facilitate transcription and analysis. All the interviews were conducted in Chinese, the native language of the interviewees, to avoid any misunderstanding. Due to the small number of the interviewees, qualitative analysis software was not used to derive knowledge from the interview transcripts. Detailed interview minutes were prepared and translated by the researcher after each interview and the important conversation content were highlighted in order to identify the similar coding. The researcher is fluent with English and Chinese, and

understands intimately the social-cultural context of China. Such deep familiarity is regarded by Esfahani and Walters (2018) as necessary for effective back-translation.

### **3.2.2 Stage 2: Survey with the Chinese male seafarers**

The second research stage focused on questionnaires directed to Chinese male seafarers who were at least 18 years old. Through the survey, it was expected that the relationship between the job satisfaction and the toleration level of sexual abstinence can be identified. Also, the influence level of sexual abstinence on the psychological health together with its induced influence on the inappropriate behavior, risk sexual behavior and work performance were evaluated. Therefore, all the research questions associated with the first and second objectives can be achieved. Meanwhile, the extent to which the job characteristics of the seafarers can contribute to the influence of sexual abstinence was tested in the survey. As a result, the first research question in the third objective can be accomplished.

- **Questionnaire design**

To ensure the effectiveness and reliability of the research, the questionnaire used to survey the Chinese male seafarers were designed into 11 parts logically (see Appendix II). The questionnaire was originally designed in English and then translated into Chinese for the convenience of the respondents whose native language is Chinese. The researcher's proficiency in both languages allowed deep understanding of the Chinese social-cultural context.

The first part of the questionnaire contained three screening questions, which helped to identify the qualified respondent of this research. The respondent should be Chinese, at least 18 years old and worked as a seafarer currently.

The next part of the questionnaire identified the job and company characteristics of the respondent during the last three years, including the average length of working period every year, the longest single working period on the ship, the nature of the company, the characteristics of the co-workers on board (nationality and gender), ship type, shore leave opportunities, and the contract requirements on the single working period on board and the holiday duration. Considering the special situation of the Covid-19, the respondents were requested to exclude the pandemic period for their answers. Meanwhile, the years of working as a seafarer, current position, working place on board and average monthly salary when working on board were asked.

Part Three evaluated the perceived job attitude of the respondent towards working as a seafarer. The questions in this part were developed based on the classical Job Descriptive Index identified by Smith, Kendall, and Hulin (1969), which evaluates the job satisfaction from five aspects including the quality of work (i.e. difficulty, responsibility and stress of the work, and work environment), pay (i.e. salary level, personal ability and choice, and recognition from the society and family), promotion (i.e. promotion opportunity), supervision (i.e. effectiveness of supervision) and co-workers (friendliness of co-workers). Considering the work characteristics of the seafarers, the perception on the living environment on board was added. Finally, the overall job satisfaction for being as a seafarer was asked.

Part Four examined the toleration level of the respondents on sexual abstinence and their general perception on the sexual right. The respondents were asked to indicate their level of agreement on the three statements, including ‘I get used to sexual abstinence when I am working on the ship’, ‘Sexual abstinence on the ship violates the basic needs of seafarers’, and ‘Sexual abstinence on the ship is normal and is associated with the job requirements of seafarers’.

Part Five to Part Eight, which were the core parts of the questionnaire, evaluated the perceived psychological health problem, inappropriate behaviors on board, inadequate

work performance and risk sexual behavior of the respondent caused by sexual abstinence. The overall perceived influence of sexual abstinence on psychological health, behavior and work performance were asked at the end of each relevant section.

The questions examining the perceived psychological health problem were selected from the psychological health index of Chinese adults (Wang, Wei & Ding, 2006). These questions contained eight common psychological problem factors including anxiety (i.e. I feel anxious), hostility (i.e. I cannot control my temper and I feel agitated), depression (i.e. I feel depressed, I feel that there is no hope for the future, and I become pessimistic), poor mental endurance (i.e. I start to have the thought of suicide), sensitive interpersonal relationship (i.e. I feel lonely and I become suspicious), inadaptability (i.e. I feel homesick), bad emotion (i.e. I feel sad) and somatization (i.e. I cannot fall asleep and I feel painful on my body). The perceived fairness and level of bigotry were excluded because the issues in these two areas are not commonly caused by sexual abstinence. Meanwhile, they are difficult to detect.

Fight, curse, argument and even self-harm are common inappropriate behaviors of the seafarers on board led by the psychological problems (He, 2007; He, 2009; Zhou, 2014). Therefore, these inappropriate behaviors are included in the questionnaire. Through the interviews conducted for this research, some interviewees indicated that they did not want to communicate with their co-workers or family members after a certain period of working on the ship. As a result, unwillingness to communicate with the co-workers and family members is also included.

The poor sleep quality together with the psychological health issues can normally lead to the tiredness (or 'fatigue') of the seafarers (Allen, Wadsworth & Smith, 2007; Hystad & Eid, 2016). Losing the attention while on duty, misunderstanding the order from the supervisor, having incidents during the work, cooperation problems with the co-workers and low work efficiency are common work performance issues for the seafarers on board led either by fatigue, human factors or psychological health issues



(Allen, Wadsworth & Smith, 2007; Rodríguez-Martos, 2010; Tsai & Liou, 2016; Trafford, 2009). Therefore, these items were used to evaluate the influence of sexual abstinence on the work performance of the seafarers.

In relation to the risk sexual behavior, the respondents were asked whether or not they 'have ever had the commercial sex activity at the ports of call to satisfy their sexual need'. The potential choice of 'I do not want to say' was provided to this question in addition to 'Yes' or 'No' considering the sensitivity of the question and the research ethics. Moreover, the perception (i.e. if the commercial sex activity is common and acceptable, and if it can effectively satisfy the sex needs of the seafarers) and the knowledge (i.e. the risk and prevention of sexual transmitted infections) of the seafarers on the risk sexual behavior were evaluated.

Part Nine requested the respondents to indicate whether or not their companies provide the appropriate facilities and support on board including the entertainment facilities, high quality internet, high standard meals, and comfortable living environment. Considering the nature of the research, the availability of the sex-related education and psychology consultation were also asked in this section.

Part Ten invited the respondents to provide their perceived effectiveness on the potential methods for overcoming the negative influence of sexual abstinence. These potential methods are mostly obtained from the interviews conducted for this research, including providing appropriate sex-related education and psychology consultation to the seafarers, enriching the entertainment facilities on board, enhancing the working and living environment, good relationship and communication with the co-workers and family members, reducing the length of single contract period on board and increasing the shore leave opportunities at port of calls.

The last part of the questionnaire surveyed the basic demographic information of the respondents including the age, education level and marriage status.

Most of the questions from Part Five to Part Eight of the questionnaire together with the questions in Part Ten are five-point Likert scale questions. Likert scales are commonly used in the social science research and are regarded as effective for investigating attendant research objectives and yielding valid outcomes (Bryman & Bell, 2011, Jennings, 2010, Kelman & Parloff, 1957, Chaudhary, 2000, Truong & Foster, 2006, Bigne, Sanchez & Sanchez, 2001, Zhao, Seibert & Hills, 2005). Technically, Likert scales yield a type of ordinal data, but most social science usage assumes equal distance between points on the scale and subsequently treats the Likert scale as interval data for analytical purposes (Bryman & Bell, 2011, Burns & Burns, 2008). Such convention allows the researchers to conduct more comprehensive statistical analysis, including the calculation of means and standard deviations, which can significantly contribute to achieving the research objectives and usually yield results that are intuitively logical and supported by other methods of analysis (Allen & Seaman, 2007, Burns & Burns, 2008).

- **Data collection**

Considering the work characteristics of the seafarers, online data collection was the best data collection option to maximize the exposure of the survey among the Chinese male seafarers and effectively achieve the desired sample size.

Online data collection is fast, efficient, and inexpensive. It allows flexible design and can achieve the desired sample size effectively due to the internet efficiency (Neuman, 2006). The disadvantages of the online data collection include coverage as well as privacy and verification. The first concern involves sampling, and unequal access and use of the Internet. Normally, older and rural people are less likely to have access to or greater discomfort with the online questionnaire (Jennings, 2010). However, such cohorts are not considered as the target participants for this research. Also, the internet access rate for the seafarers on board has been significantly improved in recent years due to the technology development, though the quality of the internet varies. As long

as a reliable online survey platform is selected, the privacy of the respondents can be well protected. People with the willingness to participate can access the survey through the internet website voluntarily, thereby satisfying the requirements of research ethics. Also, the survey can be easily disseminated among the Chinese male seafarers with sufficient promotion, as there is no access restriction. Therefore, an appropriate sample size can be achieved effectively even though response rates are likely to be very low (e.g. can be less than 1%) due to lack of awareness and the weak control on the survey participation (Vehovar & Manfreda, 2008).

To avoid participant attrition and confusion, the questionnaire was carefully designed to require no more than 20 minutes to complete (Neuman, 2006). The questionnaire was designed through the Sojump ([www.wjx.cn](http://www.wjx.cn)) online survey tool and a web link was provided for people to participate in this survey. Minimum answering time was appropriately set up for each question to request the participants to carefully read the questions, which can effectively avoid unreliable and illogical answers. Responses from the same IP address were deleted to prevent the repeated participants.

The pilot test was conducted between 25 April 2021 and 27 April 2021. The survey link was sent to 50 Chinese male seafarers who are from the same shipping company through Wechat, one of the most popular social networking platforms in China. The seafarers were informed that their participation was voluntary and they were encouraged to provide comments and opinions on structure and content at the end of the survey. A total of 43 valid responses were collected. Basic analysis such as descriptive statistics and comparison of means were conducted to test whether the questionnaire was effective in facilitating the relevant analysis and thereby achieve the research objectives. The participants' feedback indicated that the length of the questionnaire was acceptable and that the questions were clearly understood. Accordingly, no further adjustment was made to the questionnaire for the formal data collection stage, which was conducted between 6 May 2021 and 16 May 2021.

During the formal data collection period, the survey link was promoted on the Wechat. Due to the working and education background, the researcher has a large number of personal contacts that are currently working as seafarers. The researcher also encouraged these personal contacts to further forward the survey link to further disseminate the survey. Moreover, the researcher posted the survey link on the blogs of four maritime related public accounts on Wechat, which are frequently visited by the Chinese seafarers to maximize the questionnaire exposure. It was not possible, and it was not the intention of the researcher, to obtain a representative sample in terms of demographic characteristics, company characteristics and working experience.

- **Data analysis**

The most recent version of the quantitative software at the time of writing, IBM SPSS 26.0, was used to analyse the questionnaire data. This initially involved aggregate descriptions of the sample. Since one of the main purposes of the research is to identify the kind of Chinese male seafarers who are more likely to be influenced by sexual abstinence and subject to psychological health issues, hierarchical cluster analysis was selected to conduct the quantitative data analysis. ‘Cluster analysis’ refers to a family of multivariate techniques which are useful to group cases based on their cumulative scores on a range of measured variables (i.e. Likert-scaled questions) (Bryman & Bell, 2011). It is recognised as one of the most effective methods to identify the segmentation of the target population and make subsequent comparisons on the basis of demography, background and etc.

Hierarchical cluster analysis begins by assigning each case to its own cluster and in the first clustering step joins together the two closest cases based on their scores on the cluster variate (or collection of clustered items). In each subsequent step, there is one less cluster and the process continues until all cases, theoretically, are joined together in a single cluster (Ferreira & Hitchcock, 2009). The most significant advantage of hierarchical cluster analysis is that it can be effective in determining the

optimal number of clusters. This is extremely important for innovative and exploratory empirical studies, such as the current research, which lack sufficient support from the literature (Fredline, 2012).

Ward's method was selected to conduct clustering, which is the most common clustering algorithms of the hierarchical cluster analysis. This method begins with N clusters, each containing one object. The total within-cluster sum of squares (SSE) is computed to determine the next two groups merged at each step of the algorithm. Ward's method is widely regarded as the most appropriate method for clustering quantitative variables when the desired group proportions are approximately equal (Hands & Everitt, 1987). Most other measures, such as single linkage, complete linkage and average linkage, have a tendency to produce one large and numerous much smaller clusters, which is less conducive to further statistical analysis (Hair, Black, Babin, Anderson & Tatham, 1998). Comparison-of-means and chi-squared tests, as warranted, were subsequently used after each clustering option to see how the clusters significantly differ, and similarly sized clusters were therefore preferred to achieve research reliability.

Typically, the researcher decides the final cluster solution for hierarchical cluster analysis based on cluster sizes, the significance of the difference in item means between the clusters, interpretability, and, sometimes, interpretation of the accompanying dendograms (Ferreira & Hitchcock, 2009). Theoretically, every cluster solution obtained from the hierarchical technique is 'correct', but not all of them make sense for achieving the research objectives (Fredline, 2012). Therefore, the decision on the final cluster solution for hierarchical cluster analysis can be regarded as more of an art than a science (Weaver & Lawton, 2002). Basically, the size of each cluster should be large enough to facilitate the reliability of further analysis (i.e. comparison of means and chi-square test). Also, each cluster should be significantly distinguished from all other clusters on the variate items and, ideally, affiliated independent variables (Bryman & Bell, 2011, Fredline, 2012).

It is a common practice to start by examining the basic two-cluster solution and work backwards. The means of the two clusters on the original variables should be compared and see how these differ. Then, the three cluster solution should be similarly examined. Normally, this solution will contain one cluster that is present in the two cluster solution, and the other two will have resulted from the splitting of another, so it is useful to try and understand the basis for this split. The researcher must evaluate whether this split results in a more interpretable and useful segmentation than the two cluster solution. If this makes sense, the researcher should continue to proceed to the four cluster solution and so on until it is believed that the latest outcome no longer provides good discrimination into manageable and meaningful groups (Bryman & Bell, 2011, Fredline, 2012). This is related to the criterion of ‘interpretability’, one of the most important factors in deciding the final solution. The evaluation of the interpretability confirms the philosophy that the cluster analysis is an art more than a science, and indicates that the ‘meaning’ of the clusters is more important than the ‘numbers’.

Since one of the major objectives of the research is to identify the influence of sexual abstinence on the ‘psychological health’ of the Chinese male seafarers, and its further influence on the seafarers’ work performance and the operating safety of the ship, the questions used to examine the perceived psychological health issues resulting from sexual abstinence (Part Five) were selected as the items for clustering.

Additionally, multiple liner regression analysis was conducted to identify the correlation between the job satisfaction of the Chinese male seafarers and their toleration level on sexual abstinence. Multiple liner regression analysis is one of the most popular regression methods and is used to establish liner relationship between multiple independent variables and the dependent variable that is influenced by them (Fritz & Berger, 2015). Since multiple items were used to determine the job satisfaction of the Chinese male seafarers in this research (Part Four of the questionnaire), multiple liner regression analysis was effective to achieve the research

objective. Stepwise method was selected to conduct the multiple liner regression analysis, which can eliminate the unqualified independent variables based on the significance standards and thus is more reliable for ‘predicating’ the correlation (Fritz & Berger, 2015).

## **Chapter 4 Research Results**

This chapter reports on the qualitative and quantitative results of the research. Section 4.1 investigates the detailed research results for the qualitative research. Section 4.2 describes the quantitative research findings with regards to the respondents including their demographic, job and company characteristics, and then presents the perceptions of the respondents on job satisfaction, sexual abstinence, psychological health problems, inappropriate behaviour on board, inadequate work performance and risk sexual behaviours. Additionally, the available support and facilities on board from the company of the respondents are reported, and the perceived effectiveness of the potential methods for overcoming the negative influence of sexual abstinence is investigated. Meanwhile, the correlation between the job satisfaction and the toleration level of sexual abstinence based on the multiple liner regression analysis will be explored. Finally, the hierarchical cluster analysis will be reported and the differences between each cluster of the respondents will be identified.

### **4.1 Qualitative Research Results**

To provide solid support for the questionnaire design and enrich the research information, five interviews with the selected Chinese male seafarers were conducted between 12 April 2021 and 18 April 2021. These interviewees are the friends of the researcher, and the interviews were conducted face to face using Chinese as the communication language. The detailed background information of the interviewees is listed in Table 4.1.



Table 4.1 *Basic background information of the interviewees*

No	Age	Years of working as a seafarer	Current Position	Ship type	Flags of the ship that have ever sailed	Nationality of the crew that have ever sailed together	Normal contract period
1	31	10 years	First engineer	Oil tanker	China, Hong Kong (China), Panama	Chinese	6 months – 10 months
2	28	8 years	Second engineer	Oil tanker	China	Chinese	6 months – 10 months
3	28	4 years	Third engineer	Oil tanker	China	Chinese	6 months – 10 months
4	35	14 years	Second engineer	Oil tanker	China	Chinese	6 months – 10 months
5	34	11 years	First engineer	LNG	Hong Kong (China)	Chinese, British, Polish, Romanian, Croatian, Latvian, Philippine	9 months – 10 months

The interviewees were encouraged to elaborate the challenges, the shore life that they missed the most, and their feeling and emotion changes while working on board during the interview. Their attitude towards the job of seafarer and sexual abstinence were also asked. The detailed interview minutes are summarized in Appendix I.

### *The challenges for seafarers when working on the ship*

High work stress and pressure from different kinds of checks were the main challenges mentioned by the interviewees (Interviewee 1, 2, 3). The working environment was extremely bad on the ship (Interviewee 1, 3), and the manpower was not sufficient based on the point of view of Interviewee 1 and Interviewee 4. There were too many rules and requirements to follow on the ship (Interviewee 2, 3). Interviewee 3 pointed out that the seafarers sometimes were requested to conduct some work not conforming to the rules and requirements. This added extra pressure to the seafarers. Sometimes, the contract period was too long and it was difficult to conduct the shifting (Interviewee 1, 3, 5).

Meanwhile, isolation from the friends and family members often made the interviewees feel lonely and homesick (Interviewee 1, 2, 4, 5). Food quality was another problem. Interviewee 1, 3 and 4 all pointed that the food was awful on board and could not provide sufficient nutrition to the seafarers. Interviewee 1 stressed that there was lack of entertainment facilities on board. Interviewee 4 and Interviewee 5 agreed on this by indicating that life on board was boring.

Additionally, Interviewees 1 and 3 mentioned that it was difficult to deal with the interpersonal relationship on board, as the seafarers had different background and values. Interviewee 5 specifically mentioned that sexual abstinence was an issue for the seafarers.

### *The shore life that the seafarers missed the most*

Family life (Interviewee 1, 2, 4, 5), various entrainment activities such as computer games and movies (Interviewee 1, 3), and delicious food (Interviewee 1, 2) were indicated by the interviewees as the things that they missed the most while working on the ship. Interviewee 5 mentioned sexual life in the interview.

### *The overall feeling for being as a seafarer*

The overall feeling for being as a seafarer was polarized among the interviewees. Interviewee 3 believed that the seafarer was a noble job with great responsibilities, though not highly recognized by the society. Interviewee 5 agreed that the job could provide a strong sense of achievement. However, Interviewee 1 and Interviewee 4 did not want to work as the seafarers. Interviewees 1, 2 and 5 indicated that the payment of the seafarer was attractive and could support the family. Interviewee 3 had divarication on this but claimed that he developed valuable personal characteristics through the job.

### *The changes of feelings and emotions when working on the ship*

The interviewees normally felt great, motivated and full of energy when they just boarded the ship (Interviewee 1, 2, 3, 5). However, Interviewee 4 was frustrated from the very beginning. After a few weeks, the interviewees started to feel tired and board and would like to get off the ship as soon as possible (Interviewee 1, 2, 3). Interviewees 1, 2 and 4 noticed that they had some psychological issues when working on the ship for a certain period. For example, they became unwilling to communicate with their friends, family member and co-workers, or they were too worried to fall asleep. Meanwhile, Interviewee 4 and Interviewee 5 claimed that their health conditions became worse while working on the ship. The interviewees agreed that the high work stress, pressure from different checks and the unhealthy or boring

life on board were the main reasons for such changes of feelings and emotions (Interviewee 1, 2, 3, 4 5), which are consistent with the challenges they mentioned when working on the ship. Additionally, Interviewee 1 and Interviewee 2 further pointed out that homesick was also a reason for the negative feelings on board. Most of interviewees (Interviewee 1, 2, 3, 4) felt a great sense of relief when finishing the contract.

#### *The attitude towards sexual abstinence*

All the interviewees agreed that sexual life is important for the seafarers and is a kind of basic needs of human beings. After a period of sexual abstinence on board, the interviewees developed some negative feelings such as unhappiness, frustration, tiredness, loneliness and depression (Interviewee 1, 3, 5). Reducing the length of the single contract period (Interviewee 1, 2, 3, 4, 5), increasing shore leave opportunities (Interviewee 1, 2) and entertainment facilities (Interviewee 1, 3, 5) regarded as effective methods in dealing with the issues caused by sexual abstinence. Meanwhile, Interviewee 1 and 5 suggested that good connection and communication with the family members and co-workers can also solve the relevant problem.

## **4.2 Quantitative Research Results**

Between 6 May 2021 and 16 May 2021, 830 responses were received, of which 617 were fully completed and valid. These 617 respondents were all Chinese male seafarers.

### **4.2.1 Demographic, job and company characteristics**

Among the 617 respondents, 364 participants (59%) are of the age cohort 31-40. The 18-30 cohort contained 145 respondents (23.5%). The rest of the respondents fell into

the cohorts of 41-50 (84 respondents, 13.6%) and 51-60 (14 respondents, 3.9%) (see Figure 4.1). This is consistent with the average age of the Chinese seafarers, which is 36 (Xinde Marine, 2019). Diploma degree constituted the highest educational achievement of 324 respondents (52.5%) whilst 179 (29.0%) reported to have an undergraduate degree or above. The education levels for the other 114 respondents (18.5%) were either high school education or below, or technique education (see Figure 4.2). A majority of the respondents were married (452 respondents, 73.3%), 150 respondents (24.3%) were single. 15 respondents (2.4%) were either devoiced or widowed (see Figure 4.3).

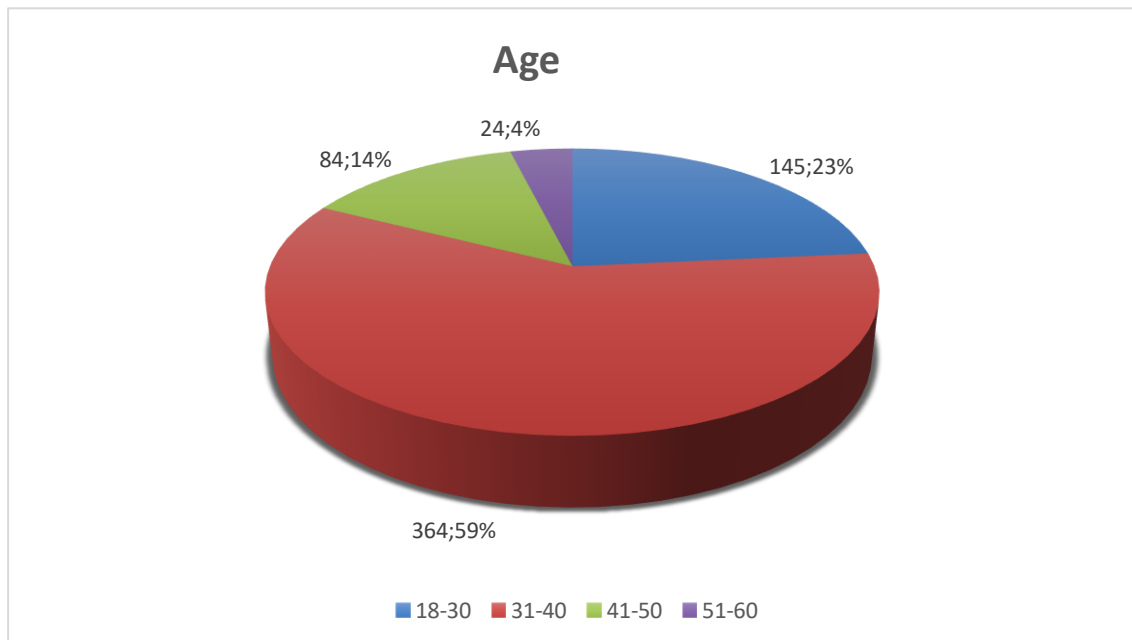


Figure 4.1 Age

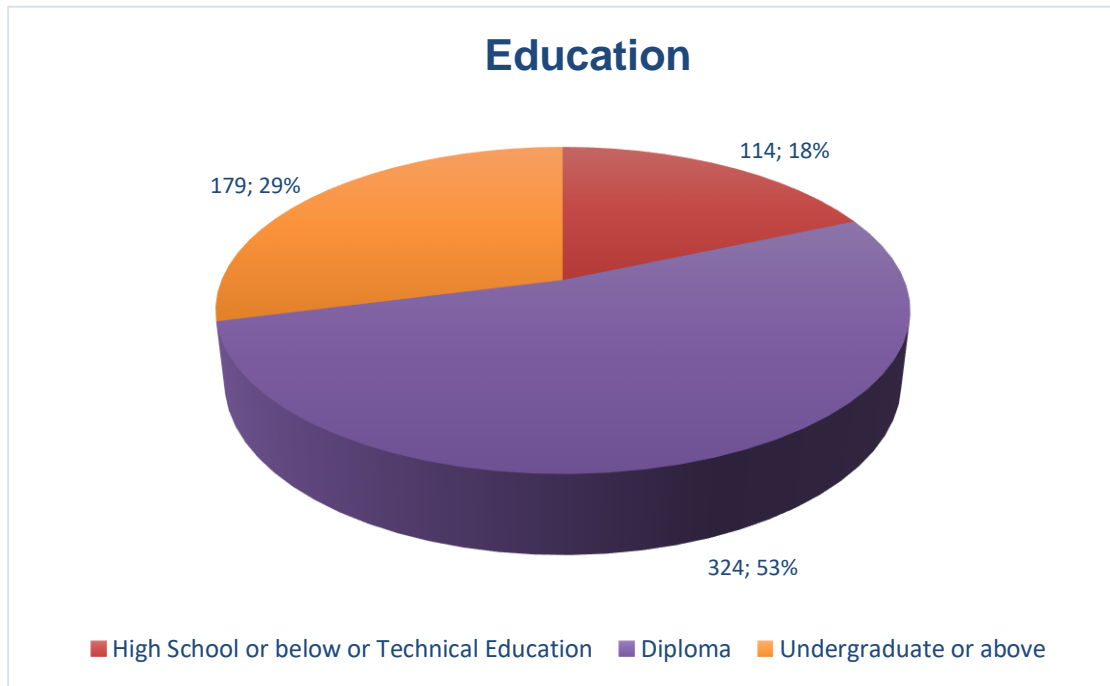


Figure 4.2 Education level

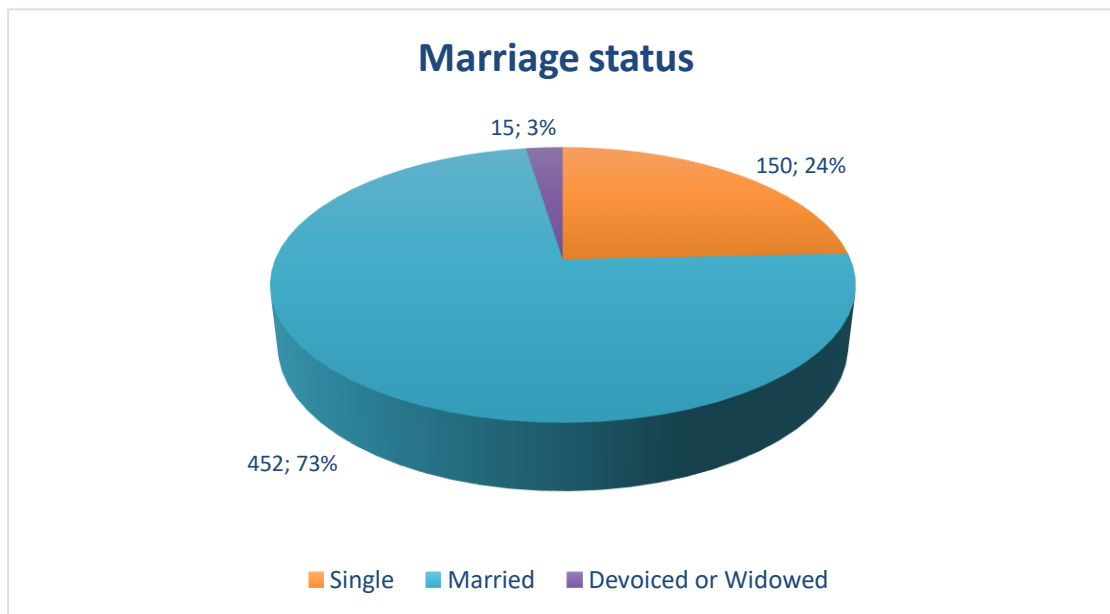


Figure 4.3 Marriage status

There were 115 respondents (18.6%) who have worked as a seafarer for 15 years or more, 152 respondents (24.6%) had 9 to 12 years working experience as a seafarer, and 86 respondents have worked for less than three years (see Figure 4.4). More than one third of the respondents (227, 36.8%) worked in the state-owned company in

China. Another one third of the respondents (207, 33.5%) were freelance seafarers who signed the working contract through a manning agency. Very few respondents (65, 10.5%) worked for the foreign shipping company, and the rest 118 respondents (19.1%) worked in the private-owned company in China (see Figure 4.5).

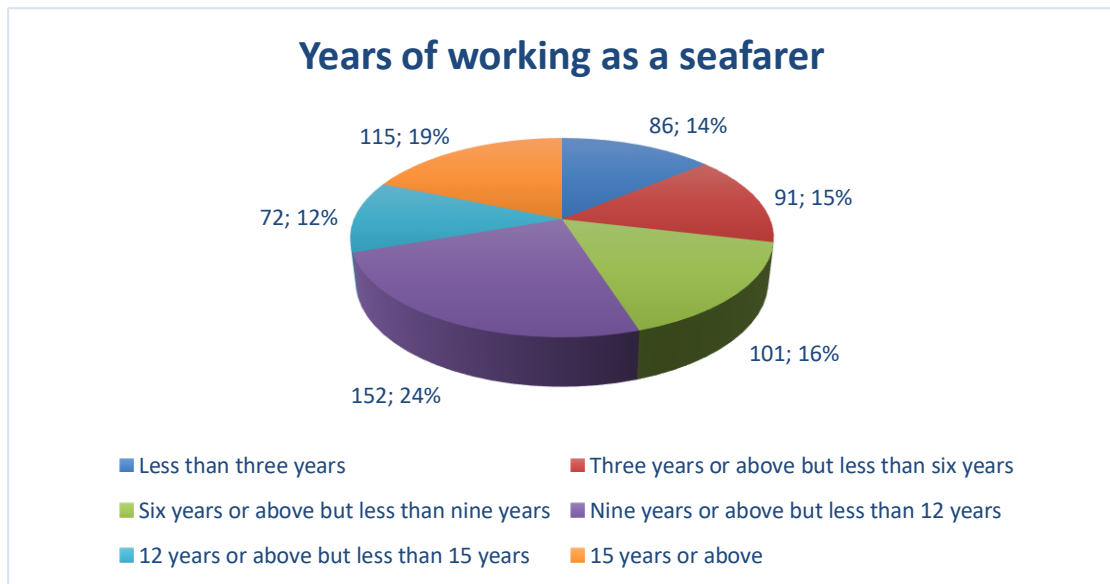


Figure 4.4 Years of working as a seafarer



Figure 4.5 Nature of the company

Around half of the respondents (315, 51.1%) normally worked on the bulk ship, and nearly one third of the respondents (182, 29.5%) worked on the oil tanker. Very small number of the respondents worked on the LNG or LNP ship (28, 4.5%), or an ocean cruise (30, 4.9%). The rest 60 respondents (10.0%) worked on the container ship (see Figure 4.6). For the positions on the ship, 250 respondents (40.5%) were currently working on the operating level, including second or third officer, and second or third engineer, whilst 192 respondents (31.1%) claimed to take the management roles on the ship, such as the captain, first officer, and chief or first engineer. The rest 175 respondents (28.4%) worked on the supporting level (see Figure 4.7). The respondents were evenly distributed for their working places on the ship, with 309 respondents (50.1%) working on the deck and 293 respondents (47.9%) in the engine room. There were 15 respondents (2.4%) who reported to work in the supporting area of the ship such as the kitchen (see Figure 4.8).

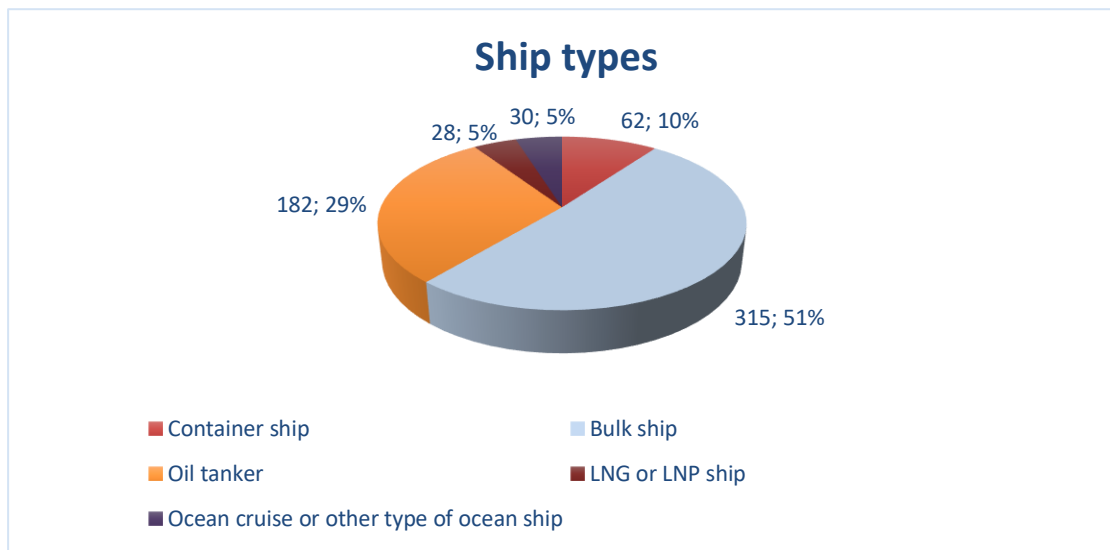


Figure 4.6 Ship types



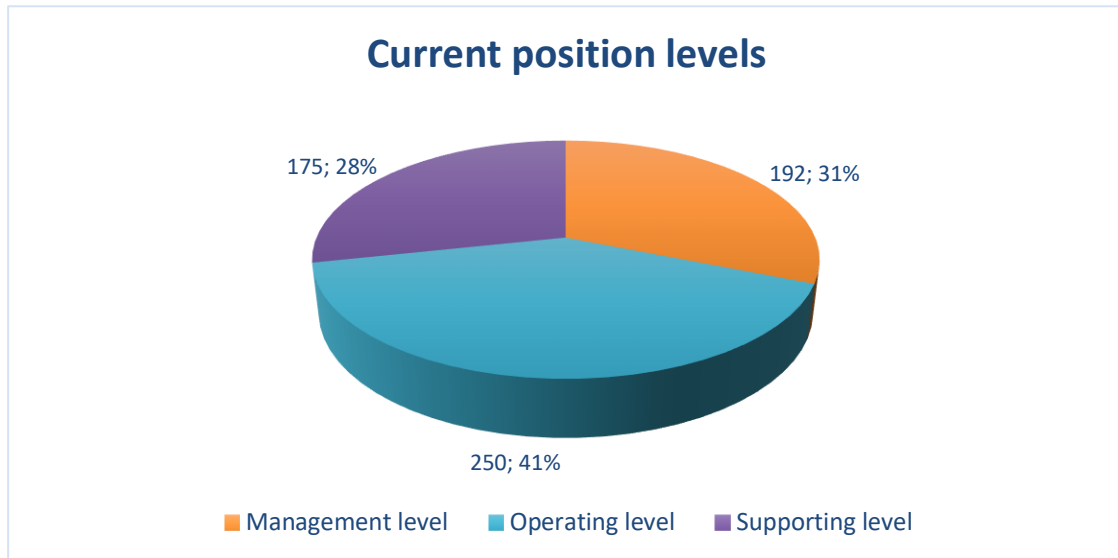


Figure 4.7 Current position levels

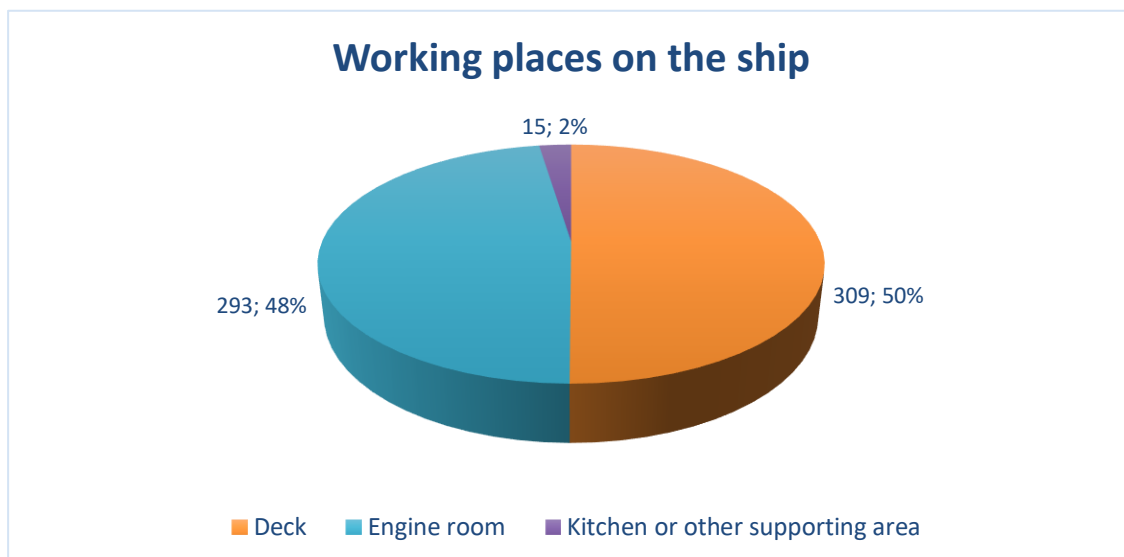


Figure 4.8 Working places on the ship

Among the 617 respondents, 175 respondents (28.4%) claimed that they have ever worked with the foreign co-workers on board, and the rest 442 respondents (71.6%) only worked with Chinese colleagues (see Figure 4.9). Only 28 respondents (4.5%) reported that they have worked with the female seafarers on board before (see Figure 4.10).

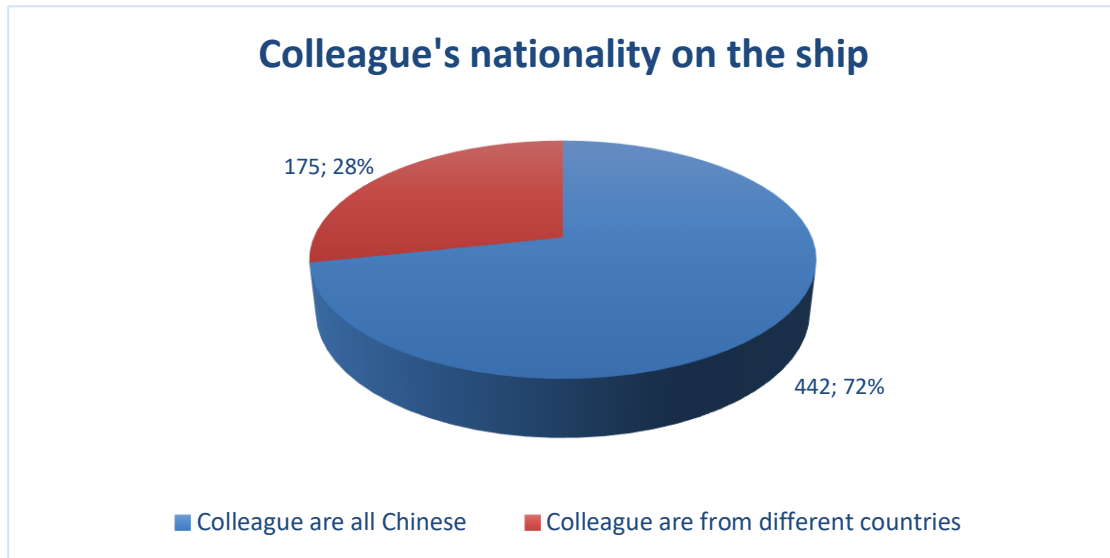


Figure 4.9 Colleague’s nationality on the ship

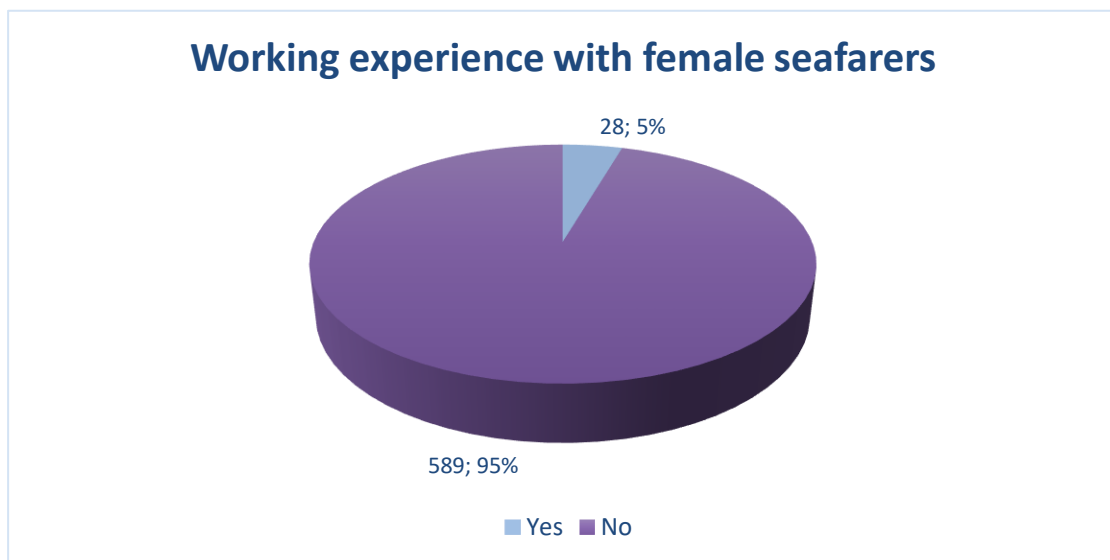
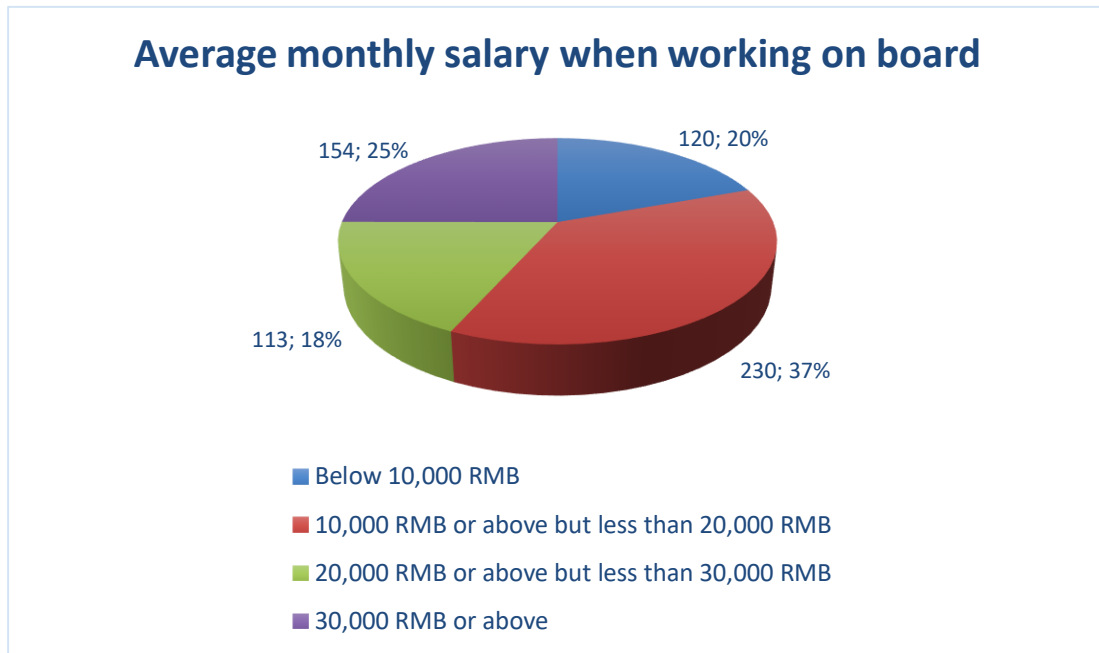


Figure 4.10 Working experience with female seafarers

A high portion of the respondents (230, 37.3%) claimed that their average monthly salary when working on board between 10,000 RMB and 20,000 RMB. 113 respondents (18.3%) indicated that their salary was between 20,000 RMB and 30,000 RMB. Meanwhile, 154 respondents reported a higher monthly income of 30,000 RMB or above when they were working on board. However, there were still 120 respondents (19.4%) whose average monthly salary was below 10,000 RMB (see Figure 4.11).



*Figure 4.11* Average monthly salaries when working on board

Nearly two-thirds of the respondents (403, 65.3%) reported that their companies request them to work on board for at least six months each time. The single contract period for another 144 respondent (23.3%) reached nine months. Only a very small portion of the respondents claimed that their single contract period was three months or below (39, 6.3%), or their companies had no requirement for their single working period on board (31, 5.1%) (see Figure 4.12). There were 297 respondents (48.2%) whose companies have no requirement on their holiday duration between each working period on the ship. 276 respondents (44.7%) could take at least three months holiday before they boarded the ship again. However, there were 44 respondents (7.1%) who could only take a maximum of two months holiday (see Figure 4.13).

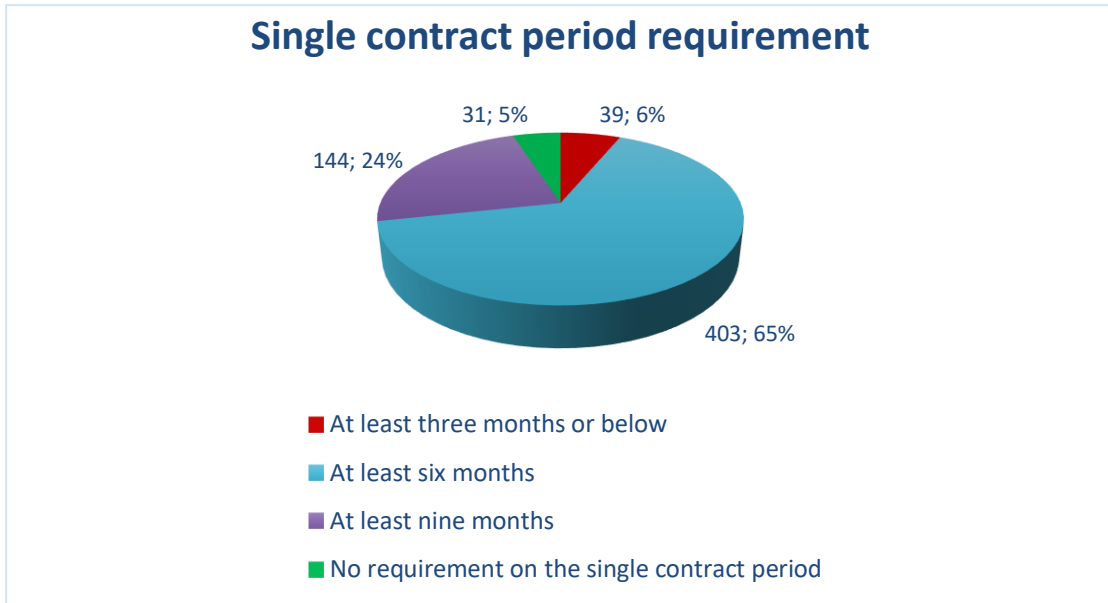


Figure 4.12 Single contract period requirement

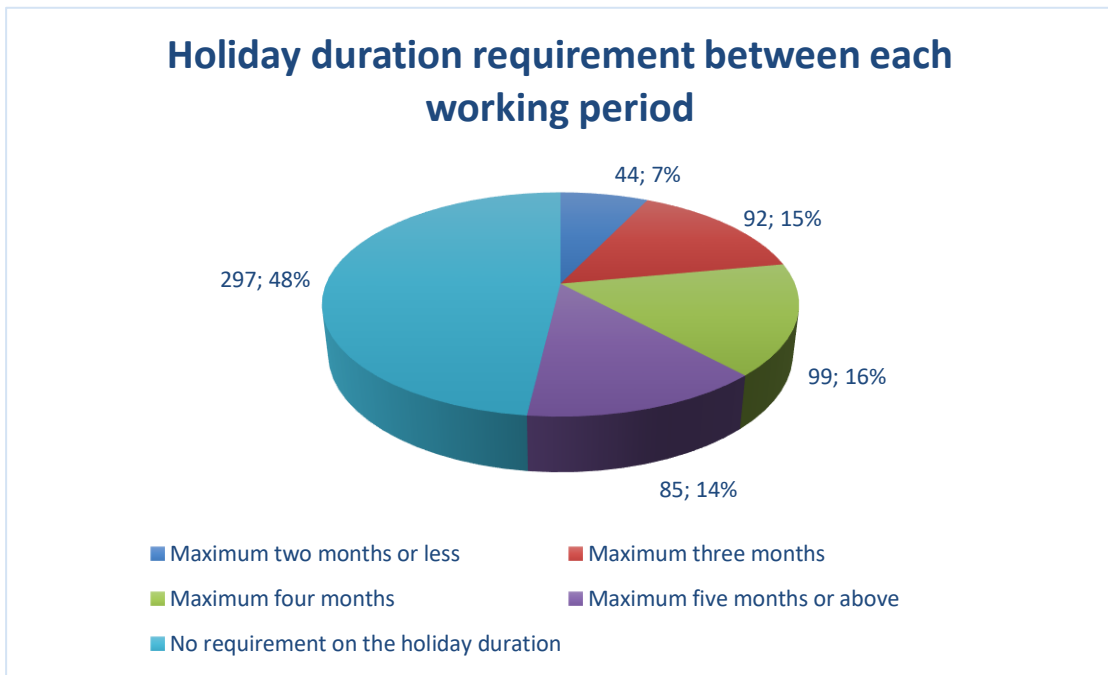
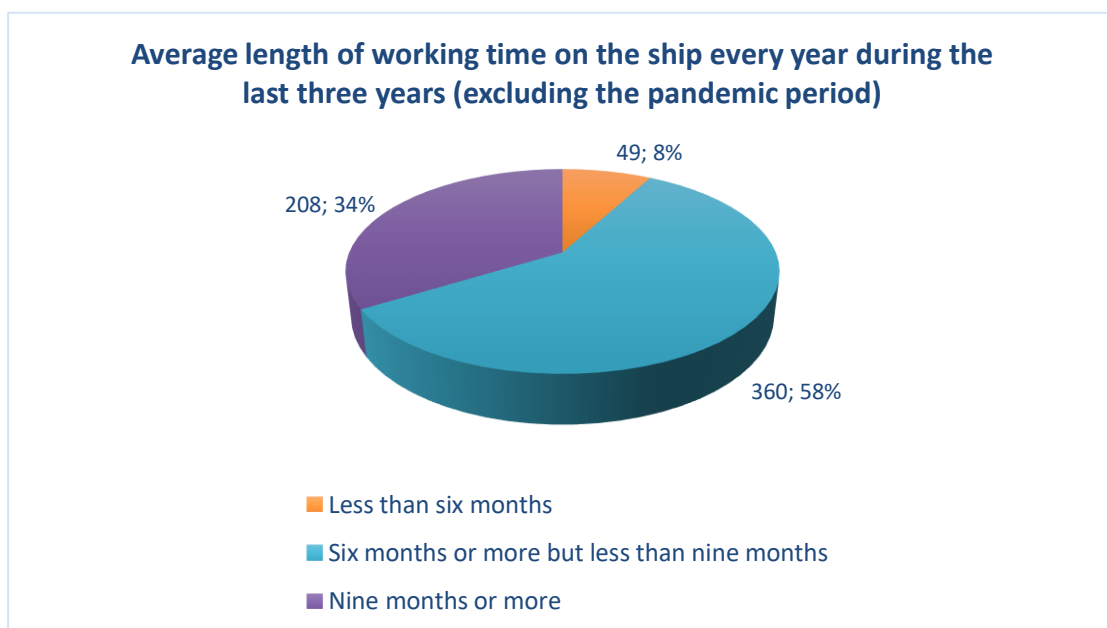


Figure 4.13 Holiday duration requirement between each working period

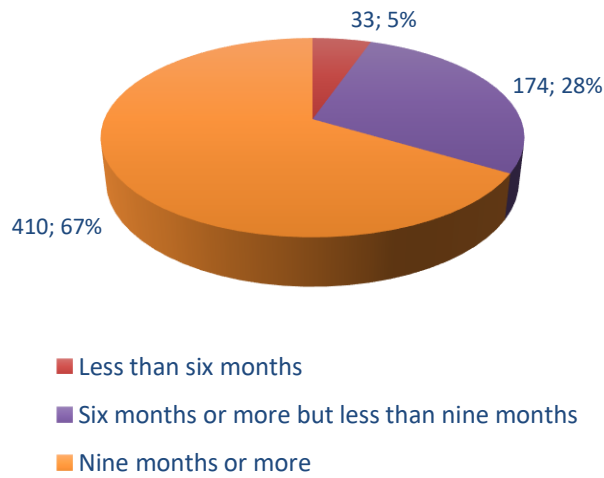
During the last three years prior to the date of survey completion, 360 respondents (58.3%) reported that their average annual working time on the ship was six to nine months. Around one-third of the respondents (208, 33.7%) worked for more than nine months in total every year, and only 49 respondents (7.9%) worked for less than six

months (see Figure 4.14). Around two thirds of the respondents (410, 66.5%) claimed that their longest single working period on the ship during the last three years (excluding the pandemic period) exceeded nine months. There were only 33 respondents whose longest single working period on board was less than six months. The longest single working period for the rest 174 respondents (28.2%) ranged from six months to nine months, which is the common working period for most of the seafarers (see Figure 4.15). Nearly one third of the respondents (194, 31.4%) of the respondents could hardly get any shore leave opportunity while they were working on the ship. Only 36 respondents (5.9%) claimed that they could frequently take the shore leave, while another 111 respondents (18.0%) might get one or two shore leave opportunities every month. The rest 276 (44.7%) respondents could randomly get one or two shore leave opportunities throughout their whole working period on the ship (see Figure 4.16).



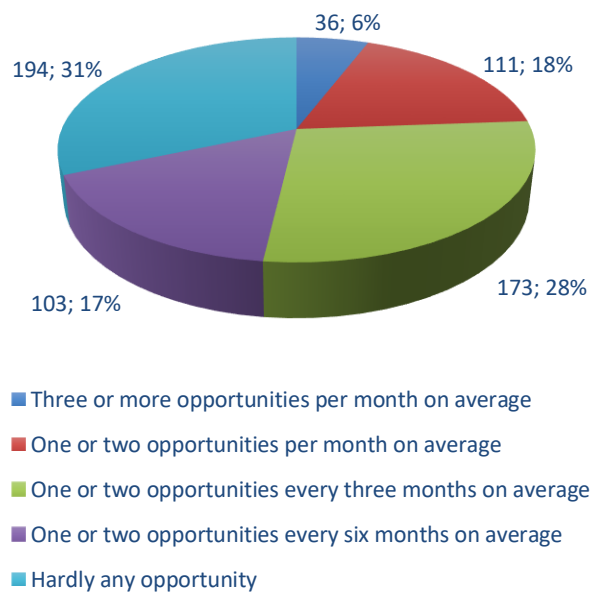
*Figure 4.14* Average length of working time on the ship every year during the last three years (excluding the pandemic period)

**Longest single working period on the ship during the last three years (excluding the pandemic period)**



*Figure 4.15* Longest single working period on the ship during the last three years (excluding the pandemic period)

**Frequency of the shore leave opportunity during the last three years (excluding the pandemic period)**



*Figure 4.16* Frequency of the shore leave opportunity during the last three years (excluding the pandemic period)

#### **4.2.2 Perceived job satisfaction**

In relation to the variables that indicating the job satisfaction levels of the seafarers, the respondents highly agree that the work of the seafarer is very stressful (mean: 4.33). However, seafarer is a job with great responsibility (mean: 4.30) though not highly respected by the society (mean, 3.22) and recognized by their family members (mean, 2.28). Meanwhile, most of the respondents believed that working as a seafarer is not easy and simple (mean: 1.88).

The respondents indicated moderate level of agreement on the items of positive relationship with the co-workers (mean: 3.50), and effective supervision (mean: 3.44). In addition, a higher portion of the respondents agreed that working as a seafarer is their own choice (mean: 3.54), but denied that their ability to only work as a seafarer (mean: 2.47). Most of the respondents did not agree that the seafarers receive better payment than the other jobs (mean: 2.36). At the same time, the working (mean: 2.40) and living (mean: 2.82) environment for seafarers were not good enough. Overall, many respondents were not satisfied with their job as a seafarer (mean: 2.70) (see Table 4.2).

#### **4.2.3 Toleration level and perceived attitude on sexual abstinence**

A great number of the respondents reported that they did not get used to sexual abstinence when they were working on the ship (mean: 2.64). Also, many respondents did not believe that sexual abstinence should be a normal job requirement for the seafarers (mean: 2.45). This is consistent with the comparably high level of agreement on that sexual life is one of the basic needs of the seafarers (mean: 3.92) (see Table 4.3).

Table 4.2 Agreement level of the variables indicating job satisfaction

<b>Variables</b>	<b>Overall Mean (N=617)</b>	<b>Strongly disagree (Value: 1)</b>	<b>Disagree (Value: 2)</b>	<b>Neutral (Value: 3)</b>	<b>Agree (Value: 4)</b>	<b>Strongly agree (Value: 5)</b>
The payment of seafarer is better than the payment of the other jobs	2.36	167 27.1%	208 33.7%	129 20.9%	81 13.1%	32 5.2%
My co-workers on the ship are friendly	3.50	13 2.1%	64 10.4%	193 31.3%	296 48.0%	51 8.3%
I can receive professional supervision when I am working on the ship	3.44	25 4.1%	73 11.8%	172 27.9%	302 48.9%	45 7.3%
The working environment on the ship is good	2.40	144 23.3%	198 32.1%	167 27.1%	98 15.9%	10 1.6%
The living environment on the ship is good	2.82	79 12.8%	148 24.0%	207 33.5%	172 27.9%	11 1.8%
Seafarer is a respected job	3.22	144 23.3%	76 12.3%	68 11.0%	157 25.4%	172 27.9%
Seafarer is a job with good promotion opportunity	2.61	115 18.6%	174 28.2%	185 30.0%	122 19.8%	21 3.4%
Seafarer is a job with great responsibility	4.30	12 1.9%	11 1.8%	39 6.3%	274 44.4%	281 45.5%
The work on the ship is simple and easy	1.88	238 38.6%	266 43.1%	66 10.7%	40 6.5%	7 1.1%
I can only work as a seafarer based on my ability	2.47	108 17.5%	230 37.3%	178 28.8%	81 13.1%	20 3.2%



Table 4.2 Agreement level of the variables indicating job satisfaction (continued)

<b>Variables</b>	<b>Overall Mean (N=617)</b>	<b>Strongly disagree (Value: 1)</b>	<b>Disagree (Value: 2)</b>	<b>Neutral (Value: 3)</b>	<b>Agree (Value: 4)</b>	<b>Strongly agree (Value: 5)</b>
Working as a seafarer is my own choice	3.54	27 4.4%	61 9.9%	129 20.9%	352 57.1%	48 7.8%
My family feel proud of me because I am a seafarer	2.28	182 29.5%	174 28.2%	182 29.5%	64 10.4%	15 2.4%
Working as a seafarer is very stressful	4.33	11 1.8%	11 1.8%	44 7.1%	249 40.4%	302 48.9%
Overall, I am satisfied with my job as a seafarer	2.70	85 13.8%	153 24.8%	253 41.0%	116 18.8%	10 1.6%

Table 4.3 *Toleration level and perceived attitude on sexual abstinence*

<b>Variables</b>	<b>Overall Mean (N=617)</b>	<b>Strongly disagree (Value: 1)</b>	<b>Disagree (Value: 2)</b>	<b>Neutral (Value: 3)</b>	<b>Agree (Value: 4)</b>	<b>Strongly agree (Value: 5)</b>
I get used to sexual abstinence when I am working on the ship	2.64	144 23.3%	149 24.1%	126 20.4%	180 29.2%	18 2.9%
Sexual abstinence on the ship violates the basic needs of seafarers	3.92	12 1.9%	38 6.2%	140 24.1%	209 33.9%	209 33.9%
Sexual abstinence on the ship is normal and is associated with the job requirements of seafarers	2.45	173 28.0%	148 24.0%	160 25.9%	119 19.3%	17 2.8%

#### **4.2.4 Perceived psychological health issues, inappropriate behaviors, inadequate work performance and risk sexual behaviors due to sexual abstinence**

- **Perceived psychological health issues**

Overall, the respondents reported moderate level of agreement on that they developed some psychological issues due to sexual abstinence on board (mean: 3.24). Specifically, the respondents agreed that they suffered some emotion and mind related psychological issues because of sexual abstinence, with slightly higher agreement on homesick (mean: 3.78), suspicion (mean: 3.73) and anxiety (mean: 3.57). Without the sexual life on board, most of the respondents claimed that they did not feel painful on their body (mean: 2.98) or have a thought of suicide (mean: 2.24) (see Table 4.4)

- **Perceived inappropriate behaviors**

The respondents generally claimed that they did not have the inappropriate behaviors on board because of sexual abstinence (mean: 2.92). However, a certain respondents reported that they became more likely to argue with the others when not having the sexual life (mean: 2.82). Meanwhile, a few respondents reported that they did not want to communicate with their co-workers (mean: 2.73) or family members (mean: 2.71) due to sexual abstinence. Unwillingness to communicate was also mentioned by some interviewees in the interview. Very limited number of the respondents indicated that they had self-harm behaviors on board caused by sexual abstinence (mean: 2.18) (see Table 4.5).

- **Perceived inadequate work performance**

Many respondents reported that they did not have worse work performance on board due to sexual abstinence (mean: 2.87). Nevertheless, there was a higher portion of respondents who indicated that they were easily to feel tired without the sexual life

(mean: 3.45). Meanwhile, a certain number of the respondents noticed that they were likely to lose attention when on duty (mean: 3.06). A few respondents also pointed out that their low efficiency on work (mean: 2.80) or sometimes misunderstanding of the order from their supervisors (mean: 2.71) because of sexual abstinence (see Table 4.6).

- **Perceived risk sexual behaviors**

More than half of the respondents (362, 58.7%) claimed that they never had commercial sex activity at the ports of call. However, there were still 126 respondents (20.4%) who admitted the participation of the commercial sex activity during the shore leave. The rest 129 respondents (20.9%) did not want to provide their answers for this question (see Figure 4.17). Even though only a small portion of the respondents reported the experience of the commercial sex activity, a higher portion of the respondents agreed that having commercial sex activity at the ports of call could effectively satisfy the seafarer's sexual need (mean: 3.26). Moreover, a great number of the respondents believed that it was common for the seafarers to have the commercial sex activity during the shore leave (mean: 3.47). Meanwhile, this behavior should be understood (mean: 3.47). The pattern of the answers for these two questions is consistent. Nevertheless, most of the respondents had adequate knowledge on the risk of sexual behaviors. They highly agreed that having the commercial sex activity had the risk of sexual transmitted infections (mean: 4.14). Also, wearing the condom might not be always safe (mean: 2.56) (see Table 4.7).

Table 4.4 *Perceived psychological health issues due to sexual abstinence*

<b>Variables</b>	<b>Overall Mean (N=617)</b>	<b>Strongly disagree (Value: 1)</b>	<b>Disagree (Value: 2)</b>	<b>Neutral (Value: 3)</b>	<b>Agree (Value: 4)</b>	<b>Strongly agree (Value: 5)</b>
I feel anxious	3.57	12 1.9%	91 14.7%	163 26.4%	238 38.6%	113 18.3%
I cannot control my temper	3.30	22 3.6%	138 22.4%	187 30.3%	174 28.2%	96 15.6%
I feel depressed	3.37	19 3.1%	137 22.2%	164 26.6%	193 31.3%	104 16.9%
I feel homesick	3.78	12 1.9%	71 11.5%	121 19.6%	251 40.7%	162 26.3%
I feel lonely	3.48	14 2.3%	119 19.3%	159 25.8%	209 33.9%	116 18.8%
I feel that there is no hope for the future	3.07	27 4.4%	194 31.4%	191 31.0%	119 19.3%	86 13.9%
I feel sad	3.36	20 3.2%	139 22.5%	163 26.4%	190 30.8%	105 17.0%
I cannot sleep well	3.41	25 4.1%	137 22.2%	136 22.0%	195 31.6%	124 20.1%
I feel painful on my body	2.98	34 5.5%	213 34.5%	179 29.0%	111 18.0%	80 13.0%
I feel agitated	3.31	28 4.5%	145 23.5%	149 24.1%	197 31.9%	98 15.9%

Table 4.4 *Perceived psychological health issues due to sexual abstinence (continued)*

<b>Variables</b>	<b>Overall Mean (N=617)</b>	<b>Strongly disagree (Value: 1)</b>	<b>Disagree (Value: 2)</b>	<b>Neutral (Value: 3)</b>	<b>Agree (Value: 4)</b>	<b>Strongly agree (Value: 5)</b>
I become suspicious	3.73	33 5.3%	192 31.1%	152 24.6%	151 24.5%	89 14.4%
I become pessimistic	3.06	37 6.0%	193 31.3%	169 27.4%	131 21.2%	87 14.1%
I start to have the thought of suicide	2.24	157 25.4%	260 42.1%	134 21.7%	29 4.7%	37 6.0%
Overall, I notice that I start to have psychological health issues	3.24	53 8.6%	138 22.4%	133 21.6%	194 31.4%	99 16.0%

Table 4.5 *Perceived inappropriate behaviors due to sexual abstinence*

<b>Variables</b>	<b>Overall Mean (N=617)</b>	<b>Strongly disagree (Value: 1)</b>	<b>Disagree (Value: 2)</b>	<b>Neutral (Value: 3)</b>	<b>Agree (Value: 4)</b>	<b>Strongly agree (Value: 5)</b>
I do not want to communicate with my co-workers	2.73	54 8.8%	272 44.1%	138 22.4%	91 14.7%	62 10.0%
I do not want to communicate with my family members	2.71	58 9.4%	274 44.4%	139 22.5%	83 13.5%	63 10.2%
I start to have the impulse to fight with the other people on the ship	2.62	81 13.1%	262 42.5%	140 22.7%	78 12.6%	56 9.1%
I start to have the impulse to curse the other people on the ship	2.65	78 12.6%	265 42.9%	128 20.7%	86 13.9%	60 9.7%
I become more likely to argue with the other people on the ship	2.82	64 10.4%	232 37.6%	138 22.4%	117 19.0%	66 10.7%
I start to have the behavior of self-harm	2.18	148 24.0%	297 48.1%	116 18.8%	22 3.6%	34 5.5%
Overall, I notice that I start to have some improper behaviors on the ship	2.92	64 10.4%	202 32.7%	140 22.7%	143 23.2%	68 11.0%

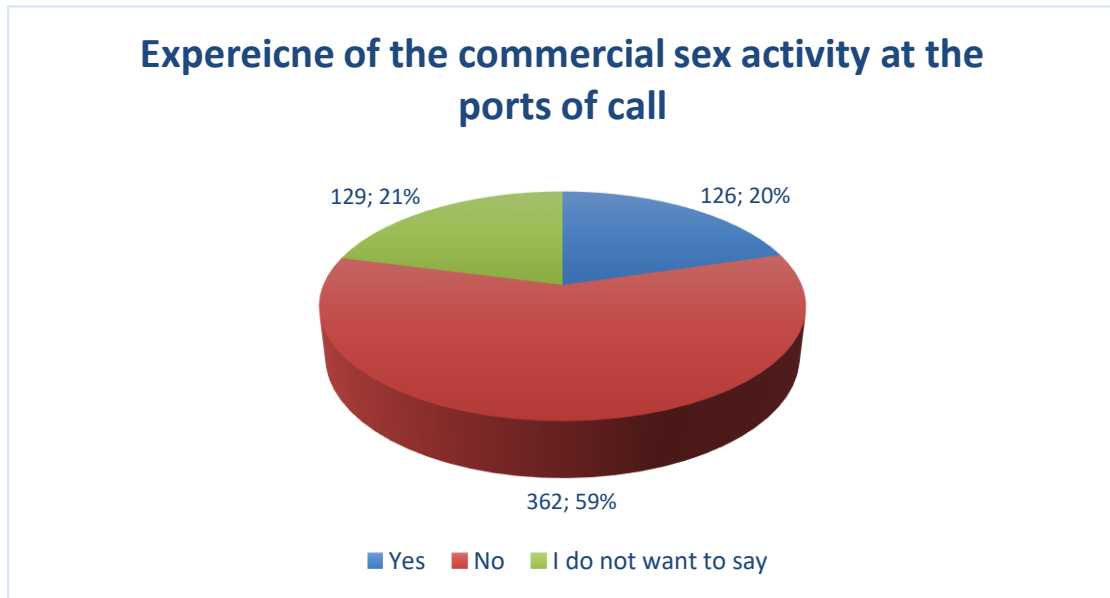
Table 4.6 *Perceived inadequate work performance due to sexual abstinence*

<b>Variables</b>	<b>Overall Mean (N=617)</b>	<b>Strongly disagree (Value: 1)</b>	<b>Disagree (Value: 2)</b>	<b>Neutral (Value: 3)</b>	<b>Agree (Value: 4)</b>	<b>Strongly agree (Value: 5)</b>
I am more easily to feel tired even though I have got enough rest	3.45	30 4.9%	115 18.6%	129 20.9%	233 37.8%	110 17.8%
I am more likely to lose my attention when I am on duty	3.06	43 7.0%	198 32.1%	146 23.7%	140 22.7%	90 14.6%
I am more likely to misunderstand the order from my supervisor	2.71	54 8.8%	264 42.8%	167 27.1%	71 11.5%	61 9.9%
I am more likely to have errors or even incidents during my work	2.58	70 11.3%	286 46.4%	157 25.4%	50 8.1%	54 8.8%
I cannot cooperate with my colleague very well at work	2.57	67 10.9%	289 46.8%	157 25.4%	50 8.1%	54 8.8%
I cannot work efficiently and may have more delays	2.80	60 9.7%	247 40.0%	135 21.9%	107 17.3%	68 11.0%
Overall, I noticed that I start to have worse work performance	2.87	59 9.6%	228 37.0%	137 22.2%	121 19.6%	72 11.7%



Table 4.7 *Perceived risk sexual behaviors due to sexual abstinence*

<b>Variables</b>	<b>Overall Mean (N=617)</b>	<b>Strongly disagree (Value: 1)</b>	<b>Disagree (Value: 2)</b>	<b>Neutral (Value: 3)</b>	<b>Agree (Value: 4)</b>	<b>Strongly agree (Value: 5)</b>
Having commercial sex activity at port of calls is an effective way to satisfy the sexual need of seafarers	3.26	58 9.4%	93 15.1%	174 28.2%	217 35.2%	75 12.2%
It is common for seafarers to have commercial sex activity at the ports of call	3.47	36 5.8%	69 11.2%	162 26.3%	271 43.9%	79 12.8%
Seafarers should be understood or forgiven when having the commercial sex activity at the ports of call	3.47	34 5.5%	71 11.5%	183 29.7%	230 37.3%	99 16.0%
Having commercial sex activity has the risk of sexual transmitted infections	4.14	13 2.1%	18 2.9%	61 9.9%	301 48.8%	224 36.3%
I will not get sexual transmitted infections when having the commercial sex activity at port of calls as long as I wear a condom	2.56	101 16.4%	209 33.9%	201 32.6%	70 11.3%	36 5.8%



*Figure 4.17* Experience of the commercial sex activity at the ports of call

#### **4.2.5 Availability of the facilities and support**

The majority of the respondents claimed that their companies did not provide sex-related education to the seafarers. Neither was the psychological consultation. Meanwhile, three quarters of the respondents indicated that there was no high-quality internet available on board. Two thirds of the respondents believed that the standard of the meals should be improved. Around half of the respondents reported the availability of the various entertainment facilities on the ship. Still, nearly half of the respondents believed that the living environment on board was comfortable (see Table 4.8).

Table 4.8 *Availability of the facilities and support*

<b>Items (N=617)</b>	<b>Yes</b>	<b>No</b>
Sex-related education to seafarers	60 9.7%	557 90.3%
Various entertainment facilities	329 53.3%	288 46.7%
High-quality internet	151 24.5%	466 75.5%
Psychological consultation	122 19.8%	495 80.2%
High standard meals	203 32.9%	414 67.1%
Comfortable living environment	302 48.9%	315 51.1%

#### **4.2.6 Perceived effectiveness of the potential methods for overcoming the negative influence of sexual abstinence**

Most of the respondents highly agreed that reducing the single contract period (mean: 4.16) and increasing the shore leave opportunities at ports of call (mean: 4.12) could effectively solve the problem induced by sexual abstinence. Keeping connected with the family and friends (mean: 3.97), appropriate sex-related education (mean: 3.94), good interpersonal relationship (i.e. friendly co-workers) (mean: 3.84), comfortable working and living environment (mean: 3.79), various entertainment facilities (mean: 3.74), high quality of meals (mean: 3.71) and appropriate psychological consultation (mean: 3.55) were also recognized by many respondents as the effective methods or support for overcoming the negative influence of sexual abstinence (see Table 4.9).

Table 4.9 *Perceived effectiveness of the potential methods for overcoming the negative influence of sexual abstinence*

<b>Variables</b>	<b>Overall Mean (N=617)</b>	<b>Strongly disagree (Value: 1)</b>	<b>Disagree (Value: 2)</b>	<b>Neutral (Value: 3)</b>	<b>Agree (Value: 4)</b>	<b>Strongly agree (Value: 5)</b>
Appropriate sex-related education is important for seafarers when suffering sexual abstinence	3.94	9 1.5%	21 3.4%	130 21.1%	298 48.3%	159 25.8%
Appropriate psychological consultation is important for seafarers when suffering sexual abstinence	3.55	30 4.9%	75 12.2%	148 24.0%	253 41.0%	111 18.0%
Appropriate entertainment facilities on board can reduce the negative influence of sexual abstinence	3.74	20 3.2%	53 8.6%	126 20.4%	289 46.8%	129 20.9%
Keeping connected with family members and friends can reduce the negative influence of sexual abstinence	3.97	10 1.6%	24 3.9%	99 16.0%	324 52.5%	160 25.9%
Reducing the single length of working period for seafarers on board can reduce the negative influence of sexual abstinence	4.16	5 0.8%	19 3.1%	70 11.3%	299 48.5%	224 36.3%

Table 4.9 *Perceived effectiveness on the potential methods for overcoming the negative influence of sexual abstinence (continued)*

<b>Variables</b>	<b>Overall Mean (N=617)</b>	<b>Strongly disagree (Value: 1)</b>	<b>Disagree (Value: 2)</b>	<b>Neutral (Value: 3)</b>	<b>Agree (Value: 4)</b>	<b>Strongly agree (Value: 5)</b>
Frequently visiting port of calls and having more shore leave opportunities can reduce the negative influence of sexual abstinence	4.12	4 0.6%	15 2.4%	93 15.1%	295 47.8%	210 34.0%
Friendly co-workers on the ship can reduce the negative influence of sexual abstinence	3.84	13 2.1%	42 6.8%	126 20.4%	288 46.7%	148 24.0%
High quality of meals on the ship can reduce the negative influence of sexual abstinence	3.71	21 3.4%	55 8.9%	147 23.8%	255 41.3%	139 22.5%
Good working and living conditions on the ship can reduce the negative influence of sexual abstinence	3.79	18 2.9%	50 8.1%	128 20.7%	269 43.6%	152 24.6%

#### 4.2.7 Multiple liner regression analysis

To effectively identify the correlation between the job satisfaction of the Chinese male seafarers and their toleration level of sex abstinence, multiple liner regression analysis was conducted. The statement of ‘I get used to sexual abstinence when I am working on the ship’ was the dependent variable, which indicated the respondents’ toleration level of sex abstinence. The items used to evaluating the job satisfaction of the respondents (Part Three of the questionnaire) were analyzed as the independent variables.

Based on the stepwise method, the overall job satisfaction of the seafarer, perceived working environment, ability constraints for the other jobs (i.e. I can only work as a seafarer based on my ability), own choice for working as a seafarer and perceived friendliness of the co-workers had a positive correlation with the toleration level of sex abstinence. The perceived job responsibility (i.e. Seafarer is a job with great responsibility) had a negative correlation (see Table 4.10). The variables that were excluded from the multiple liner regression test were reported in Table 4.11.

Table 4.10 *Correlation between the job satisfaction and the toleration level of sex abstinence*

Variables	B	Standard Error	t-stat Value	Sig.	VIF
Overall job satisfaction	.202	.053	3.814	P<0.001	1.417
Good working environment	.176	.048	3.686	P<0.001	1.344
Ability constraint for the other jobs	.198	.043	4.592	P<0.001	1.030
Own choice for working as a seafarer	.196	.051	3.849	P<0.001	1.180
Perceived job responsibility	-.145	.054	-2.716	P<0.007	1.022
Friendly co-workers	.114	.055	2.070	P<0.039	1.199

Table 4.11 *Excluded variables from the multiple liner regression test*

Variables	B	t-stat Value	Sig.	VIF
Better payment than the other jobs	.055	1.368	P<0.172	1.259
Professional supervision	.042	.922	P<0.357	1.596
Good living environment	.020	.411	P<0.682	1.799
Seafarer is a respected job	-.023	-.568	P<0.570	1.247
Seafarer is a job with good promotional opportunity	.059	1.292	P<0.197	1.619
The work on the ship is simple and easy	.041	1.055	P<0.292	1.151
My family feel proud of me because of my job	.078	1.747	P<0.081	1.519
Working as a seafarer is very stressful	.004	.099	P<0.921	1.134

#### 4.2.8 Hierarchical cluster analysis

In order to effectively identify the kind of Chinese male seafarers who are more likely to be influenced by sexual abstinence and subject to psychological health issues, hierarchical cluster analysis was employed. Since one of the main purposes of the research is to explore the influence of sexual abstinence on the psychological health of the seafarers, the 14 items (Part Five of the questionnaire) used to exam the respondents' perceived psychological health issues were selected for clustering. Another reason for selecting these 14 items for clustering is that the psychological health issue is also the main factor leading to inappropriate behaviors and inadequate work performance (Wong *et al.*, 2007). Therefore, clustering using these 14 psychological health related items is effective for achieving the overall research objective.

To find out the most effective cluster solution, five rounds of testing were made, from a two-cluster solution to a six-cluster solution using Ward's method. The four-cluster solution was the most effective way to differentiate the sample, thereby achieving the relevant research objectives. The two-cluster solution was not strong enough to

clearly identify a sufficient number of distinct segments of the seafarers, while the five-cluster and six-cluster solutions did not clearly distinguish each of the yielded segments. The three-cluster solution did not observably identify the segment that was significantly influenced by sexual abstinence.

For the four-cluster solution, there were 189 members in Cluster 1, 235 members in Cluster 2, 78 members in Cluster 3 and 115 members in Cluster 4, and these four clusters were significantly differentiated by the ANOVA test using Tukey's HSD method ( $p < 0.001$ ) on the variate items (see Table 4.12). Amongst the 14 clustering items, homesick is the most common negative feeling induced by sexual abstinence (mean: 3.78), while very limited respondents developed the thought of suicide (mean: 2.24). The members in Cluster 4 hardly developed any psychological health issues because of sexual abstinence, and thus the cluster was named as the 'saint' group. On the opposite, the members in Cluster 3 significantly suffered from sexual abstinence and reported serious psychological health issues. Some members in this cluster even claimed that they had the thought of suicide (mean: 3.54). As a result, this cluster was named as the 'sufferer' group. The members in Cluster 2 did not have most of the negative feelings and emotions due to sexual abstinence except for homesick (mean: 3.58), anxiety (mean: 3.35) and loneliness (mean: 3.20). Only a few members in this cluster reported that they felt sad (mean: 3.03) and had some sleep (mean: 3.10) and depression (mean: 3.02) issues. The members in Cluster 2 had adapted to the life on the ship and were not easily influenced by sexual abstinence psychologically. Therefore, this cluster was named as the 'adapter' group. The members in Cluster 1 agreed that they were influenced by sexual abstinence and developed some psychological health issues. However, these issues were not as serious as Cluster 3. In addition, these members did not have the thought of suicide (mean: 2.44) because of sexual abstinence, and did not quite feel painful on the body (mean: 3.44) or no hope for the future (mean: 3.57). According to literatures, the reactions of the members in Cluster 1 were very common when people experience sexual abstinence. As a result, this cluster was named as the 'average people' group.



Table 4.12 *Perceived psychological health issues due to sexual abstinence by clusters*

Variables	Overall Mean (N=617)	Average People (n=189)	Adapter (n=235)	Sufferer (n=78)	Saint (n=115)
I feel anxious	3.57	4.08	3.35	<b>4.92</b>	<u>2.23</u>
I cannot control my temper	3.30	3.86	2.98	<b>4.92</b>	<u>1.93</u>
I feel depressed	3.37	4.04	3.02	<b>4.91</b>	<u>1.92</u>
I feel homesick	3.78	4.28	3.58	<b>4.95</b>	<u>2.56</u>
I feel lonely	3.48	4.06	3.20	<b>4.96</b>	<u>2.07</u>
I feel that there is no hope for the future	3.07	3.57	2.63	<b>4.85</b>	<u>1.94</u>
I feel sad	3.36	3.96	3.03	<b>4.96</b>	<u>1.96</u>
I cannot sleep well	3.41	4.05	3.10	<b>4.96</b>	<u>1.96</u>
I feel painful on my body	2.98	3.44	2.54	<b>4.97</b>	<u>1.78</u>
I feel agitated	3.31	3.98	2.94	<b>5.00</b>	<u>1.82</u>
I become suspicious	3.73	3.73	2.64	<b>4.99</b>	<u>1.81</u>
I become pessimistic	3.06	3.70	2.53	<b>4.92</b>	<u>1.83</u>
I start to have the thought of suicide	2.24	2.44	1.95	<b>3.54</b>	<u>1.61</u>
Overall, I notice that I start to have psychological health issues	3.24	3.97	2.83	<b>4.54</b>	2.01

Note 1: The number in bold indicates that the agreement level is significantly higher than the other groups. The number with the underline indicates that the agreement level is significantly lower than the other groups.

Note 2: All differences are significant at  $p < 0.001$  level.

- **Inter-clusters differences on toleration level and perceived attitude of sexual abstinence**

The members of the Saint cluster moderately agreed that they got used to sexual abstinence on board, while the members in the Sufferer group strongly disagreed. Although the members in both the Average People group and the Adapter group also showed some disagreement on this statement, the mean for the Adapter group was

slightly higher than the Average People group. This indicates a better adaption to the life on board for the Adapter group. The members in the Sufferer group strongly agreed that sexual abstinence violated the basic need of the seafarers and should not be a normal job requirement. The Average People cluster also agreed on these two statements, but the mean was slightly lower for the former and a little higher for the latter compared with the Sufferer cluster. Amongst the four clusters, only the members in the Saint group somewhat considered sexual abstinence as a normal job requirement, and they reported the lowest level of agreement on the violation of the seafarers' basic need for sexual abstinence. For the members in the Adapter cluster, they moderately agreed that sexual abstinence violated the basic need of the seafarers and slightly disagreed that sexual abstinence should be normal job requirement. All of the above differences are significantly different between the four clusters based on the ANOVA test using Tukey's HSD method ( $p < 0.001$ ) (see Table 4.13).

- **Inter-clusters differences on perceived inappropriate behaviors**

Consistent with the perceived psychological health issues, the four clusters are significantly different from each other on the inappropriate behaviors ( $p < 0.001$  for all relevant items). The members in the Saint cluster did not induce any inappropriate behavior due to sexual abstinence. Meanwhile, the Sufferer cluster highly agreed that they developed most of the inappropriate behaviors on board except for self-harm (mean: 3.33). The Adapter cluster also reported no inappropriate behaviors caused by sexual abstinence, but the means for each item were slightly higher than the Saint cluster. The medium to low level influence of sexual abstinence was resulted from the Average People cluster for their behaviors on board. However, very limited members in the Average People cluster reported the self-harm behavior (mean: 2.37) (see Table 4.14).

- **Inter-clusters differences on perceived inadequate work performance**

Similar to the psychological health issues and inappropriate behaviors, the members in the Saint cluster did not agree at all that their work performance was influenced by sexual abstinence. The Adapter cluster was not influenced either. However, some members in this group developed the tiredness (mean: 3.17), which was quite common on the ship. Conversely, the Sufferer group claimed that their work performance became much worse without sexual life. The tiredness was an extremely serious issue in the Sufferer group (mean: 4.81). The members in the Average People cluster were moderately influenced by sexual abstinence on their work performance, but they did not admit the cooperation problem (mean: 2.84) and the occurrence of errors (mean: 2.96). The above differences are all statistically significant ( $p < 0.001$ ) (see Table 4.15).

- **Inter-clusters differences on perceived risk sexual behaviors**

There were more members in the Average People cluster who admitted to have the experience of commercial sex activity during the shore leave. However, the majority of the members reported 'No' for such experience. A comparably higher portion of members in the Sufferer cluster did not express whether or not they had the commercial sex activity at the ports of call. These differences are highly significant (see Table 4.16).

The members in the Average People cluster, Adapter cluster and Sufferer cluster moderately agreed that having commercial sex activity at the ports of call could effectively satisfy the sexual needs of seafarers and should be understood. Particularly, the Sufferer cluster reported a comparably higher level of agreement on that the seafarers should be understood for having the commercial sex activity (mean: 3.92). However, the members in the Saint cluster disagreed on both of these two statements. All of the four clusters agreed at a medium level that it was common for seafarers to

have commercial sex activity during their shore leave. The mean for this statement was comparably lower for the Saint cluster. Additionally, the members in all four clusters, particularly the sufferer cluster (mean: 4.51), agreed that having commercial sex activity at the ports of call had the risk of sexual transmitted infections. The four clusters, particularly the Saint cluster (mean: 2.32), were also aware that wearing the condom was not always safe. The differences of the agreement level on the above statements are all statistically significant between the four clusters. However, the level of significance varies (see Table 4.17).

Table 4.13 *Toleration level and perceived attitude of sexual abstinence by clusters*

<b>Variables</b>	<b>Overall Mean (N=617)</b>	<b>Average People (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
I get used to sexual abstinence when I am working on the ship	2.64	2.41	2.75	<u>1.71</u>	<b>3.43</b>
Sexual abstinence on the ship violates the basic needs of seafarers	3.92	4.21	3.75	<b>4.72</b>	<u>3.23</u>
Sexual abstinence on the ship is normal and is associated with the job requirements of seafarers	2.45	2.12	2.63	<u>1.40</u>	<b>3.32</b>

Note 1: The number in bold indicates that the agreement level is significantly higher than the other groups. The number with the underline indicates that the agreement level is significantly lower than the other groups.

Note 2: All differences are significant at  $p < 0.001$  level.

Table 4.14 *Perceived inappropriate behaviors due to sexual abstinence by clusters*

<b>Variables</b>	<b>Overall Mean (N=617)</b>	<b>Average People (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
I do not want to communicate with my co-workers	2.73	3.19	2.31	<b>4.29</b>	<u>1.79</u>
I do not want to communicate with my family members	2.71	3.12	2.27	<b>4.31</b>	<u>1.83</u>
I start to have the impulse to fight with the other people on the ship	2.62	3.06	2.20	<b>4.19</b>	<u>1.70</u>
I start to have the impulse to curse the other people on the ship	2.65	3.09	2.22	<b>4.23</b>	<u>1.74</u>
I become more likely to argue with the other people on the ship	2.82	3.35	2.34	<b>4.37</b>	<u>1.86</u>
I start to have the behavior of self-harm	2.18	2.37	1.93	<b>3.33</b>	<u>1.63</u>
Overall, I notice that I start to have some improper behaviors on the ship	2.92	3.42	2.52	<b>4.31</b>	<u>1.95</u>

Note 1: The number in bold indicates that the agreement level is significantly higher than the other groups. The number with the underline indicates that the agreement level is significantly lower than the other groups.

Note 2: All differences are significant at  $p < 0.001$  level.

Table 4.15 *Perceived inadequate work performance due to sexual abstinence by clusters*

Variables	Overall Mean (N=617)	Average People (n=189)	Adapter (n=235)	Sufferer (n=78)	Saint (n=115)
I am more easily to feel tired even though I have got enough rest	3.45	3.94	3.17	<b>4.81</b>	<u>2.30</u>
I am more likely to lose my attention when I am on duty	3.06	3.54	2.69	<b>4.64</b>	<u>1.96</u>
I am more likely to misunderstand the order from my supervisor	2.71	3.02	2.32	<b>4.37</b>	<u>1.86</u>
I am more likely to have errors or even incidents during my work	2.58	2.86	2.22	<b>4.17</b>	<u>1.77</u>
I cannot cooperate with my colleague very well at work	2.57	2.84	2.20	<b>4.17</b>	<u>1.81</u>
I cannot work efficiently and may have more delays	2.80	3.25	2.38	<b>4.40</b>	<u>1.83</u>
Overall, I noticed that I start to have worse work performance	2.87	3.36	2.46	<b>4.46</b>	<u>1.81</u>

Note 1: The number in bold indicates that the agreement level is significantly higher than the other groups. The number with the underline indicates that the agreement level is significantly lower than the other groups.

Note 2: All differences are significant at  $p < 0.001$  level.

Table 4.16 *Experience of commercial sexual activity at the ports of call by clusters*

<b>Experience of Commercial Sexual Activity at the Ports of Call (N=617)</b>		<b>Average people (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
Yes (Count: 126 / 20.4%)	Count	63	36	14	13
	% within Ward Method	<b>33.3%</b>	15.3%	17.9%	11.3%
No (Count: 362 / 58.7%)	Count	80	153	40	89
	% within Ward Method	42.3%	65.1%	51.3%	<b>77.4%</b>
I do not want to say (Count: 129 / 20.9%)	Count	46	46	24	13
	% within Ward Method	24.3%	19.6%	<b>30.8%</b>	11.3%

$X^2 = 51.162$  Pearson Chi-square Significant Test:  $P < 0.001$

Note: The percentage in bold indicates a significantly higher portion of members than the other groups

Table 4.17 *Perceived risk sexual behaviors due to sexual abstinence by clusters*

<b>Variables</b>	<b>Overall Mean (N=617)</b>	<b>Average People (n=189) a</b>	<b>Adapter (n=235) b</b>	<b>Sufferer (n=78) c</b>	<b>Saint (n=115) d</b>
Having commercial sex activity at port of calls is an effective way to satisfy the sexual need of seafarers (P<0.001)	3.26	3.37 (b)(c)	3.28 (a)(c)	3.53 (a)(b)	<u>2.84</u>
It is common for seafarers to have commercial sex activity at port of calls (P<0.018)	3.47	3.56 (b)(c)	3.49 (a)(c)(d)	3.58 (a)(b)	<u>3.20</u> (b)
Seafarers should be understood or forgiven when having the commercial sex activity at port of calls (P<0.001)	3.47	3.62 (b)	3.46 (a)	<b>3.92</b>	<u>2.93</u>
Having commercial sex activity has the risk of sexual transmitted infections (P<0.001)	4.14	4.13 (b)(d)	4.10 (a)(d)	<b>4.51</b>	4.01 (a)(b)
I will not get sexual transmitted infections when having the commercial sex activity at port of calls as long as I wear a condom (P<0.005)	2.56	2.66 (b)(c)	2.51 (a)(c)(d)	2.83 (a)(b)	<u>2.32</u>

Note 1: The number in bold indicates that the agreement level is significantly higher than the other groups. The number with the underline indicates that the agreement level is significantly lower than the other groups.

Note 2: Means with the same alphabetical superscript are not significantly different from each other at the 0.05 probability level.



- **Inter-clusters differences on perceived job satisfaction**

The four clusters all strongly agreed that seafarer was a job with great responsibility and the work was very stressful. Meanwhile, the members all disagreed that they could only work as a seafarer based on their ability, and believed that the work of seafarers was not simple and easy. Therefore, there was no statistical significance for these four statements across the four clusters.

Although the members in the four clusters all disagreed that the seafarers received good payment, the disagreement level for the Saint cluster was slightly lower than the Average people cluster and the Sufferer cluster. All of the four clusters moderately agreed that the co-workers were friendly on board. However, the means of the Saint cluster and the Adapter cluster were obviously higher than the Average People cluster and the Sufferer cluster. Only the members in the Sufferer cluster slightly disagreed that they could receive the effective supervision on board. This is significantly different from the members of the other three clusters, who reported moderate level of agreement on this statement. All four clusters, especially the Sufferer cluster and the Adapter cluster, disagreed that the working environment on board was good. The disagreement level of the Saint cluster was comparably lower on this statement. Only the members in the Saint cluster moderately agreed that the living environment on board was comfortable. The mean was significantly higher than the Average people cluster and the Sufferer cluster, but not the Adapter cluster. The Sufferer cluster was the only cluster disagreeing that the seafarer was a respected job. The mean was significantly lower than the Saint cluster and the Adapter cluster, who reported medium level of agreement on this statement. The members in the Saint cluster indicated a medium to low level of agreement on the good promotion opportunity of the seafarers, which was significantly higher than the other three clusters that disagreed on this. The members in all four clusters moderately agreed that working as a seafarer was their own choice. The means of the Saint cluster and the Adapter cluster were comparably higher than the Average People cluster and the Sufferer

cluster. Even though the members of all four clusters, particularly the Sufferer cluster and the Average People cluster, did not believe that their family felt proud of them because of their occupation, the mean of the Saint cluster was still higher than the other three clusters. Overall, only the members in the Saint cluster reported a medium to low level job satisfaction. The mean was significantly higher than the Average People cluster and the Suffer cluster, but not the Adapter cluster. The differences of the agreement level on all of the above statements were highly significant based on the ANOVA test ( $p < 0.001$  or  $p < 0.002$ ) (see Table 4.18)

Table 4.18 *Agreement level of the variables indicating job satisfaction by clusters*

<b>Variables</b>	<b>Overall Mean (N=617)</b>	<b>Average People (n=189) a</b>	<b>Adapter (n=235) b</b>	<b>Sufferer (n=78) c</b>	<b>Saint (n=115) d</b>
The payment of seafarer is better than the payment of the other jobs ( $P < 0.001$ )	2.36	2.18 (b)(c)	2.48 (a)(d)	<u>1.96</u> (a)	<b>2.67</b> (b)
My co-workers on the ship are friendly ( $p < 0.001$ )	3.50	3.37 (c)	3.62 (d)	<u>3.13</u> (a)	<b>3.72</b> (b)
I can receive professional supervision when I am working on the ship ( $P < 0.001$ )	3.44	3.38 (b)	3.51 (a)(d)	<u>2.95</u>	<b>3.70</b> (b)
The working environment on the ship is good ( $P < 0.001$ )	2.40	2.19 (c)	2.50	<u>2.03</u> (a)	<b>2.81</b>
The living environment on the ship is good ( $P < 0.001$ )	2.82	2.59 (c)	2.90	<u>2.51</u> (a)	<b>3.23</b>
Seafarer is a respected job ( $P < 0.002$ )	3.22	3.03 (b)(c)	3.34 (a)(d)	<u>2.83</u> (a)	<b>3.56</b> (b)

Table 4.18 *Agreement level of the variables indicating job satisfaction by clusters (continued)*

<b>Variables</b>	<b>Overall Mean (N=617)</b>	<b>Average People (n=189) a</b>	<b>Adapter (n=235) b</b>	<b>Sufferer (n=78) c</b>	<b>Saint (n=115) d</b>
Seafarer is a job with great responsibility (P<0.260)	4.30	4.35	4.31	4.35	4.17
The work on the ship is simple and easy (P<0.076)	1.88	1.84	1.89	1.72	2.05
I can only work as a seafarer based on my ability (P<0.114)	2.47	2.60	2.44	2.51	2.31
Working as a seafarer is my own choice (p<0.001)	3.54	3.26 (c)	3.65 (d)	<u>3.37</u> (a)	<b>3.90</b> (b)
My family feel proud of me because I am a seafarer (P<0.001)	2.28	2.10 (b)(c)	2.35 (a)	1.92 (a)	<b>2.69</b>
Working as a seafarer is very stressful (P<0.062)	4.33	4.42	4.26	4.45	4.23
Overall, I am satisfied with my job as a seafarer (P<0.001)	2.70	2.44 (c)	2.89 (d)	<u>2.19</u> (a)	<b>3.07</b> (b)

Note 1: The number in bold indicates that the agreement level is significantly higher than the other groups. The number with the underline indicates that the agreement level is significantly lower than the other groups.

Note 2: Means with the same alphabetical superscript are not significantly different from each other at the 0.05 probability level.

Note 3: The agreement level for the variables in red is not significantly different between the four clusters

- **Demographic, job and company characteristics by clusters**

There was no statistically significant difference between the four clusters on the basis of age (see Table 4.19) and marriage status (see Table 4.20). On the education qualification, the Saint cluster had a higher portion of members with an undergraduate degree or above and a lower portion of members with the education below diploma. These differences are highly significant (see Table 4.21).

Table 4.19 *Respondents' age by clusters*

<b>Age (N=617)</b>		<b>Average people (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
18-30 (Count: 145 / 23.5%)	Count	37	50	21	37
	% within Ward Method	19.6%	21.3%	26.9%	32.2%
31-40 (Count: 364 / 59.0%)	Count	119	142	47	56
	% within Ward Method	63.0%	60.4%	60.3%	48.7%
41-50 (Count: 84 / 13.6%)	Count	27	29	9	19
	% within Ward Method	14.3%	12.3%	11.5%	16.5%
51-60 (Count: 24 / 3.9%)	Count	6	14	1	3
	% within Ward Method	3.2%	6.0%	1.3%	2.6%

$X^2 = 14.461$  Pearson Chi-square Significant Test:  $P < 0.107$

Table 4.20 Respondents' marriage status by clusters

<b>Marriage Status (N=617)</b>		<b>Average people (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
Single (Count: 150 / 24.3%)	Count	47	50	20	33
	% within Ward Method	24.9%	21.3%	25.6%	28.7%
Married (Count: 452 / 73.3%)	Count	137	180	56	79
	% within Ward Method	72.5%	76.6%	71.8%	68.7%
Devoiced or Widowed (Count: 15 / 2.4%)	Count	5	5	2	3
	% within Ward Method	2.6%	2.1%	2.6%	2.6%

$X^2 = 2.748$  Pearson Chi-square Significant Test:  $P < 0.840$

Table 4.21 Respondents' education level by clusters

Education (N=617)		Average people (n=189)	Adapter (n=235)	Sufferer (n=78)	Saint (n=115)
High School or below or Technical Education (Count: 114 / 18.5% )	Count	37	49	14	14
	% within Ward Method	19.6%	20.9%	17.9%	<u>12.2%</u>
Diploma (Count: 324 / 52.5% )	Count	106	124	46	48
	% within Ward Method	56.1%	52.8%	59.0%	<u>41.7%</u>
Undergraduate or above (Count: 179 / 29.0% )	Count	46	62	18	53
	% within Ward Method	24.3%	26.4%	23.1%	<b>46.1%</b>

$X^2 = 21.436$  Pearson Chi-square Significant Test:  $P < 0.002$

Note: The percentage in bold indicates a significantly higher portion of members than the other groups. The percentage with the underline indicates a significantly lower portion of members than the other groups

No statistically significant difference was identified between the four clusters on years of working as a seafarer (see Table 4.22), the nature of the company (see Table 4.23), ship types (see Table 4.24), current position levels (see Table 4.25), working places on the ship (see Table 4.26) and colleague's nationality on the ship (see Table 4.27). However, there was a significantly high portion of members in the Saint cluster who claimed that they had ever worked with the female seafarers before (see Table 4.28).

Table 4.22 *Years of working as a seafarer by clusters*

<b>Years of Working as a Seafarer? (N=617)</b>		<b>Average people (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
Less than three years (Count: 86 / 13.9%)	Count	22	36	11	17
	% within Ward Method	11.6%	15.3%	14.1%	14.8%
Three years or above but less than six years (Count: 91 / 14.7%)	Count	24	30	10	27
	% within Ward Method	12.7%	12.8%	12.8%	23.5%
Six years or above but less than nine years (Count: 101 / 16.4%)	Count	32	44	13	12
	% within Ward Method	16.9%	18.7%	16.7%	10.4%
Nine years or above but less than 12 years (Count: 152 / 24.6%)	Count	55	54	18	25
	% within Ward Method	29.1%	23.0%	23.1%	21.7%
12 years or above but less than 15 years (Count: 72 / 11.7%)	Count	18	26	12	16
	% within Ward Method	9.5%	11.1%	15.4%	13.9%
15 years or above (Count: 115 / 18.6%)	Count	38	45	14	18
	% within Ward Method	20.1%	19.1%	17.9%	15.7%

$X^2 = 17.031$  Pearson Chi-square Significant Test:  $P < 0.317$

Table 4.23 *Nature of the company by clusters*

<b>Nature of the Company (N=617)</b>		<b>Average people (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
State-owned company in China (Count: 227 / 36.8% )	Count	68	78	30	51
	% within Ward Method	36.0%	33.2%	38.5%	44.3%
Private-owned company in China (Count: 118 / 19.1% )	Count	43	45	14	16
	% within Ward Method	22.8%	19.1%	17.9%	13.9%
Foreign company (Count: 65 / 10.5% )	Count	17	21	10	17
	% within Ward Method	9.0%	8.9%	12.8%	14.8%
Freelance seafarers or contracting with a manning agency (Count: 207 /33.5% )	Count	61	91	24	31
	% within Ward Method	32.2%	38.8%	30.8%	27.0%

$X^2 = 12.684$  Pearson Chi-square Significant Test:  $P < 0.177$



Table 4.24 Respondents' ship types by clusters

<b>Ship Types (N=617)</b>		<b>Average people (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
Container ship (Count: 62 / 10.0%)	Count	18	20	7	17
	% within Ward Method	9.5%	8.5%	9.0%	14.8%
Bulk ship (Count: 315 / 51.1%)	Count	103	131	41	40
	% within Ward Method	54.5%	55.7%	52.6%	34.8%
Oil tanker (Count: 182 / 29.5%)	Count	49	66	24	43
	% within Ward Method	25.9%	28.1%	30.8%	37.4%
LNG or LNP ship (Count: 28 / 4.5%)	Count	10	10	2	6
	% within Ward Method	5.3%	4.3%	2.6%	5.2%
Ocean cruise or other type of ocean ship (Count: 30 / 4.9%)	Count	9	8	4	9
	% within Ward Method	4.8%	3.4%	5.1%	7.8%

$X^2 = 18.342$  Pearson Chi-square Significant Test:  $P < 0.106$

Table 4.25 Respondents' current position levels by clusters

<b>Current Position Levels (N=617)</b>		<b>Average people (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
Management level (Count: 192 / 31.1%)	Count	56	74	24	38
	% within Ward Method	29.6%	31.5%	30.8%	33.0%
Operating level (Count: 250 / 40.5%)	Count	83	91	26	50
	% within Ward Method	43.9%	38.7%	33.3%	43.5%
Supporting level (Count: 175 / 28.4%)	Count	50	70	28	27
	% within Ward Method	26.5%	29.8%	35.9%	23.5%

$X^2 = 5.192$  Pearson Chi-square Significant Test:  $P < 0.519$

Table 4.26 Respondents' working places on the ship by clusters

<b>Working place on the ship (N=617)</b>		<b>Average people (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
Deck (Count: 309 / 50.1%)	Count	95	114	35	65
	% within Ward Method	50.3%	48.5%	44.9%	56.5%
Engine room (Count: 293 / 47.5%)	Count	91	113	41	47
	% within Ward Method	48.1%	48.1%	53.8%	40.9%
Kitchen or other supporting area (Count: 15 / 2.4%)	Count	3	8	1	3
	% within Ward Method	1.6%	3.4%	1.3%	2.6%

$X^2 = 5.159$  Pearson Chi-square Significant Test:  $P < 0.524$

Table 4.27 Colleague's nationality by clusters

<b>Colleague's Nationality (N=617)</b>		<b>Average people (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
Colleague are all Chinese (Count: 442 / 71.6%)	Count	136	173	51	82
	% within Ward Method	72.0%	73.6%	65.4%	71.3%
Colleague are from different countries (Count: 175 / 28.4%)	Count	53	62	27	33
	% within Ward Method	28.0%	26.4%	34.6%	28.7%

$X^2 = 1.970$  Pearson Chi-square Significant Test:  $P < 0.579$

Table 4.28 Respondents' working experience with female seafarers by clusters

Working Experience with Female Seafarers on the Ship (N=617)		Average people (n=189)	Adapter (n=235)	Sufferer (n=78)	Saint (n=115)
Yes (Count: 28 / 4.5% )	Count	7	7	2	12
	% within Ward Method	3.7%	3.0%	2.6%	<b>10.4%</b>
No (Count: 589 / 95.5% )	Count	182	228	76	103
	% within Ward Method	96.3%	97.0%	97.4%	<u>89.6%</u>

$X^2 = 11.555$  Pearson Chi-square Significant Test:  $P < 0.009$

Note: The percentage in bold indicates a significantly higher portion of members than the other groups. The percentage with the underline indicates a significantly lower portion of members than the other groups

Amongst the four clusters, the average monthly salary when working on board was not significantly different (see Table 4.29). There was a higher portion of members in the Sufferer cluster whose companies required them to work on board for at least nine months. However, the portion of members for his cohort in the Saint clusters was comparably lower (see Table 4.30). Moreover, a higher portion of members in the Sufferer cluster could only take a maximum of two months holiday before they worked on the ship again. At the same time, a comparably lower portion of members in Sufferer cluster indicated that there was no requirement for their holiday duration (see Table 4.31). These differences were all statistically significant.

Table 4.29 Respondents' average monthly salary when working on the ship by clusters

<b>Average Monthly Salary when Working on the Ship (N=617)</b>		<b>Average people (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
Below 10,000 RMB (Count: 120 / 19.4%)	Count	35	39	22	24
	% within Ward Method	18.5%	16.6%	28.2%	20.9%
10,000 RMB or above but less than 20,000 RMB (Count: 230 / 37.3%)	Count	79	91	24	36
	% within Ward Method	41.8%	38.7%	30.8%	31.3%
20,000 RMB or above but less than 30,000 RMB (Count: 113 / 18.3%)	Count	29	46	16	22
	% within Ward Method	15.4%	19.6%	20.5%	19.1%
30,000 RMB or above (Count: 154 / 25.0%)	Count	46	59	16	33
	% within Ward Method	24.3%	25.1%	20.5%	28.7%

$X^2 = 10.072$  Pearson Chi-square Significant Test:  $P < 0.345$

Table 4.30 *Single contract period requirement by clusters*

<b>Single Contract Period Requirement (N=617)</b>		<b>Average people (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
At least three months or below (Count: 39 / 6.3% )	Count	13	12	7	7
	% within Ward Method	6.9%	5.1%	9.0%	6.1%
At least six months (Count: 403 / 65.3% )	Count	115	165	38	85
	% within Ward Method	60.8%	70.2%	48.7%	73.9%
At least nine months (Count: 144 / 23.3% )	Count	50	52	29	13
	% within Ward Method	26.5%	22.1%	<b>37.2%</b>	<u>11.3%</u>
No requirement on the single contract period (Count: 31 / 5.1% )	Count	11	6	4	10
	% within Ward Method	5.8%	2.6%	5.1%	8.7%

$X^2 = 28.206$  Pearson Chi-square Significant Test:  $P < 0.001$

Note: The percentage in bold indicates a significantly higher portion of members than the other groups. The percentage with the underline indicates a significantly lower portion of members than the other groups

Table 4.31 *Holiday duration requirement between each working period by clusters*

<b>Holiday Duration Requirement between each Working Period on the Ship (N=617)</b>		<b>Average people (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
Maximum two months or less (Count: 44 / 7.1%)	Count	13	10	16	5
	% within Ward Method	6.9%	4.3%	<b>20.5%</b>	4.3%
Maximum three months (Count: 92 / 14.9%)	Count	26	37	9	20
	% within Ward Method	13.8%	15.7%	11.5%	17.4%
Maximum four months (Count: 99 / 16.0%)	Count	30	39	14	16
	% within Ward Method	15.9%	16.6%	17.9%	13.9%
Maximum five months or above (Count: 85 / 13.8%)	Count	32	28	8	17
	% within Ward Method	16.9%	11.9%	10.3%	14.8%
No requirement on the holiday duration (Count: 297 / 48.1%)	Count	88	121	31	57
	% within Ward Method	46.6%	51.5%	<u>39.7%</u>	49.6%

$X^2 = 30.055$  Pearson Chi-square Significant Test:  $P < 0.003$

Note: The percentage in bold indicates a significantly higher portion of members than the other groups. The percentage with the underline indicates a significantly lower portion of members than the other groups

There was no statistically significant difference between the four clusters on the average length of working time every year on the ship (see Table 4.32) and the longest single working period (see Table 4.33) during the last three years (excluding the pandemic period). Nevertheless, the frequency of the shore leave opportunity varied significantly between the four clusters. There was a higher portion of members in the Saint cluster and the Adapter cluster who could frequently get the shore leave opportunity when they were working on board. However, a higher portion of members in the Sufferer cluster could hardly get any shore leave opportunity (see Table 4.34).

Table 4.32 *Average length of working time on the ship every year by clusters*

<b>Average Length of Working Time on the Ship Every Year during the Last Three Years (excluding the pandemic period) (N=617)</b>		<b>Average people (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
Less than six months (Count: 49 / 7.9% )	Count	13	24	4	8
	% within Ward Method	6.9%	10.2%	5.1%	7.0%
Six months or more but less than nine months (Count: 360 / 58.3% )	Count	108	140	40	72
	% within Ward Method	57.1%	59.6%	51.3%	62.6%
Nine months or more (Count: 208 / 33.7% )	Count	68	71	34	35
	% within Ward Method	36.0%	30.2%	43.6%	30.4%

$X^2 = 7.612$  Pearson Chi-square Significant Test:  $P < 0.268$



Table 4.33 *Longest single working period on the ship by clusters*

<b>Longest Single Working Period on the Ship during the Last Three Years (excluding the pandemic period) (N=617)</b>		<b>Average people (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
Less than six months (Count: 33 / 5.3%)	Count	9	14	4	6
	% within Ward Method	4.8%	6.0%	5.1%	5.2%
Six months or more but less than nine months (Count: 174 / 28.2%)	Count	44	69	19	42
	% within Ward Method	23.2%	29.3%	24.4%	36.5%
Nine months or more (Count: 410 / 66.5%)	Count	136	152	55	67
	% within Ward Method	72.0%	64.7%	70.5%	58.3%

$X^2 = 7.590$  Pearson Chi-square Significant Test:  $P < 0.270$

Table 4.34 *Frequency of the shore leave opportunity on the ship by clusters*

Frequency of the Shore Leave Opportunity on the Ship during the Last Three Years (Excluding the pandemic period) (N=617)		Average people (n=189)	Adapter (n=235)	Sufferer (n=78)	Saint (n=115)
Three or more opportunities per month on average (Count: 36 / 5.8% )	Count	11	7	4	14
	% within Ward Method	5.8%	3.0%	5.1%	<b>12.2%</b>
One or two opportunities per month on average (Count: 111 / 18.0% )	Count	25	54	8	24
	% within Ward Method	13.2%	<b>23.0%</b>	10.3%	<b>20.9%</b>
One or two opportunities every three months on average (Count: 173 / 28.0% )	Count	55	78	14	26
	% within Ward Method	29.1%	33.2%	17.9%	22.6%
One or two opportunities every six months on average (Count: 103 / 16.7% )	Count	34	36	12	21
	% within Ward Method	18.0%	15.3%	15.4%	18.3%
Hardly any opportunity (Count: 194 / 31.4% )	Count	64	60	40	30
	% within Ward Method	33.9%	25.5.%	<b>51.3%</b>	26.1%

$X^2 = 40.854$  Pearson Chi-square Significant Test:  $P < 0.001$

Note: The percentage in bold indicates a significantly higher portion of members than the other groups

- **Availability of the facilities and support by clusters**

There was a higher portion of members in the Saint cluster who indicated the availability of sex-related education from their companies (see Table 4.35). For the remaining facilities and support including the various entertainment facilities (see Table 4.36), high quality internet (see Table 4.37), psychological consultation (see Table 4.38), high standard meals (see Table 4.39) and comfortable living environment (see Table 4.40), a higher portion of members in the Saint cluster experienced such facilities and support on board while a higher portion of members in the Sufferer cluster reported ‘No’. These differences were all statistically significant.

Table 4.35 *Availability of sex-related education by clusters*

<b>Sex-related Education (N=617)</b>		<b>Average people (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
Yes (Count: 60 / 9.7% )	Count	10	26	4	20
	% within Ward Method	5.3%	11.1%	5.1%	<b>17.4%</b>
No (Count: 557 / 90.3% )	Count	179	209	74	95
	% within Ward Method	94.7%	88.9%	94.9%	<u>82.6%</u>

$X^2 = 14.289$  Pearson Chi-square Significant Test:  $P < 0.003$

Note: The percentage in bold indicates a significantly higher portion of members than the other groups

Table 4.36 *Availability of various entertainment facilities by clusters*

Various Entertainment Facilities on Board (N=617)		Average people (n=189)	Adapter (n=235)	Sufferer (n=78)	Saint (n=115)
Yes (Count: 329 / 53.3%)	Count	87	126	30	86
	% within Ward Method	46.0%	53.6%	<u>38.5%</u>	<b>74.8%</b>
No (Count: 288 / 46.7%)	Count	102	109	48	29
	% within Ward Method	54.0%	46.4%	<b>61.5%</b>	<u>25.2%</u>

$X^2 = 32.244$  Pearson Chi-square Significant Test:  $P < 0.001$

Note: The percentage in bold indicates a significantly higher portion of members than the other groups. The percentage with the underline indicates a significantly lower portion of members than the other groups

Table 4.37 *Availability of high quality internet by clusters*

High Quality Internet on Board (N=617)		Average people (n=189)	Adapter (n=235)	Sufferer (n=78)	Saint (n=115)
Yes (Count: 151 / 24.5%)	Count	36	55	12	48
	% within Ward Method	19.0%	23.4%	<u>15.4%</u>	<b>41.7%</b>
No (Count: 466 / 75.5%)	Count	153	180	66	67
	% within Ward Method	81.0%	76.6%	<b>84.6%</b>	<u>58.3%</u>

$X^2 = 25.188$  Pearson Chi-square Significant Test:  $P < 0.001$

Note: The percentage in bold indicates a significantly higher portion of members than the other groups. The percentage with the underline indicates a significantly lower portion of members than the other groups

Table 4.38 *Availability of psychological consultation by clusters*

<b>Psychological Consultation on Board (N=617)</b>		<b>Average people (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
Yes (Count: 122 / 19.8%)	Count	26	54	7	35
	% within Ward Method	13.8%	23.0%	<u>9.0%</u>	<b>30.4%</b>
No (Count: 495 / 80.2%)	Count	163	181	71	80
	% within Ward Method	86.2%	77.0%	<b>91.0%</b>	<u>69.6%</u>

$X^2 = 19.809$  Pearson Chi-square Significant Test:  $P < 0.001$

Note: The percentage in bold indicates a significantly higher portion of members than the other groups. The percentage with the underline indicates a significantly lower portion of members than the other groups

Table 4.39 *Availability of high quality meals by clusters*

<b>High Quality Meals on Board (N=617)</b>		<b>Average people (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
Yes (Count: 203 / 32.9%)	Count	51	80	9	63
	% within Ward Method	27.0%	34.0%	<u>11.5%</u>	<b>54.8%</b>
No (Count: 414 / 67.1%)	Count	138	155	69	52
	% within Ward Method	73.0 <sup>^</sup>	66.0%	<b>88.5%</b>	<u>45.2%</u>

$X^2 = 44.202$  Pearson Chi-square Significant Test:  $P < 0.001$

Note: The percentage in bold indicates a significantly higher portion of members than the other groups. The percentage with the underline indicates a significantly lower portion of members than the other groups

Table 4.40 *Availability of comfortable living environment by clusters*

<b>Comfortable Living Environment on Board (N=617)</b>		<b>Average people (n=189)</b>	<b>Adapter (n=235)</b>	<b>Sufferer (n=78)</b>	<b>Saint (n=115)</b>
Yes (Count: 302 / 48.9%)	Count	83	113	23	83
	% within Ward Method	43.9%	48.1%	<u>29.5%</u>	<b>72.2%</b>
No (Count: 315 / 51.1%)	Count	106	122	55	32
	% within Ward Method	56.1%	51.9%	<b>70.5%</b>	<u>27.8%</u>

$X^2 = 38.632$  Pearson Chi-square Significant Test:  $P < 0.001$

Note: The percentage in bold indicates a significantly higher portion of members than the other groups. The percentage with the underline indicates a significantly lower portion of members than the other groups

- **Inter-clusters differences on the perceived effectiveness of the potential methods for overcoming the negative influence of sexual abstinence**

The members in all four clusters reported a medium level of agreement on the effectiveness of psychological consultation, entertainment facilities, connection with the family members and friends, high standard meals and good working and living condition for overcoming the negative influence of sexual abstinence. Therefore, there was no significant difference on these items between the four clusters based on the ANOVA test (see Table 4.41).

Both the Average People cluster and the Sufferer cluster highly agreed that appropriate sex-related education was essential for overcoming the negative influence of sexual abstinence. The Saint cluster and the Adapter cluster only indicated a medium level agreement on this, and means were comparably lower than those two

clusters. The members in the Sufferer cluster strongly agreed that reducing the length of single contract period and increasing the frequency of shore leave opportunity could effectively reduce the negative influence of sexual abstinence. The Average People cluster and Adapter cluster also highly agreed, but the agreement level was not as high as the Sufferer cluster. However, the Saint cluster only reported a medium level of agreement on these two statements, which was comparably lower than the other three groups. Meanwhile, the Sufferer cluster highly agreed that friendly co-workers were also important in dealing with the negative influence caused by sexual abstinence. Nevertheless, the other three cluster only reported a medium level of agreement on this statement. All of these differences were statistically significant (see Table 4.41).

Table 4.41 *Perceived effectiveness of potential methods for overcoming the negative influence of sexual abstinence by clusters*

<b>Variables</b>	<b>Overall Mean (N=617)</b>	<b>Average People (n=189) a</b>	<b>Adapter (n=235) b</b>	<b>Sufferer (n=78) c</b>	<b>Saint (n=115) d</b>
Appropriate sex-related education is important for seafarers is important for seafarers when suffering sexual abstinence (P<0.001)	3.94	4.03 (c)	3.83 (d)	<b>4.46 (a)</b>	<u>3.65 (b)</u>
Appropriate psychological consultation is important for seafarers when suffering sexual abstinence (P<0.054)	3.55	3.61	3.51	3.78	3.37

Table 4.41 *Perceived effectiveness of potential methods for overcoming the negative influence of sexual abstinence by clusters (continued)*

<b>Variables</b>	<b>Overall Mean (N=617)</b>	<b>Average People (n=189) a</b>	<b>Adapter (n=235) b</b>	<b>Sufferer (n=78) c</b>	<b>Saint (n=115) d</b>
Appropriate entertainment facilities on board can reduce the negative influence of sexual abstinence (P<0.875)	3.74	3.69	3.77	3.76	3.74
Keeping connected with family members and friends can reduce the negative influence of sexual abstinence (P<0.218)	3.97	3.95	3.96	4.15	3.90
Reducing the single length of working period for seafarers on board can reduce the negative influence of sexual abstinence (P<0.001)	4.16	4.24 (b)	4.07 (a)(d)	<b>4.71</b>	<u>3.86</u> (b)
Frequently visiting port of calls and having more shore leave opportunities can reduce the negative influence of sexual abstinence (P<0.001)	4.12	4.14 (b)	4.06 (a)	<b>4.72</b>	<u>3.81</u>
Friendly co-workers on the ship can reduce the negative influence of sexual abstinence (P<0.007)	3.84	3.78 (b)(d)	3.80 (a)(d)	<b>4.18</b>	3.77 (a)(b)



Table 4.41 *Perceived effectiveness of potential methods for overcoming the negative influence of sexual abstinence by clusters (continued)*

<b>Variables</b>	<b>Overall Mean (N=617)</b>	<b>Average People (n=189) a</b>	<b>Adapter (n=235) b</b>	<b>Sufferer (n=78) c</b>	<b>Saint (n=115) d</b>
High quality of meals on the ship can reduce the negative influence caused by sexual abstinence (P<0.362)	3.71	3.67	3.69	3.90	3.67
Good working and living conditions on the ship can reduce the negative influence caused by sexual abstinence (P<0.558)	3.79	3.73	3.80	3.92	3.78

Note 1: The number in bold indicates that the agreement level is significantly higher than the other groups. The number with the underline indicates that the agreement level is significantly lower than the other groups.

Note 2: Means with the same alphabetical superscript are not significantly different from each other at the 0.05 probability level.

Note 3: The agreement level for the variables in red is not significantly different between the four clusters

## Chapter 5 Discussion

This chapter discusses and analyses the results described in the previous chapter, and considers their theoretical and practical implication. The overall influence of sexual abstinence on psychological health, behaviors and work performance will be discussed in Section 5.1. Section 5.2 will analyse the overall attitude of the respondents on sexual abstinence. In Section 5.3, a comprehensive analysis on the cluster differentiation will be conducted. Finally, the correlation between the job satisfaction and the toleration level of sexual abstinence will be detailed analysed. The relevant management implications will be proposed at the end of each relevant section to reduce the negative impacts of sexual abstinence, protect the rights of the seafarers and enhance the operating safety of the ship.

### **5.1 Overall Influence of Sexual Abstinence on Psychological Health, Behaviors, and Work Performance**

Based on the overall agreement level of the respondents, the negative influence of sexual abstinence on psychological health, behaviours and work performance was summarized in a descending order in Figure 5.1, Figure 5.2 and Figure 5.3 respectively.

- **Overall influence of sexual abstinence on psychological health** (see Figure 5.1)

Generally, the respondents indicated a medium level of agreement on that they developed some psychological health issues because of sexual abstinence (mean: 3.24). Specifically, homesick, suspicion and anxiety were the three common issues induced by sexual abstinence based on the report of the respondents. Homesick is the instinct of human beings while being away from home for a long time. When not having the sexual life, the seafarers may particularly miss their wife and the family

life. For example, Interviewee 1 stated that '*I missed my family*' and '*I felt isolated from my wife* (when suffering sexual abstinence on board)' (see Appendix I). Suspicion and anxiety were also commonly discussed in the literatures in relation to the psychological health of the seafarers and were recognized as the major issues (Carotenuto *et al.*, 2013; Guo, 2020; Zhu & Ma, 2018). Although suspicion and anxiety can be caused by many factors, sexual abstinence is one of the main reasons due to lack of love and changes of hormone (Carcedo *et al.*, 2019; Fegg *et al.*, 2003). This is consistent with the result of this research.

Moreover, the respondents also reported other symptoms in relation to psychological health, including the loneliness, sleep problem, depression, sadness and hostility, because of sexual abstinence. Even though these issues were not as serious as homesick, suspicion and anxiety, still they were widely distributed among the respondents. Many literatures proved that the average level of psychological health of the seafarers is lower than the average people on the above areas (Carotenuto *et al.*, 2013; Li, Liu & Li, 2018; Zhu & Ma, 2018). In addition to the closed space of the working environment and isolation from the society, sexual abstinence may be another reason for causing such difference.

The respondents did not admit that they developed the pain on their body and started to have the thought of suicide due to sexual abstinence. Usually, these two symptoms indicate extremely serious psychological health issues caused by multiple factors, and the problem may already last for a while (Wang, Wei & Ding, 2006). Therefore, it is fortunate that the respondents did not report these two symptoms when suffering from sexual abstinence.

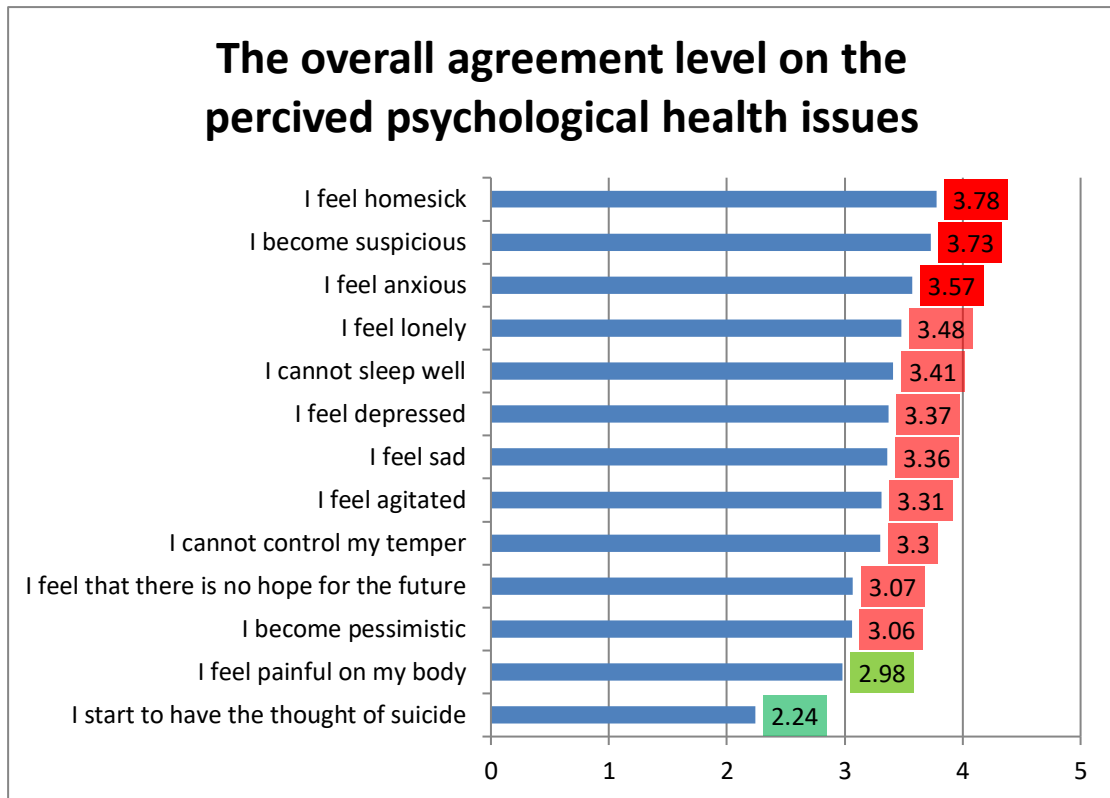


Figure 5.1 The overall agreement level on the perceived psychological health issues

- **Overall influence of sexual abstinence on behaviors** (see Figure 5.2)

The respondents generally did not agree that they developed inappropriate behaviors due to sexual abstinence (mean: 2.92). This indicates that the seafarers can generally control their behaviors on board and sexual abstinence mainly influences their emotions and feelings negatively. Although the respondents claimed they developed some communication issues because of sexual abstinence, such inappropriate behaviors may only influence the interpersonal relationship and normally will not lead to serious problems (Rogers, 1962).

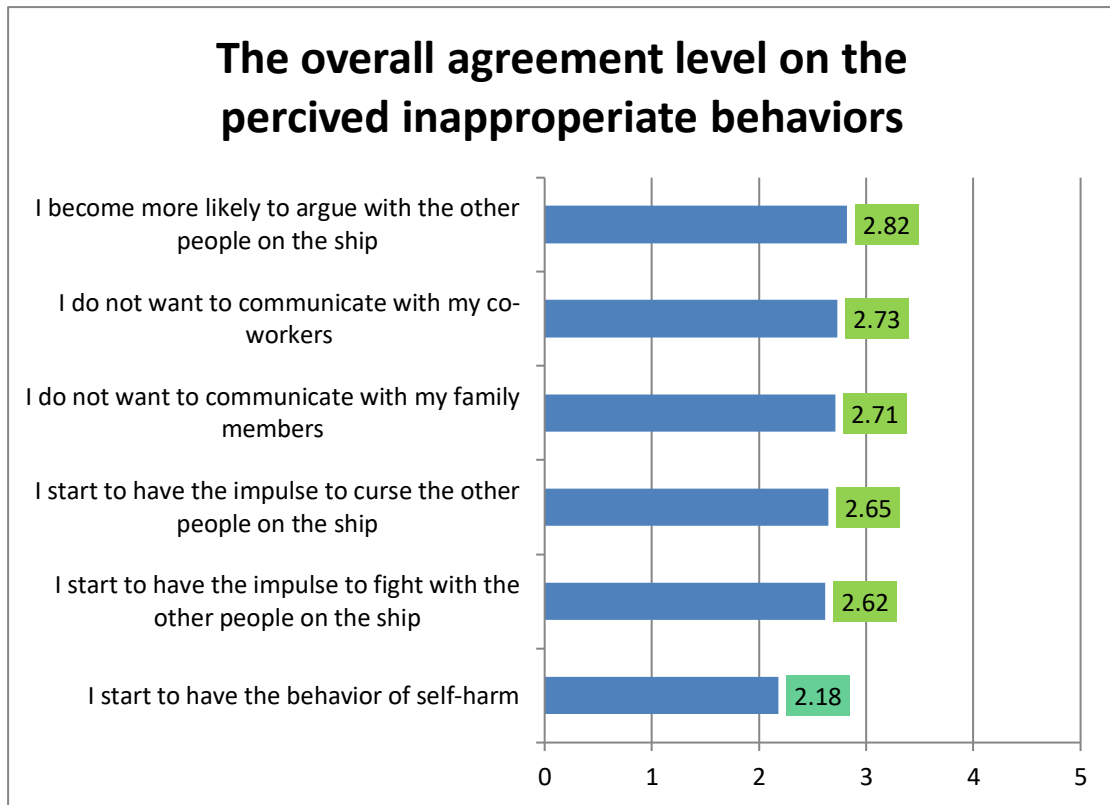
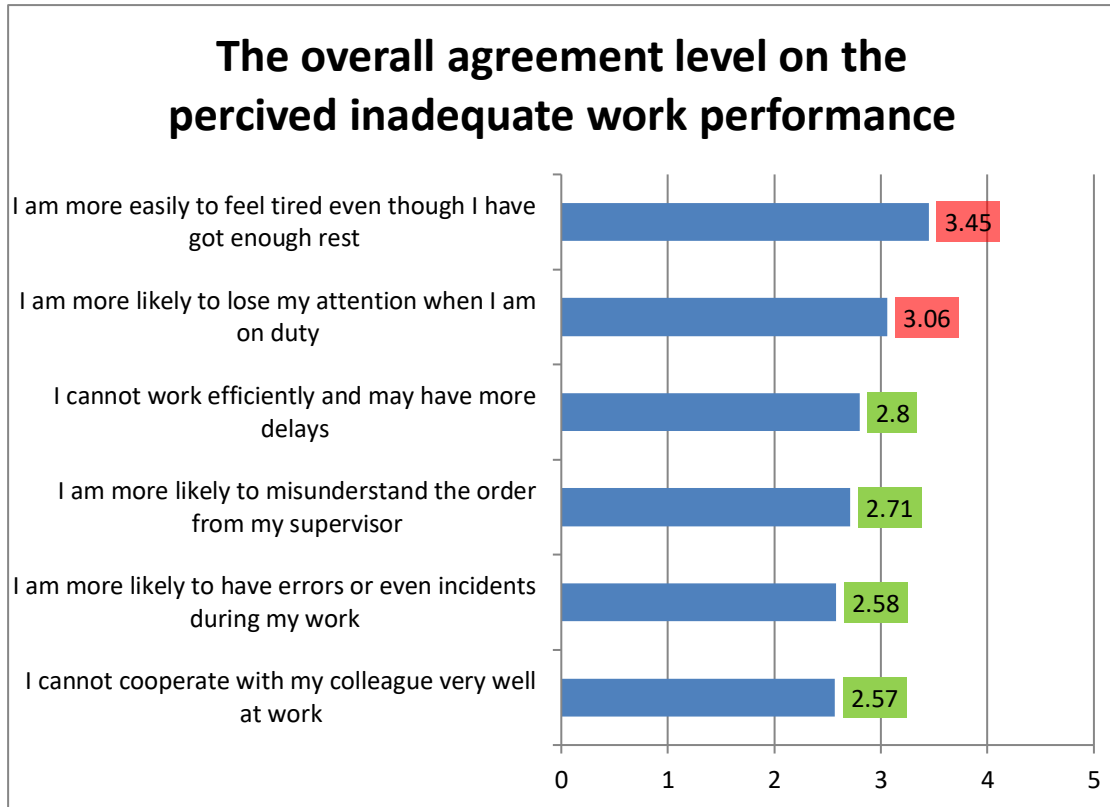


Figure 5.2 The overall agreement level on the perceived inappropriate behaviors

- **Overall influence of sexual abstinence on work performance** (see Figure 5.3)

Similar to the perceived inappropriate behavior, most of the respondents reported that they did not have inadequate work performance because of sexual abstinence (mean: 2.87). However, respondents claimed that they were easily to feel tired and might lose the attention when on duty. Normally, these two symptoms indicate the problem of fatigue. Currently, no research directly supports that sexual abstinence can cause the fatigue of the seafarers (IMO, 2019). Nevertheless, it is proved that sexual abstinence can induce the sleep problem and anxiety (Carcedo *et al.*, 2015), which are the key factors that lead to the fatigue (IMO, 2019). Therefore, it is no doubt that the respondents reported the tiredness and loss of attention during the work when suffering from sexual abstinence on board.



*Figure 5.3* The overall agreement level on the perceived inadequate work performance

- **Management considerations**

Even though no serious issues of the inappropriate behaviors and inadequate work performance were reported, the majority of the respondents suffered a certain level of psychological health issues without sexual life on board. The seafarers are a group of people that will easily develop psychological health problems due to the characteristics of their work (Zhu & Ma, 2018). With the further stimulation of sexual abstinence, more psychological related issues may be developed. If not appropriately managed, the operating safety of the ship will be seriously influenced.

To avoid the operating incidence caused by the psychological health issues of the seafarers, an early warning mechanism must be established. Commonly, the seafarers need to do the physical check before they board the ship. This is to ensure that their

physical health condition fulfil the requirements of seaworthiness. However, no one pays attention to the physical and psychological health conditions of the seafarers during the voyage. It is suggested that the psychological health of the seafarers should be evaluated and monitored dynamically while they are working on board. For example, the seafarers must be surveyed every month based on the psychological health index. Once potential problems are identified, psychological intervention and support must be provided in time to avoid the occurrence of the disaster. Wang, Shi and Dai (2020) proposed an early warning mechanism of the psychological health for the seafarers, which was argued to be essential for the operating safety of the ship. The detailed intervention and support methods for the relevant symptoms of the psychological health issues developed by sexual abstinence will be discussed in Section 5.3 based on the results of hierarchical cluster analysis.

Meanwhile, the tiredness and loss of attention when on duty led by sexual abstinence should also catch the attention of the relevant managers in the ship company, as these two issues are closely related to the fatigue. Commonly, insufficient manpower on board and high work pressure of the seafarers are considered the main reasons for the occurrence of the fatigue (IMO, 2019). However, according to the results of this research, sexual abstinence may also indirectly lead to the fatigue issue, thus furthering influencing the work performance of the seafarers. As a result, the ship company and the relevant government authorities should think comprehensively when managing the fatigue issues. Strong attention should be paid not only to the work load and manpower, but also to all the other factors that may lead to the sleep and rest problems, including sexual abstinence.

Since the sleep quality of the seafarers is extremely important for the operating safety of the ship, a voluntary reporting system should be established. It is encouraged that the seafarers can report their sleep quality voluntarily on board based on the Pittsburgh sleep quality index, and indicate the factors influencing their sleep, such as sexual abstinence. Once the serious sleeping problem is identified through the

assessment, appropriate intervention and work relocation must be made to avoid the occurrence of the incident.

## **5.2 Overall Attitude on Sexual Abstinence**

Except for the Saint cluster, most of the respondents believed that sexual abstinence should not be a normal job requirement for the seafarers. The majority of the respondents, including the members in the Saint cluster, agreed that sexual abstinence on board violated the basic physiological need of human beings (see Table 4.13). It is proved that the seafarers have strong consciousness of sexual right.

- **Management considerations**

According to Maslow's (1943) hierarchy of needs, sexual life is the basic physiological needs of human beings. Therefore, the sexual right of the seafarers must be respected. The ship company should not take it for granted that sexual abstinence is part of the job requirements of the seafarers. Appropriate spiritual and material compensation must be made to effectively protect the right of the seafarers. For example, travel incentives can be provided to the seafarers and their family members during the holiday to compensate the time of the seafarers for being away from the family as well as the love that they missed. Meanwhile, various kinds of recognition and praise should be frequently provided to the seafarers to appreciate their sacrifice. Many literatures support that appropriate compensation and recognition on the work can effectively reduce the dissatisfaction of the employee and further generate their loyalty. Meanwhile, the organisation can demonstrate their respectful consideration on the right of the employee (Prasetio, Agathanisa & Luturlean, 2019; Weathington & Tetrick, 2000). As a result, offering incentive and rewards to compensate the sexual abstinence is vital, and can thus increase the satisfaction and eliminate the grievance.



### **5.3 Cluster Differentiation Analysis**

Based on the hierarchical cluster analysis conducted for this research, the four identified clusters were not only significantly polarized in the areas of perceived psychological health problems, inappropriate behaviors and inadequate work performance, but also highly varied in terms of risk sexual behaviors, demographic characteristics and job characteristics. Additionally, the members in the four clusters reported the availability of support and facilities on board variously, and developed different levels of agreement on the effectiveness of the potential methods for overcoming the issues of sexual abstinence (see Section 4.2.8). Appropriate management consideration will be provided based on the analysis of such differences.

#### **5.3.1 Cluster differentiation analysis on the risk sexual behaviors**

Amongst the four clusters, there was a higher portion of the members in the Saint cluster who claimed that they did not engage in the commercial sex activities at port of calls (see Table 4.16). One of the main reasons is that the members in the Saint cluster were not significantly influenced by sexual abstinence for their emotions and feelings (see Table 4.12).

Conversely, more members in the Average People cluster indicated the participation of the commercial sex activities during their shore leave. Although a great number of the members in the Sufferer group did not want to report their experience of the commercial sex activities due to the sensitivity of the question, it is predicted that many of them participated before (see Table 4.16). This is because a certain number of the members in this cluster agreed that having commercial sex activities at port of calls could effectively satisfy the sexual needs of the seafarers (see Table 17). Therefore, there is a tendency that the seafarers who strongly suffered from sexual abstinence are more likely to participate in commercial sex activities.

Although most of the respondents demonstrated an adequate level of the knowledge in relation to the protection of the risk sexual behaviors according to this research (see Table 4.17), participation of the commercial sex activities has the greatest level of risk of sexual transmitted infections (Gysels, Pool & Bwanika, 2001; Wong, Tam & Leung, 2007). Unfortunately, the respondents generally agreed that it was common for the seafarers to participate in the commercial sex activities during their shore leave (see Table 4.17).

Except for the Saint cluster, the majority of whom did not experience the commercial sex activities, the rest of the respondents seek understanding or forgiveness for having commercial sex activities, especially those in the Sufferer cluster, who were significantly suffered from sexual abstinence (see Table 4.17). These respondents believe that sexual abstinence is a valid excuse for the seafarers to satisfy their sexual needs through commercial sex activities. However, having commercial sex activities violates the ethics or even the legislation. Therefore, appropriate management and intervention must be conducted to prevent the risk sexual behaviors of the seafarers induced by sexual abstinence.

### *Management consideration*

Even though the respondents of this research had some basic knowledge in relation to the protection of risk sexual behaviors, appropriate sex-related education is still essential. The majority of the respondents indicated that there was no sex-related education available to them. Only the Saint cluster had a slightly higher portion of the members who experienced such education before (see Table 4.35). This is probably one of the reasons explaining why the Saint cluster contented comparably fewer members experiencing commercial sex activities before and were less influenced by sexual abstinence. Proper sex-related education will provide scientific guidance for the seafarers to overcome the negative influences caused by sexual abstinence. Rather than participating in commercial sex activities, the seafarers can satisfy their sexual

needs in a more appropriate way. Meanwhile, the rest of the respondents of this research were eager to have the sex-related education, especially the members in the Sufferer cluster, who were significantly influenced by sexual abstinence. Therefore, appropriate sex-related education must be provided to the seafarers frequently on board or during their holiday.

Meanwhile, free condom should be provided to the seafarers on board. Even though this is a passive intervention method, wearing the condom during the commercial sex activities can at least reduce some risk of sexual transmitted infections (Visser *et al*, 2010). At the same time, free self-test tools and paper should be offered to the seafarers, and seafarers should be encouraged to do the test for sexual transmitted infections voluntarily after having the commercial sex activities. Some sexual transmitted infections are spread not only through sex activities, they may be spread through contact. Additionally, the symptoms are not obvious at the early stage of some sexual transmitted infections. Conducting self-test voluntarily can help the seafarers to identify the disease in time and effectively avoid its spreading on board (Chen *et al*, 2008; Xie, 1995).

In addition, the seafarers should be requested to develop the right value system and morals through the daily management on the ship. They should be encouraged to experience different cultures and release their work pressure through healthy activities during the shore leave instead of participating in the commercial sexual activities.

### **5.3.2 Cluster differentiation analysis on the demographic characteristics**

The four identified clusters were not significantly different from each other for their ages (see Table 4.19). According to the Seafarers Happiness Index developed by The Mission to Seafarers (2020), the senior seafarers normally feel much happier for their life than the younger seafarers. It is because the senior seafarers are more used to the

work and life on board. However, this is not the case for sexual abstinence according to the current study. The respondents across different age groups were all significantly influenced by sexual abstinence, which proved sexual abstinence as a common problem for the seafarers on board. Meanwhile, the marriage status did not significantly differentiate the four clusters either (see Table 4.20). Again, this emphasised the universality of the sexual abstinence problem.

Based on the research result, education level is the only demographic characteristic that highly differentiated the four clusters (see Table 4.21). There was a higher portion of members in the Saint cluster with at least a university degree. According to Report on National Mental Health Development in China (2019-2020), people with higher education level normally have a better psychological enduring capacity compared with people who are not very well educated, and are not likely to develop psychological health problems (Chinese Academy of Sciences, 2021). This explained why the Saint cluster was not significantly influenced by sexual abstinence on their psychological health, behaviors and work performance.

### *Management consideration*

As has been discussed in Section 5.2, the sexual need is one of the basic physiological needs of human beings. People will universally develop some psychological health issues when suffering sexual abstinence for a long time. Therefore, appropriate psychological consultation is needed on board, which can effectively help the seafarers to release their pressure and manage their emotions and feeling positively (Bindman, 1959). It is noticed that a higher portion of the members in the Saint cluster experienced the psychological consultation on board before while most of the members in the Sufferer group not (see Table 4.38). This strongly supported that appropriate psychological consultation can effectively minimize the negative influence of sexual abstinence on psychological health, behaviours and work performance. Meanwhile, the seafarers expect to have the psychological consultation

on board. For example, Interviewee 1 mentioned ‘*a psychologist is need on board to help the seafarers to solve the psychological problem*’ (see Appendix I).

Currently, the education level of the seafarers in China is comparably low (MSA China, 2020). The ship company should develop an education level improvement scheme and encourage the seafarers to participate in the continuing education during their holiday. This cannot only increase the work competence of the seafarers but can also improve their psychological enduring capacity, which can reduce the negative influence of sexual abstinence. Since the work competence and the psychological enduring capacity are both important for the operating safety of the ship, continuing to improve the education level of the seafarers is vital.

### **5.3.3 Cluster differentiation analysis on the job characteristics**

Amongst the four clusters, no significant difference was identified in terms of the years of working as a seafarer (see Table 4.22), company nature (see Table 4.23), ship types (see Table 4.24), current positions (see Table 4.25), working places on the ship (see Table 4.26), colleague’s nationality (see Table 4.27) average monthly salary on the ship (see Table 4.29), average length of working time on the ship every year (see Table 4.28) and longest single working period on board (see Table 4.29). This further proves that sexual abstinence is a universal problem for most of the seafarers and is hardly influenced by any external factors. However, the four clusters did differentiate from each other for the working experience with female seafarers (see Table 4.28), single contract period requirement (see Table 4.30), holiday duration requirement between each working period (see Table 4.31), and frequency of the shore leave opportunity (see Table 4.34).

There was a higher portion of members in the Saint cluster that reported the working experience with female seafarers (see Table 4.28). Normally, people who are trapped

in an environment containing peers all with the same gender are more likely to suffer the sex induced psychological health problem, such as the prisoners and soldiers (Allard, 2011; Carcedo *et al.* 2019). This is probably one of the reasons why the members in the Saint cluster were not strongly influenced by sexual abstinence and still maintained the comparably healthier psychological state.

The members in the Sufferer cluster, who significantly suffered from sexual abstinence on board, generally had a longer single working period in their contracts and the holiday duration was shorter. It is easy to understand that the longer the seafarers are isolated from their families, the more likely they are to develop the psychological health issues, inappropriate behaviors and inadequate work performance induced by sexual abstinence. Meanwhile, over half of the members in the Sufferer cluster could hardly get any shore leave opportunity, the proportion of which was much higher than the other three clusters. On the opposite, a higher portion of members in the Adapter cluster and the Saint cluster were able to get the shore leave opportunity more frequently. Shore leave is one of the rights of the seafarers. It links the seafarers to the society while they are working on board. Moreover, the seafarers can effectively release their stress and repression obtained from the closed working environment through the shore leave (Hebbar & Mukesh, 2020). Therefore, the seafarers with more shore leave opportunities can better overcome the negative influence of sexual abstinence and sustain the wellbeing of their psychological health.

### *Management consideration*

To reduce the sex-induced psychological pressure, the ship company can consider recruiting the female seafarers. So far, there is no research directly supporting that the male seafarers can have better performance when working with the female seafarers on board. Nevertheless, some evidence from this research, at least, proves that having the seafarers with the mixed genders on the ship can reduce a certain level of the negative influence caused by sexual abstinence. Currently, only 1% of the seafarers

are female, and the female seafarers are still considered as a minority group. It is widely known that there are many constraints for the female seafarers to work on board, such as sexual harassment and masculine norms (Kitada, 2021). However, the ship company should respect the gender equality and provide the same employment opportunity to the female seafarers, making the working environment on board more diversified (Kitada, 2021; Zhao *et al.*, 2017).

To better protect the right of the seafarers and reduce the influence of sexual abstinence, the ship company should reduce their single working period on board and provide more flexibility on their holiday. Even though this can significantly increase the operating cost of the ship company, however, setting up the appropriate requirements for the single contract period and the holiday duration can help the seafarers to sustain the adequate working status (Sliskovic & Penezic, 2016). According to the interview conducted for this research, most of the interviewees (Interviewees 1, 2, 3, and 4) indicated that their feelings and emotions negatively changed, partly because of sexual abstinence, after a certain period of working on the ship (see Appendix I). This significantly influenced their psychological health and work performance. Therefore, the seafarers cannot be kept working on board for a long duration. Otherwise, the operating safety of the ship cannot be assured. Meanwhile, most of the respondents for this research, especially the ones in the Sufferer cluster whose contract period was comparably longer, agreed that reducing the single working period on board is an effective method for overcoming the issues of sexual abstinence (see Table 4.41).

If reducing the length of the single working period on board is not possible, the ship must improve the quality of the internet on the ship. Due to the characteristics of the work, the seafarers cannot stay with their families and accompany their loved ones. Therefore, homesick is the most common issue for the seafarers induced by sexual abstinence on board (see Figure 5.1). Interviewee 2 of this research even '*felt guilty to his family members*' for not accompanying them (see Appendix I). This also indirectly

explains why the seafarers expect shorter contract period and longer holiday duration. To solve the issue of homesick effectively, the high quality internet on board is essential, which enables the seafarers to keep connected with their families and sustain the healthy mental state (Sliskovic & Penezic, 2016). Specifically for this research, a higher portion of members in the Saint cluster reported the availability of high quality internet on board. However, the majority members in the Sufferer cluster do not have access to fast and stable internet when working on the ship. This further proves that the high quality internet is vital for reducing the negative impact of sexual abstinence on the seafarers.

Most of the respondents of this research, particularly the members from the Sufferer cluster, believed that having more shore leave opportunities was able to minimize the negative influence of sexual abstinence (see Table 4.41). Interviewee 2 mentioned that *'the shore leave could distract my attention on sexual abstinence and was probably my happiest time when working on board'* (see Appendix I). Therefore, more shore leave opportunities should be created to the seafarers. The ship company should understand that the shore leave opportunity is not a privilege but a right for the seafarers. The managers on board should equally consider the shore leave requests of the seafarers and allocate the opportunity fairly. Meanwhile, the seafarers who develop the symptoms of psychological health issues should be given the priority for the shore leave, which enables them to release their stress.

Because of Covid-19, the shore leave became impossible for most of the ports. Alternatively, the ship company should enhance the entertainment facilities on board, which can distract the attention of the seafarers on sexual abstinence and help them to release the psychological pressure. Currently, the entertainment facilities on many ships are very limited and out of date. Some ships even do not equip the entertainment facilities for the seafarers, which violates the requirement of the Maritime Labour Convention 2006. According to the result of this research, the Saint cluster, which was not influenced by sexual abstinence, enjoyed various entertainment facilities on



board. However, a higher portion of members in the Sufferer cluster reported no such facilities available on the ship, thus significantly influenced by sexual abstinence (see Table 4.36). This strongly proves the effectiveness of the entertainment facilities in overcoming the issues of sexual abstinence.

#### **5.4 Correlation Analysis between the Job Satisfaction and the Toleration Level of Sexual Abstinence**

Based on the results of the hierarchical cluster analysis, the members in the Saint cluster, who were not influenced by sexual abstinence on the psychological health, behaviors and work performance, demonstrated a significantly higher level of toleration for the life without sex on board (see Table 4.13). This is completely in conformity with logic. The more people get used to the life, the healthier the psychological state will be (Sun, 2001). Meanwhile, it is noticed that the Saint cluster reported a comparably higher level of agreement than the other three clusters on the variables indicating the job satisfaction, even though the means for these items were generally low (see Table 4.18). Therefore, the relationship between the job satisfaction and the toleration level is worth of deep discussion.

According to the multiple liner regression analysis, it is proved that the job satisfaction of the seafarers has a tight correlation with the toleration level of sexual abstinence. Specifically, the overall job satisfaction, perceived working environment, ability constraints for the other jobs, own choice for working as a seafarer and friendliness of co-workers were positively correlated with the toleration level of sexual abstinence, while the perceived job responsibility had a negative correlation (see Table 4.10).

The working environment on the ship is tough, which significantly influences the wellbeing of the seafarers (Islam *et al.*, 2018). Normally, the seafarers who positively perceive the working environment develop a stronger adaptability towards work

(Maggiori *et al.*, 2013). Therefore, they can better tolerate sexual abstinence on board. The ability constraints for other jobs and their own choices for working as seafarers indicated the career identity of the respondents (Meijers, 1998). Many researches prove that high career identity can lead to high job satisfaction and strong work motivation (Alnak *et al.*, 2012; Weber & Ladkin, 2011). As a result, the seafarers with better and clearer career identity are more likely to accept the negative factors associated with the job such as sexual abstinence. Similarly, the friendliness of the co-workers can also stimulate the motivation of the employee and generate their positive attitude towards job (Huddleston & Good, 1999; Nordlholm & Westbrook, 2006). Therefore, good interpersonal relationship on board, to some extent, can compromise the negative impacts of sexual abstinence suffered by the seafarers. Since the perceived working environment, ability constraints, own choices for working as seafarers and friendliness of the co-workers all directly contribute to the development of job satisfaction (Smith, Kendall, & Hulin, 1969; Sui & Li, 200), there is no doubt that the seafarers with higher overall job satisfaction can better get used to sexual abstinence on board.

The perceived responsibility of the job reflects the conscientiousness of the seafarers. Meanwhile, it also indicates the psychological pressure developed from the work. Based on the previous research, people with strong sense of responsibility develop high job stress (Britt *et al.*, 1995). This appropriately explains the reasons why the perceived responsibility of the seafarer job is negatively correlated with the toleration level of sexual abstinence. The more the seafarer is responsible, the more work stress is developed, which will aggravate the inadaptation of the seafarers for the life on board and their psychological health issues induced by sexual abstinence.

The members of the Saint cluster, who get used to sexual abstinence on board, also reported similar patterns of agreement level on the above variables based on the hierarchical cluster analysis (see Table 4.18). This further proved the reliability of the multiple liner regression result.

- **Management considerations**

Sexual abstinence is an unavoidable issue for the seafarers when working on the ship. While effectively minimizing its negative influence on the psychological health, behaviors and work performance of the seafarers, the ship company also needs to seriously consider how to improve their toleration level of sexual abstinence. Based on the research result, increasing the job satisfaction of the seafarers, particularly in the areas of working environment, carrier identity and friendlies of co-workers, is one of the possible solution.

*Improving the working environment on board*

The working environment of the ship is influenced by many external factors out of the control of the ship owners, such as weather conditions, noise and vibration. The ship company should at least make the working environment on board safe and clean. If possible, colorful decoration should be applied which can reduce the stress of the seafarers (Shao & Guo, 2012).

Although no significant correlation was identified between the living condition on board and the toleration level of sexual abstinence, the working and living environment cannot be discussed separately considering the unique job characteristics of the seafarers. Therefore, attention should also be paid to the comfortability of the living areas on board to improve the seafarers' toleration level of sexual abstinence. Normally, sweet and comfortable living environment can effectively reduce the work stress. However, poor living condition can further stimulate the negative feelings and emotions developed from the psychological pressure (Chen *et al.*, 2003). This partly explains the polarized reactions of the Saint cluster and the Suffered cluster caused by sexual abstinence. A significantly higher portion of members in the Saint cluster reported that their living environment on board was comfortable. On the opposite, more members in the Sufferer cluster claimed that their living condition on the ship

was not adequate (see Table 4.40). As a result, their influenced level of sexual abstinence was significantly different.

Meanwhile, the standard of the meals should also be seriously considered, which can also be recognized as part of the working environment on the ship. Many countries set up the legislation to regulate the minimum standard of the meals on board. However, the interviewees for this research reported that '*the food was a disaster and I could not get enough nutrition*' (Interviewee 1), '*the food on board was awful and all expired*' (Interviewee 4) and '*the food was not healthy at all*' (Interviewee 5) (see Appendix I). Strong attention should be paid to these complains, as the nutrition obtained from the meals significantly influence the health condition of the seafarers, including their psychological health (Oldenburg, Harth, & Jensen, 2013; Zhang, 1995). Furthermore, lack of appetite on board further aggravates the negative influence of sexual abstinence on the seafarers. This was also proved based on the chi-square test on the availability of high quality meals on board reported by the members from the four identified clusters (see Table 4.39).

As a result, appropriate working environment together with the comfortable living condition and high quality meals on board is essential to improve the toleration level of sexual abstinence and overcome its negative influence effectively. This was also agreed by the most of the respondents of this research (see Table 4.9).

#### *Enhancing the career identity of the seafarers*

Most of the respondents agreed that working as a seafarer was their own choice, especially the members in the Saint cluster and Adapter cluster (see Table 4.18). This indicated their willingness to do the job and is an important intrinsic factor, which sets up the foundation to improve the career identity of the seafarers (Meijers, 1998). However, the stimulation from the external environment were generally low according to the perception of the respondents, which could not effectively assist the

seafarers to develop their career identify. For example, most of the respondents believed that their payment was not desirably high and the promotion opportunity was very limited. Meanwhile, they could not receive recognition from their family members because of their job. Some of the respondents even could not perceive the respect on their profession from the society (see Table 4.2). Therefore, the ship company must take effective actions to influence the perceptions of the seafarers on these external factors and further enhance their career identity.

On the one hand, the ship company should increase the benefits of the seafarers and ensure their salary is worth of their effort. Meanwhile, more promotion opportunities should be created allowing the seafarers to obtain the vision for their career development. The employees with better payment and a clear idea on their career development are more loyal and their career identity is much stronger (Meijers, 1998; Weber & Ladkin, 2011).

On the other hand, the ship company, together with the other relevant stakeholders, must take the responsibility to actively propagandize, allowing more people to deeply understand the contribution of the seafarers to the society and their scarification. With the better recognition from the whole society, the seafarers can receive more respect, which can significantly develop their career identify (Meijers, 1998).

Once the seafarers develop the stronger career identity with the support of the above methods, they will be more motivated and can better adapt the difficulties at work including sexual abstinence.

#### *Creating friendly interpersonal relationship*

Most of the respondents claimed that their co-workers on board were friendly (see Table 4.2). However, Interviewee 1 and Interviewee 3 mentioned that '*the interpersonal relationship on board was very complicated*' and '*working with people*

*from different background was challenging'* (see Appendix I). Meanwhile, many tragedies happened on board were because of the interpersonal conflicts. Therefore, appropriate intervention must be placed to enhance the interpersonal relationship on board, which cannot only improve the cooperation between the seafarers but can also increase their toleration level of sexual abstinence according to the result of this research. Since the seafarers on board may come from different countries and have different background, the workshop in relation to cross-culture communication should be provided to the seafarers. This can allow the seafarers to better understand and adapt to the diversified working environment. At the same time, the ship company should promote appropriate organizational culture to encourage the seafarers to be generous, kind and polite to each other. The entire team on board should stay together like family members. Once help or support is needed, everyone can give a hand.

## **Chapter 6 Conclusion**

By pointing out the theoretical contribution and the practical implication of this research, as well as the research limitations and future research directions, this chapter serves as the conclusion of the thesis. Specifically, Section 6.1 discusses the significance of the research including the theoretical contribution and the practical implication. Section 6.2 points out the associated research limitations and future research directions.

### **6.1 Research Significance**

It is contended that this research makes certain innovative contributions to the existing literature and has strong practical implications to the shipping industry.

#### **6.1.1 Theoretical contribution**

The safety management of the ship has been discussed by many studies. However, hardly any literature has considered sexual abstinence of the seafarer as a potential risk factor for the operating safety of the ship. Although the psychological health of the seafarers is a hot topic for the psychology and maritime research, very limited research focused on discussing the sex-induced psychological health issues. This research successfully addressed these research gaps and identified influence of sexual abstinence on the seafarers.

*Identifying the relationship between the job satisfaction and the toleration level of the seafarers on sexual abstinence*

Based on the result of the multiple liner regression analysis, the correlation between the job satisfaction and the toleration level of the seafarers on sexual abstinence is

identified. Amongst the variables indicating the job satisfaction of the seafarers, the overall job satisfaction, perceived working environment, ability constraints for the other jobs, own choice for working as a seafarer and friendliness of the co-workers were positively correlated with the toleration level of sexual abstinence, while the perceived job responsibility had a negative correlation.

It is commonly known that job satisfaction can stimulate the motivation of the employees and increase their work performance. This research extends the function of the job satisfaction in the context of the maritime industry, that is high job satisfaction can increase the toleration level of sexual abstinence for the seafarers. This finding cannot be only applied in the maritime industry, but can also be referenced by the industry whose employees need to work in a closed environment and be away from the family members for a long time.

*Establishing the relationship between sexual abstinence and the psychological health, behaviors, work performance and the participation of the risk sexual activities*

The medical and psychology literature already proved that sexual abstinence can lead to serious psychological health issues. However, no further study was conducted to examine the influence of sexual abstinence on people's behaviors, work performance and the participation of the risk sexual activities. Using the Chinese male seafarers as the study object, this research proved that the seafarers, who significantly suffered from sexual abstinence, are more likely to have psychological health problems, thus further resulting in inadequate work performance on board. Meanwhile, there is a higher probability for these seafarers to participate in the commercial sex activities during the shore leave. There is no evidence to support that the psychological health issues induced by sexual abstinence can lead to serious inappropriate behaviors for the seafarers on the ship.



### *Proposing the influence of sexual abstinence on the occurrence of fatigue*

Fatigue is a serious problem existing among the seafarers, which highly influence the operating safety of the ship. High work stress and insufficient sleep are commonly known as the main factors that lead to the fatigue of the seafarers. Through this research it is identified that sexual abstinence can also cause the fatigue indirectly. Sexual abstinence can highly influence the sleep quality of the seafarers. Therefore, the seafarers who suffered from sexual abstinence normally feel tired on board and are easily to lost attention while on duty. As a result, as a new factor that may lead to fatigue, the issue of sexual abstinence for the seafarers must be appropriately intervened.

#### **6.1.2 Practical implication**

In addition to the above theoretical contributions, this research also has significant implication to the shipping industry. It is proved that sexual abstinence can cause many problems. Therefore, appropriate management strategies must be placed to minimize its negative influence and enhance the operating safety of the ship.

### *Assisting the ship company to better understand the characteristics of the seafarers with potential to be influenced by sexual abstinence*

According to the research result, sexual abstinence is a universal problem for the seafarers. Generally, the seafarers will develop some symptoms of psychological health problems after suffering from abstinence. Particularly, the seafarers with lower education level, longer contract period, less holiday duration and limited shore leave opportunities are more easily to be influenced by sexual abstinence. Meanwhile, the working experience with the female seafarers can also have an impact on the influence level of sexual abstinence. Most of the seafarers agreed that sexual

abstinence on board violated the basic physiological need of human beings and should not be a normal job requirement.

#### *Proposing a management framework for the ship company*

Based on the above identified characteristics, a management framework to handle sexual abstinence issues is proposed for the consideration of the ship company. It is recommended that the ship company must pay strong attention to the psychological health issues of the seafarers induced by sexual abstinence. An early warning mechanism on the psychological health of the seafarers should be established, and their psychological state should be monitored dynamically during the voyage. At the same time, appropriate psychological consultation should be available to the seafarers on board to reduce their psychological stress caused by sexual abstinence.

Meanwhile, the ship company needs to encourage the seafarers to voluntarily report their sleep quality. Once serious sleep problems caused by sexual abstinence are identified, work relocation must be made. This can effectively avoid the occurrence of the incidence.

Since the sexual life is the basic physiological need of human beings, the ship company must respect the sexual needs of the seafarers. The ship company should not take it for granted that sexual abstinence is associated with the job requirements of the seafarers. Appropriate incentive, compensation and recognition must be provided to reward their sacrifice.

Appropriate sex-related education should be continuously provided to the seafarers to encourage them to satisfy their sexual need on board in a healthier way. Free condom and voluntary self-test are essential to prevent the spread of the sexual transmitted infections on board. The seafarers should be requested to develop right value system

and morals and avoid participating in the commercial sex activities during the shore leave.

Continuous education programme can be offered to the seafarers during their holiday to improve their education level. People with higher education normally have better psychological enduring capability, thus are not easily influenced by sexual abstinence. Meanwhile, the ship company should reduce the single contract period for the seafarers and make their holiday duration more flexible. More shore leave opportunities should be provided to the seafarers fairly whenever possible.

High quality internet and various entertainment facilities on board are also essential, which can allow the seafarers to be continuously in connection with their family members and distract their attention on sexual abstinence. Therefore, these supporting facilities must be enhanced.

The ship company can consider recruiting some female seafarers. This cannot only demonstrate their respect on gender equality, but can also assist to minimize the negative influence of sexual abstinence on the male seafarers. Working in the environment consisting of mixed genders colleagues can somewhat reduce the psychological stress developed from sexual abstinence.

Finally, the ship company must try to increase the job satisfaction of the seafarers, which can improve their toleration level on sexual abstinence. Specifically, the ship company should improve the working environment for the seafarers on board, including providing a comfortable living area and enhancing the meal standards. Meanwhile, the ship company must stimulate the seafarers to develop career identity. The ship company should provide competitive payment to the seafarers and take the responsibility to actively propagandize the seafarers as a respected profession. Additionally, a friendly interpersonal relationship must be set up on board to make sure the seafarers can cooperate with each other very well.

### *Catching the attention of the relevant stakeholders*

It is noticed that the relevant stakeholders of the maritime industry, including the government authorities, non-government organisation, industry association and ship companies, pay strong attention to the safety as well as the rights of the seafarers. However, hardly any of these stakeholders ever consider sexual abstinence of the seafarers as an issue. This research will urge these stakeholders to propose an agenda that can effectively address the issues of sexual abstinence for seafarers. This can better protect the rights of the seafarers and enhance the operating safety of the ship.

## **6.2 Research Limitations and Future Research Directions**

Although the researcher tried to make the research as rigorous as possible, various limitations exist and must be acknowledged. First, considering the time and scale of the research, this research only focuses on the Chinese male seafarers. The number of interviews conducted and the number of the respondents for the questionnaire based survey were both limited, though sufficient to achieve the current research objectives. It is hoped that the study object for the issues of sexual abstinence can be extended to the seafarers worldwide with consideration of their demographic and job characteristics. Therefore, more data can be collected for further analysis to make the research result more reliable and representative.

Second, the researcher carried out the current study solely from the perspective of the seafarers. Since sexual abstinence of the seafarers is a serious issue worth of deep investigation, the attention and attitudes from the relevant industry stakeholders are also essential. The interviews with the government authorities, industry association and ship companies should be conducted in the future to explore their perceptions towards the issues of sexual abstinence. The multiple stakeholders approach can make the research more comprehensive. Therefore, the management strategies proposed to

minimize the negative influence of sexual abstinence will be more practical and effective. This can better protect the rights of the seafarers and enhance the operating safety of the ship.

Third, the current study only examined the relationship between the job satisfaction and the toleration level of the seafarers on sexual abstinence. There are more factors, such as cultural dimensions and moral identities of the seafarers, which may influence their toleration level. Therefore, these potential relationship are worth of further investigation.

Finally, the research identified the different influence level of sexual abstinence on the Chinese male seafarers using hierarchical cluster analysis. Hierarchical cluster analysis is effective in determining the characteristics of the seafarers who are more likely to be suffered from sexual abstinence, and is able to identify its overall influence level on the psychological health, behaviors, and work performance based on the clusters. To confirm the inter-item component relationships between the psychological health problems, inappropriate behaviors and inadequate work performance induced by sexual abstinence (i.e. what kind of negative feelings and emotions caused by sexual abstinence can lead to the seafarers not working efficiently?), structure equation modelling can be applied to the data for the future research to gain better understanding on such inter-relationships.

Limitations notwithstanding, this innovative research has the potential to better protect the rights of the seafarers and enhance the safety of the shipping industry. The proposed management framework to intervene the negative influences caused by sexual abstinence is feasible and effective. Definitely, this research can stimulate more future studies to focus on the seafarers' sexual abstinence issues, and will generate attention from the whole society to have a deep understanding on the sacrifice of the seafarers.

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## Appendices

### Appendix I Interview Questions and Interview Transcripts

#### Interview Transcript 1:

1. What is your age?

A: 31

2. How long have you been working as a seafarer?

A: Around 10 years

3. What is your current position?

A: First engineer

4. When was your last shipping experience? How long did it last?

A: I boarded the ship in Nov 2019 and got off in May 2020. It lasted around 7 months.

5. On which types of ships have you ever sailed?

A: Oil tanker

6. On which flag have you ever sailed?

A: China, Hong Kong (China) and Panama

7. What was the nationality of the crew on the ships that you have ever sailed?

A: All of them are Chinese

8. Are you working for a manning agency or hired by a shipping company?

A: I am hired by a shipping company

9. How many months are your contracts on board ships?

A: 6 months – 10 months

10. Can you estimate how many hours do you work per day?

A: Around 8 hours per day. Sometimes, I need to work overtime

11. Do you think the manning level is sufficient or should be increased?

A: It is not sufficient. A new position should be created to manage the rescue equipment on board and do the daily maintenance and check on this equipment. Another third officer and third engineer should be added to reduce the current workload. More sailors should be added in order to improve the efficiency for unloading the goods at the port. In addition, I believe a psychologist is needed on board to help the seafarers to solve the psychological problem. I do believe that many seafarers suffer psychological problem during the voyage.

12. What are the main challenges for seafarers when at sea? You may describe the challenges in the areas of work and living on board.

A: The machines and equipment on the ship always have problems, which cause high work pressure for seafarers. Sometimes, we do not know how to fix the problems. This can even lead to some safety issues. We really feel stressful. The working environment is another big problem. We need to suffer the high temperature and noise in the engine room, while it is cold on the deck sometimes. We believe that our health condition has been significantly influenced by the poor working condition on board. For the living, the internet is a big issue. The internet is slow and extremely expensive. We cannot contact our family frequently, which makes me feel lonely and homesick. I really feel that accompany of the family is very important to me and I do need their care when I work on board. However, connection is really a great challenge on board. In addition, the food on board is a disaster for me. The quality of the food is really poor, and sometimes we cannot get enough nutrition. The contract period is too long and I cannot get off the ship easily. The worst is that we do not have entertainment activities. The life is so boring.

13. Compared to shore life, what do you miss the most?

A: The various entertainment activities and the family life. Also, I miss the delicious food.

14. Could you please describe your overall feelings for being a seafarer?

A: I decided to work on the ship because of my family. I need to support my family. Working as a seafarer can earn more money. I think I can provide my family a better and happier life. However, the seafarer is not an easy job. We actually suffered psychologically and physically. It is all because of life. If I had another option, I will not work as a seafarer.

15. Could you please compare your feelings when you just board the ship with when you work on the ship for a certain period?

A: When I just board the ship, I normally feel OK. I just worry about the general condition of the ship, I mean the condition of the equipment and machines. I also worry about the personal relationship with the colleague. After around one month, I start to feel impatient. I do not want to work on the ship. Before I finish the contract, I even do not want to stay one more minute on the ship. However, I feel much happier at that time, because I can get off the ship and get together with my family.

16. Why do you have such changes on feelings?

A: I think this is because of the work pressure. Also, isolation from the normal shore life and family cause such changes.

17. Do you think sexual life is important for seafarers when working on the ship? Do you think sexual abstinence can lead some problems?

A: This is a great problem I don't feel joy and happiness without the sexual life. I feel isolated from my wife, which cause great psychological pressure. Also, I feel my basic sexual needs cannot be satisfied properly. This leads some negative feelings including anxiety, impatient and disappointed.

18. What kind of methods do you think can solve the sexual abstinence issues for seafarers?

A: Increase the shifting frequency and reduce the total working period on the ship. Improve the quality of the internet and provide free WIFI to seafarers. Make sure we can have good contact with our family members. Also, provide more entertainment facilities and have more shore leave opportunities. Finally, increase the manpower and reduce the work pressure.

## **Interview Transcript 2:**

1. What is your age?

A: 28

2. How long have you been working as a seafarer?

A: Around 6 years

3. What is your current position?

A: Second engineer

4. When was your last shipping experience?

A: July 2020

5. On which types of ships have you ever sailed?

A: Oil tanker

6. On which flag have you ever sailed?

A: China

7. What was the nationality of the crew on the ships that you have ever sailed?

A: All of them are Chinese

8. Are you working for a manning agency or hired by a shipping company?

A: I am hired by a shipping company

9. How many months are your contracts on board ships?

A: 6 months – 10 months

10. Can you estimate how many hours of work you are doing per day?

A: Around 8 hours per day.

11. Do you think the manning level is sufficient or should be increased?

A: It is sufficient. There is no need to add manpower on the ship.

12. What are the main challenges for seafarers when at sea? You may describe the challenges in the areas of work and living on board.

A: Seafarers suffer high pressure during the work. The job lacks of the recognition from the society. I always feel homesick when I am working on board. I really want to stay together with my family members. There are too many checks and requirements on board and I feel tired about these.

13. Compared to shore life, what do you miss the most?

A: Family members' accompany and the food from my family.

14. Could you please describe your overall feelings for being a seafarer?

A: The seafarer is a stable job with good payment. I think this job has a medium level payment compared with the other jobs. However, the duration on board is too long, which makes me feel isolated from my family as well as the society. I always suffer high psychological pressure. There is very limited ways on board to reduce my psychological pressure. I feel that I do not want to communicate with the others. I also noticed that I cannot communicate with my family members properly after I go back home, as I cannot find the common topic to communicate with them due to the lack of connection with the society.

15. Could you please compare your feelings when you just board the ship and when you work on the ship for a certain period?

A: I normally feel full of energy when I just board the ship. However, after a few weeks, I start to feel tired with high psychological pressure. When I complete my contract and leave the ship, I feel that I was released from the prison.



16. Why do you have such changes on feelings?

A: The working environment on board makes me feel isolated from the society and my family. I need to do the repeating work every day. I need to deal with different checks from the company and comply with different kinds of requirements. Sometimes, I also feel guilty to my family members and miss them very much.

17. Do you think sexual life is important for seafarers when working on the ship? Do you think sexual abstinence can lead some problems?

A: I totally agree with this. Sexual life is very important for seafarers.

18. What kind of methods do you think can solve the sexual abstinence issues for seafarers?

A: I think that reducing the service duration of the seafarers on board can solve this issue. Meanwhile, more shore leave opportunities are needed to distract our attention on sexual abstinence. Probably, the shore leave was the happiest time while I was working on board.

### **Interview Transcript 3**

1. What is your age?

A: 28

2. How long have you been working as a seafarer?

A: Around 4 years

3. What is your current position?

A: Third engineer

4. When was your last shipping experience?

A: January 2019. It lasted around 6 months.

5. On which types of ships have you ever sailed?

A: Oil tanker

6. On which flag have you ever sailed?

A: China

7. What was the nationality of the crew on the ships that you have ever sailed?

A: All of them are Chinese

8. Are you working for a manning agency or hired by a shipping company?

A: I am hired by a shipping company

9. How many months are your contracts on board ships?

A: 6 months – 10 months

10. Can you estimate how many hours of work you are doing per day?

A: Around 8 hours per day. Sometimes, I need to work overtime

11. Do you think the manning level is sufficient or should be increased?

A: It is sufficient. However, I think a doctor is needed on board.

12. What are the main challenges for seafarers when at sea? You may describe the challenges in the areas of work and living on board.

A: Seafarers are easy to suffer fatigue on board. The working environment on the ship is extremely bad. In addition, the seafarers sometimes will be requested to conduct some work that does not conform to the rules and requirements. The ship owner always has higher requirements but the support is quite limited. For example, the ship owner cannot provide the material and back up parts on time. When dealing with the PSC check, political factors sometimes will influence the result. This is out of the control of the seafarers. The contract period is too long. It is difficult to do the shifting. The payment is low. Meanwhile, the chef on board sometimes is not professional. The food is not tasty. Seafarers are from different places. They have different values and background. To work with people from different places is also challenging.

13. Compared to shore life, what do you miss the most?

A: The life on shore is colorful. There are many activities that I miss. I would like to dine together with my friends, to play the computer games with my friends and to watch the movies. I think there is lack of material life and intellectual life on board.

14. Could you please describe your overall feelings for being a seafarer?

A: I think that the seafarer is a noble job with high responsibilities. The seafarers actually sacrificed themselves to make great contribution to the world. I developed the character of hard working and persistence through this job. However, the seafarer does not have good career path. The work is boring and dangerous, and does not receive recognition from the society. The payment is too low.

15. Could you please compare your feelings when you just board the ship and when

you work on the ship for a certain period?

A: I think that I can earn a lot of money when I just board the ship. So, I am quite motivated. However, I do feel extremely tired when I get off from the ship. I would like to travel and buy the things I like when I get off the ship.

16. Why do you have such changes on feelings?

A: It is very difficult to deal with the personal relationship on board. Also, the food is not healthy and the work is with high pressure. I feel suffered and fatigue. When facing the PSC check, I have high psychological stress. I do not like to face the machine every day.

17. Do you think sexual life is important for seafarers when working on the ship? Do you think sexual abstinence can lead some problems?

A: I totally agree with this. Sexual life is the basic needs for people. If a person has no sexual life for a long time, it can cause serious psychological problem. Lack of the sexual life on board makes me feel very uncomfortable.

18. What kind of methods do you think can solve the sexual abstinence issues for seafarers?

A: Reduce the contact period. More entertainment facilities should be provided on board.

## **Interview Transcript 4**

1. What is your age?

A: 35

2. How long have you been working as a seafarer?

A: Around 14 years

3. What is your current position?

A: Second engineer

4. When was your last shipping experience?

A: May 2020.

5. On which types of ships have you ever sailed?

A: Oil tanker

6. On which flag have you ever sailed?

A: China

7. What was the nationality of the crew on the ships that you have ever sailed?

A: All of them are Chinese

8. Are you working for a manning agency or hired by a shipping company?

A: I am hired by a manning agency

9. How many months are your contracts on board ships?

A: 6 months – 10 months

10. Can you estimate how many hours of work you are doing per day?

A: Around 8 hours per day. If the condition of the ship is not that good, I need to work overtime sometimes.

11. Do you think the manning level is sufficient or should be increased?

A: It is not sufficient at all. More people are needed in the engine room. There are some unnecessary positions on the ship. For example, the political commissar on my ship is not necessary and should be eliminated.

12. What are the main challenges for seafarers when at sea? You may describe the challenges in the areas of work and living on board.

A: The life is very boring on the ship. Every day is the same. There is no life actually. I really feel suffered. I felt that I was isolated from my family when working on the ship. I do not know how to communicate with my family and friends. In addition, I cannot see my career development on the ship. The food on the ship is awful. I think the food is all expired.

13. Compared to shore life, what do you miss the most?

A: I miss my family.

14. Could you please describe your overall feelings for being a seafarer?

A: I do not work as a seafarer any more. I started to hate this job from my first day on the ship.

15. Could you please compare your feelings when you just board the ship and when you work on the ship for a certain period?

A: I feel annoying when I receive the call from the company asking me to board the ship. People who work in the engine room look much older than the other people who work on the land. When I am working on the ship, I just want to finish the contract as soon as possible.

16. Why do you have such changes on feelings?

A: I really feel stressful when working on the ship. Sometimes, I even cannot fall asleep. There are too many things that I need to worry about, for example, the machine, the safety issues and the interpersonal relationship.

17. Do you think sexual life is important for seafarers when working on the ship? Do you think sexual abstinence can lead some problems?

A: Yes. However, I have no time to think about it. The life is really suffering on the ship. I only hope that I can be healthy when I am working on the ship.

18. What kind of methods do you think can solve the sexual abstinence issues for seafarers?

A: Reducing the contact period. It is better to reduce the contract period to 3-4 months. Also, try to extend the holiday period.

## **Interview Transcript 5**

1. What is your age?

A: 34

2. How long have you been working as a seafarer?

A: Around 11 years

3. What is your current position?

A: First engineer

4. When was your last shipping experience?

A: October 2020.

5. On which types of ships have you ever sailed?

A: LNG

6. On which flag have you ever sailed?

A: Hong Kong (China)

7. What was the nationality of the crew on the ships that you have ever sailed?

A: Chinese, British, Polish, Romanian, Croatian, Latvian and Philippine

8. Are you working for a manning agency or hired by a shipping company?

A: I am hired by a shipping company

9. How many months are your contracts on board ships?

A: 9 months – 10 months

10. Can you estimate how many hours of work you are doing per day?



A: Around 8 hours per day.

11. Do you think the manning level is sufficient or should be increased?

A: I think it is sufficient. However, I think a head equipment operator is needed.

12. What are the main challenges for seafarers when at sea? You may describe the challenges in the areas of work and living on board.

A: The life is too boring on the ship and every day is the same. There is no communication with family and friends. Also, there is no sexual life.

13. Compared to shore life, what do you miss the most?

A: I miss my family. Also, I do need the sexual life

14. Could you please describe your overall feelings for being a seafarer?

A: The high payment strongly motivates me to work as a seafarer. I also would like to be promoted to the chief engineer. Then, I can have a strong sense of achievement. However, I do feel that the seafarer is suffering high pressure on the ship. The holiday time on shore is not sufficient. I do need more time to stay with my family. Also, the time for taking the holiday is unpredictable. Sometime, I do need to work longer on the ship than my contract period. I really hate about this. In addition, the company tries to cut the operation cost, which makes the seafarers suffer more pressure.

15. Could you please compare your feelings when you just board the ship and when you work on the ship for a certain period?

A: I feel great when I just board the ship. If the equipment maintains good condition and there is no special situation, I can always keep a normal mental state. I always think positive. However, I do feel that my health condition become worse when I work for a while on the ship. This is because that the food on the ship is not healthy at all. I think we do need some healthy food on the ship. More sports facilities are also needed, so we can maintain the healthy condition through more exercise.

16. Why do you have such changes on feelings?

A: I think it is because of the working environment and the unhealthy life on the ship.

17. Do you think sexual life is important for seafarers when working on the ship? Do you think sexual abstinence can lead some problems?

A: Yes. I think everyone needs proper sexual life. I will feel tired and depressed if I cannot have the sexual life for a long time

18. What kind of methods do you think can solve the sexual abstinence issues for seafarers?

A: Reducing the contact period. Also, more entertainment facilities are needed on board. This can make the life on board more interesting. The seafarers should have good communication with each other and try to have group entertainment activities together. Therefore, the seafarer will not feel lonely. Moreover, shore leave opportunities are important. This is really valuable for the seafarer to relax.

## **Appendix II Online-survey Questionnaire**

### **Part I: Screening Questions:**

1. Are you a Chinese and at least 18 years old?
  - A. Yes
  - B. No (Stop survey)
  
2. Are you a seafarer now (including the service attendant on the ocean cruise)?
  - A. Yes
  - B. No (Stop survey)
  
3. Your gender?
  - A. Male
  - B. Female (Stop survey)

### **Part II: Job and Company Characteristics**

4. During the last three years (not including the pandemic period), what is your average working time on the ship every year?
  - A. Less than six months
  - B. Six months or more but less than nine months
  - C. Nine months or more
  
5. During the last three years (not including the pandemic period), what is your longest single working period on the ship?
  - A. Less than six months
  - B. Six months or more but less than nine months
  - C. Nine months or more

6. During the last three years (not including the pandemic period), which of the following statement best describes your situation?
- A. I am working in a state-owned company as a seafarer
  - B. I am working in a private-owned company as a seafarer, and the headquarter of the company locates in China.
  - C. I am working in a foreign company as a seafarer and the headquarter of the company locates out of China
  - D. I am a freelance seafarer. I work on the ship through an agency.
7. During the last three years (not including the pandemic period), which of the following statement best describes your situation?
- A. I normally work on the ship that all of the seafarers are Chinese
  - B. I normally work on the ship that seafarers come from different countries
8. During the last three years, have you ever worked with female seafarers on the ship?
- A. Yes
  - B. No
9. During the last three years (not including the pandemic period), which of the following statement best describes your situation?
- A. I work on a container ship
  - B. I work on a bulk ship
  - C. I work on an oil tanker
  - D. I work on a LNG or LNP ship
  - E. I work on an ocean cruise (for leisure or passenger transport purpose) or other types of ocean ship.
10. During the last three years (not including the pandemic period), which of the following statement best describes your situation when you were working on the

ship?

- A. I could get three or more shore leave opportunities per month on average.
  - B. I could get one or two shore leave opportunities per month on average.
  - C. I could get one or two shore leave opportunities every three months on average.
  - D. I could get one or two shore leave opportunities every six months on average.
  - E. I could hardly get any shore leave opportunity.
11. During the last three years (not including the pandemic period), which of the following statement best describes your situation?
- A. My company requests me to work on the ship for at least three months or below each single time.
  - B. My company requests me to work on the ship for at least six months each single time.
  - C. My company requests me to work on the ship for at least nine months each single time.
  - D. My company does not have any requirement for the work duration on the ship each single time or I can decide the work duration by myself.
12. During the last three years (not including the pandemic period), which of the following statement best describes your situation?
- A. My company requests that I can maximally have two months or less holiday, then I have to work on the ship again.
  - B. My company requests that I can maximally have three months holiday, then I have to work on the ship again.
  - C. My company requests that I could maximally have four months holiday, then I have to work on the ship again.
  - D. My company requested that I could maximally have five months or above holiday, then I have to work on the ship again.
  - E. My company does not have any requirement or I can decide when to work on the ship again by myself.

13. How long have you worked as a seafarer?

- A. Less than three years
- B. Three years or more but less than six years
- C. Six years or more but less than nine years
- D. Nine years or more but less than 12 years
- E. 12 years or more but less than 15 years
- F. 15 years or more

14. What is your current position level?

- A. Management level (including captain, chief engineer, first officer and first engineer)
- B. Operating level (including second officer, third officer, second engineer and third engineer)
- C. Supporting level (including chef, sailor, equipment operator and attendant)

15. Where do you normally work on the ship?

- A. Deck
- B. Engine room
- C. Kitchen or other supporting areas (such as canteen, storage room or cabin)

16. What is your average monthly income when you are working on the ship?

- A. Below 10,000 RMB
- B. 10,000 RMB or above but less than 20,000 RMB
- C. 20,000 RMB or above but less than 30,000 RMB
- D. 30,000 RMB or above

### **Part III: Job Satisfaction**

17. Please evaluate your level of agreement on the following statement based on your attitude towards the seafarer job. (1= Strongly disagree ... 3=Neutral...5=Strongly

agree)

- 17a. The payment of seafarer is better than the payment of the other jobs.
- 17b. My co-workers on the ship are friendly.
- 17c. I can receive professional supervision when I am working on the ship.
- 17d. The working environment on the ship is good.
- 17e. The living environment on the ship is good.
- 17f. Seafarer is a respected job.
- 17g. Seafarer is a job with good promotion opportunity.
- 17h. Seafarer is a job with great responsibility
- 17i. The work on the ship is simple and easy.
- 17j. I can only work as a seafarer based on my ability.
- 17k. Working as a seafarer is my own choice.
- 17l. My family feel proud of me because I am a seafarer.
- 17m. Working as a seafarer is very stressful
- 17n. Overall, I am satisfied with my job as a seafarer.

#### **Part IV: Sexual Abstinence Attitude**

18. Please evaluate your level of agreement on the following statement based on your attitude towards sexual abstinence. (1= Strongly disagree ... 3=Neutral...5=Strongly agree)
- 18a. I get used to sexual abstinence when I am working on the ship.
  - 18b. Sexual abstinence on the ship violates the basic needs of seafarers.
  - 18c. Sexual abstinence on the ship is normal and is associated with the job requirements of seafarers.

#### **Part V: Sexual Abstinence and Psychological Health Issues**

19. Please evaluate your level of agreement on the following changes of your emotions and feelings after you suffer a certain period of sexual abstinence on the

ship. (1= Strongly disagree ... 3=Neutral...5=Strongly agree)

19a. I feel anxious.

19b. I cannot control my temper.

19c. I feel depressed.

19d. I feel homesick.

19e. I feel lonely.

19f. I feel that there is no hope for the future

19g. I feel sad.

19h. I cannot sleep well.

19i. I feel painful on my body.

19j. I feel agitated.

19k. I become suspicious.

19l. I become pessimistic.

19m. I start to have the thought of suicide.

19n. Overall, I notice that I start to have psychological health issues.

## **Part VI: Sexual Abstinence and Inappropriate Behaviors on the Ship**

20. Please evaluate your level of agreement on the following statement after you suffer a certain period of sexual abstinence on the ship.

20a. I do not want to communicate with my co-workers.

20b. I do not want to communicate with my family members.

20c. I start to have the impulse to fight with the other people on the ship.

20d. I start to have the impulse to curse the other people on the ship.

20e. I become more likely to argue with the other people on the ship.

20f. I start to have the behavior of self-harm

20g. Overall, I notice that I start to have some improper behaviors on the ship.



## **Part VII: Sexual Abstinence and Work Performance**

21. Please evaluate your level of agreement on the following statement after you suffer a certain period of sexual abstinence on the ship. (1= Strongly disagree ... 3=Neutral...5=Strongly agree)
- 21a. I am more easily to feel tired even though I have got enough rest.
- 21b. I am more likely to lose my attention when I am on duty.
- 21c. I am more likely to misunderstand the order from my supervisor.
- 21d. I am more likely to have errors or even incidents during my work.
- 21e. I cannot cooperate with my colleague very well at work.
- 21f. I cannot work efficiently and may have more delays
- 21g. Overall, I noticed that I start to have worse work performance.

## **Part VIII: Sexual Abstinence and Risk Sexual Behaviors**

22. Have you ever had the commercial sex activity at port of calls in order to satisfy your sexual need?
- A. Yes
- B. No
- C. I do not want to say
23. Please evaluate your level of agreement on the following statement based on your attitude towards commercial sex activity. (1= Strongly disagree ... 3=Neutral...5=Strongly agree)
- 23a. Having commercial sex activity at port of calls is an effective way to satisfy the sexual need of seafarers.
- 23b. It is common for seafarers to have commercial sex activity at the ports of call.
- 23c. Seafarers should be understood or forgiven when having the commercial sex activity at the ports of call.
- 23d. Having commercial sex activity has the risk of sexual transmitted infections.

23e. I will not get sexual transmitted infections when having the commercial sex activity at port of calls as long as I wear a condom.

### **Part IX: Facilities and Company Support**

24. Please indicate that whether your company provides the following facilities or support to seafarers? (Yes / No)

24a. My company provides sex-related education to seafarers.

24b. My company provides various entertainment facilities to seafarers on board.

24c. My company provides high-quality internet connection facility to seafarers on board.

24d. My company provides psychological consultation to seafarers on board.

24e. My company provides high standard meals to seafarers on board.

24f. My company provides comfortable living environment to seafarers on board.

### **Part X: Seafarers' Perception on the Methods for Overcoming Sexual Abstinence**

25. Please evaluate your level of agreement on the following statement based on your attitude. (1= Strongly disagree ... 3=Neutral...5=Strongly agree)

25a. Appropriate sex-related education is important for seafarers

25b. Appropriate psychological consultation is important for seafarers when suffering sexual abstinence.

25c. Appropriate entertainment facilities on board can reduce the negative influence caused by sexual abstinence.

25d. Keeping connected with family members and friends can reduce the negative influence caused by sexual abstinence.

25e. Reducing the length of single contract period for seafarers on board can reduce the negative influence caused by sexual abstinence.

25f. Frequently visiting port of calls and having more shore leave opportunities can reduce the negative influence caused by sexual abstinence.

25g. Friendly co-workers on the ship can reduce the negative influence caused by sexual abstinence.

25h. High quality of meals on the ship can reduce the negative influence caused by sexual abstinence.

25i. Good working and living conditions on the ship can reduce the negative influence caused by sexual abstinence.

### **Part XI: Basic Demographic Information**

26. Age

A. 18-30

B. 31-40

C. 41-50

D. 51-60

27. What is your education level?

A. High School or below or Technical Education

B. Diploma

C. Undergraduate or above

28. What is your marriage status?

A. Single

B. Married

C. Devoiced or Widowed