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Correlation of Physical Fitness Factors, Body Mass Index, and Time Spent in Physical Activity of AIMS Maritime Students: Basis in the Preparation of Agile and Resilient Cadets Onboard

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Abstract

This research aims to assess the current physical fitness status of maritime students and develop strategies to prepare them before their onboarding on international and local vessels. Physical conditioning is identified as the dependent variable, reflecting the general physical functioning and fitness of the respondents. The research hypothesizes that physical activity and BMI also play a significant role in predicting physical conditioning. A total of 212 respondents from the marine transportation and marine engineering programs were included in the study, predominantly male students aged 19-21, classified under the "lower middle-income" socioeconomic category. The results indicate that the respondents perceive themselves as having good muscular condition, flexibility, and body composition. The study reveals positive associations between muscular flexibility and condition, muscular flexibility and physical conditioning, and body composition and physical conditioning. Multiple regression analyses identified muscle flexibility, muscular condition, body composition, BMI, and time spent on physical activity as significant predictors of physical conditioning. Notably, small decreases in body composition and time spent on physical activity were associated with increased physical conditioning, emphasizing the importance of improving these variables to enhance physical health. In conclusion, this research provides insights into the physical fitness status of maritime students and identifies factors influencing their physical conditioning. The study highlights the contributions of muscular flexibility, muscular condition, body composition, physical activity, and BMI in maintaining good physical health among maritime students.

Keywords: Physical Conditioning, BMI, Muscular Flexibility, Muscular Condition, Muscle Flexibility

1. Introduction. It has been established in the existing literature that physical fitness plays a crucial role in many aspects of our lives. This is particularly true in the case of seafarers. Several studies have noted that accidents, injuries, and health concerns are prevalent onboard (Xu, T., Liu, X., & Hu, S. 2020; Carter, T., 2005; Guitton, M. J.,2015). From a study reported by the Center for Maritime Safety and Health Studies

(2019), it was confirmed that aside from the high prevalence of health-related issues, mortality rates are significantly higher onboard compared to jobs at shore.

In terms of the incidence rates Sagaro et al. (2021), stated that ratings and cadets had significantly higher rates of reported gastrointestinal, musculoskeletal, and dermatological disorders compared with officers. Partly, these health concerns can be attributed to sedentary lifestyle. Studies have demonstrated that physical inactivity is associated with the presence of several non-communicable diseases (Haskell et al. 2007). In a study conducted by Rębacz-Maron (2015), it was noted that students at a certain maritime university demonstrated a sustained increase in body height, mass, hip size, and visceral fatness since 1969-2007. Hypothetically, this can be attributed to the use of gadgets that is sustainably dominating the lives of many adolescents and young adults up to the present.

To mitigate the risks associated with sedentary lifestyle, AIMS devised ways to ensure that students are healthy enough prior to ship onboarding. Upon resumption of face-to-face classes, physical education courses are subsequently offered to ensure that students are in good shape once they applied for onboard training. Although the PE courses are already in place, evaluations on the physical education courses are only confined with the actual compliance of the activities on the program. Their compliance is not concurrently validated with actual parameters of health. Aside from that, PE courses for maritime students are not similar to other PE courses. Foundational PE courses such as PE 1 and 2 are aimed in developing students' swimming skills. Although swimming has physical benefits, it can be argued that the benefits reaped by other students enrolled in other programs are not the same for maritime students. Also, as per review of the course specifications, promotion of physical wellness was never mentioned in the course specifications. Therefore, a program that promotes the physical wellness of students shall be put in place. To ensure that this program would be effective, data on physical fitness and physical activity are paramount for a differentiated training program depending on student's state of physical fitness.

In terms of the actual gap in literature, the literature and studies published in research databases have exhaustively explored the influence of physical activity on the Physical health of general populations. Upon review of literature, the researchers have observed that there is a dearth in research studies that are focused in determining the physical conditioning of general populations in combination with other factors of physical fitness. Other than that, the researchers have also observed that research papers for maritime are mostly focused on health concerns onboard, little research has been done assessing the physical fitness of maritime students prior to their ship onboarding in the Philippines. The study aims to determine the physical fitness of AIMS Maritime students as well as their engagement in physical activities.

Literature Review. Body Mass and Physical Health. Body mass index (BMI) is typically used to categorize people as underweight, normal weight, overweight or obese. BMI has been widely investigated to understand its relationship with physical health, particularly muscle strength, endurance, physical function, and mortality.

BMI and muscle strength. Simbolon and Firdausi (2019) discovered a significant relationship between BMI and leg power, speed, and the strength and endurance of the arm muscles. According to Guler et al. (2020), people with normal BMI levels performed better on physical fitness tests than people with higher BMI values. In contrast, obesity reduced mobility abilities among its victims.

BMI and physical function. According to Charlton et al. (2015), lean body mass is a strong predictor of upper body strength, while higher body fat percentage and lower physical activity are linked to poorer outcomes on tests of lower extremity performance. Moreover, lean mass is the primary factor that

determines cardiorespiratory fitness, regardless of sex, age, and magnitude of obesity (Yanek et al., 2015). On the other hand, higher BMI and body fat percentage were linked to poor physical function while appendicular lean mass percentage was linked with better physical function (Kim et al. (2017). A study done by Reinders et al. (2015) found that obese men had the highest risk of physical function deterioration. Conversely, overweight and obese women who lost the most weight had the greatest risk of lean mass loss. The weight at which a person enters old age is informative for predicting loss in lean mass and physical function, illustrating the importance of monitoring weight.

BMI and mortality. According to Flicker et al. (2010), participants who were overweight had the lowest death risk. On the other hand, those who were overweight had a 13% lower death risk than those who were of normal weight. Participants who were obese and normal weight had comparable risk of mortality. Sedentary behavior raised mortality risk by 28% for men and 100% for women across all BMI levels.

BMI and physical fitness. There are also numerous studies that showed the relationship between BMI and physical fitness. One study found that there is a high prevalence of low or poor fitness among obese patients (Srivastava et al., 2013). Furthermore, it was discovered that BMI is significantly related to the chosen physical fitness indices (efficiency fitness index).

Another study indicated that a person's fitness is significantly influenced by having a body with a natural high muscle-to-fat ratio (Chandel et al., 2017). The results suggest that body composition significantly influence physical fitness. Women with normal BMI had better values in all tests than overweight women (Vaquero-Cristóbal et al., 2013). The flamenco test and 8-foot up-and-go test revealed significant differences.

The studies reviewed demonstrate that BMI has a major impact on physical health. High BMI values are linked to low levels of muscle strength, physical function, and physical fitness. Individuals with normal BMI values are associated with better physical fitness. While that is the case, the studies also found that overweight individuals have a lower risk of mortality than normal-weight and obese individuals. Therefore, to prevent obesity, it is important to go through physical activity programs that meet the rules of physical fitness and monitor weight to maintain good physical function during old age. Even among high-risk overweight and obese people, adding lean mass can enhance fitness.

Physical Activity and Health. Physical activity has shown to have a significant impact on physical health, especially when it comes to body composition, strength, endurance, and overall physical function. There is a lot of in-depth research studies that explored the relationship between physical activity, body mass index, and physical health.

Simbolon and Firdausi (2019) looked into the correlation between BMI and indicators of physical fitness, including leg and arm muscle strength and speed. According to the study, there was a direct relationship between BMI and leg power and speed as well as arm strength and endurance. The findings imply that physical activity programs that follow physical fitness recommendations help avoid overweight and obesity.

In another study, Charlton et al. (2015) examined the predictors of upper and lower extremity strength in older adults. Lean body mass was found to be a powerful predictor of upper body strength, while higher body fat percentage and lower physical activity were linked to poorer outcomes on tests of lower extremity performance.

Flicker et al. (2010) looked at the mortality risk connected to BMI and physical activity. According to the study, individuals who were overweight had the lowest death risk, while women across all BMIs who

were sedentary had mortality risks that were twice as high. The findings suggest that physical activity can lower mortality risk, particularly for women.

Guler et al. (2020) investigated the connection between BMI and physical fitness in young adults. In the stuy, they found that those with normal BMI values had the highest physical fitness test scores, while obese people had decreased movement skills as a result of weight gain.

Another study looked at the impact of weight loss on physical function in overweight and obese individuals and found that obese men had the highest risk of physical function deterioration (Reinders et al., 2015). On the other hand, overweight and obese women who shed the most weight had the greatest risk of losing lean mass. The results suggest that tracking lean mass and weight is crucial for predicting physical function in older adults.

A study exploring the relationship between lean, mass, obesity, and cardiorespiratory fitness in African Americans found that lean mass was the key determinant of cardiorespiratory fitness, independent of sex, age, and magnitude of obesity (Yanek et al., 2015). The results suggest that, even in high-risk overweight and obese individuals, interventions that enhance lean mass may improve fitness.

In older individuals, higher BMI and percent body fat were associated with poor physical function, while percent appendicular lean mass was associated with better physical function (Kim et al., 2017). When it comes to gender, the study found no significant difference between the two variables.

A study done by Vaquero-Cristóbal et al. (2013) found that women with normal BMI performed better on physical fitness tests than overweight women, with significant differences found in the flamenco test and 8-foot up-and-go test.

Srivastava et al. (2013) explored the prevalence of low fitness among obese people and the correlation between physical fitness indicators and BMI. They discovered that there is a significant correlation between physical fitness indicators and BMI. Moreover, obese individuals are more prevalent to have low fitness. The results suggest that physical activity may enhance physical fitness among these individuals.

In conclusion, previous studies have highlighted the relationship between physical activity and physical health, and suggest that the two variables are closely related. Maintaining a healthy BMI and increasing physical activity levels can enhance muscular strength, endurance, power, and speed, while lowering the risk of becoming overweight and obese. Lean body mass is strongly correlated with upper body strength, while higher body fat percentage and lesser physical activity are associated with poorer outcomes on lower extremity performance tests.

Additionally, being sedentary greatly increases the mortality risk for both men and women, especially among people with a normal BMI. While losing weight is important for preventing physical function decline, the weight at which a person reaches old age is informative for predicting lean mass loss and physical function. Due to weight increase, obese people have decreased movement skills and obese men are at the highest risk of decline in physical function. While that is the case, overweight and obese women who lost the most weight were at the greatest risk of losing lean mass. Lean mass is the primary predictor of cardiorespiratory fitness, independent of sex, age, and magnitude of obesity, emphasizing the need for interventions that enhance lean mass to improve fitness among high-risk overweight and obese people. Overall, those who naturally have a higher muscle-to-fat ratio tend to be more fit. In order to maintain excellent physical health and prevent chronic illnesses, it is crucial to encourage physical exercise and have a healthy body composition.

Demographic Differences in Physical Activity. Physical activity is an important part of a healthy lifestyle since it helps prevent chronic diseases, lowers stress and anxiety, and improves physical fitness. However, physical activity levels differ in demographic factors, including age, gender, socioeconomic status (SES), and geography. The findings of several studies that explore these differences are discussed in this literature review.

Age. A study done by Pisciottano et al. (2014) found that age has a detrimental effect on strength and physical performance. According to what they discovered, lower limb muscle strength was positively correlated with physical ability tests. This suggests that muscle strength should be prioritized for healthy aging. Only 11% of older men reach the recommended levels of physical activity, and participation decreases as men age (Health Canada, 2016).

Gender. Women demonstrated a greater BMI trend than males, according to a research done by Bhurosy & Jeewon from 2014. They are reported to have considerably less physical activity than men do (DeWolfe et al., 2020), which suggests that anxiety sensitivity contributes to gender disparities in physical activity. They also used fewer mobile devices and felt less motivated to use them, which resulted in lower levels of physical activity (WhiteHead et al., 2017).

Socioeconomic Status. A study explored the connection between SES and physical activity among adolescents. Stalsberg and Pedersen (2010) discovered that those with higher SES were more physically active than those with lower SES. According to Eime et al. (2015), engagement rates in physical activity rose with greater SES and fell with increasing distance.

Geography. McPhee et al. (2016) revealed that the vast majority of older adults in the United Kingdom do not reach the minimum amount of physical activity required to maintain health, and sedentary lifestyles in older age contribute to the early onset of illness, disease, and frailty. According to Krug et al. (2013), one-third of the adult population is concerned with getting enough physical activity, and one-fourth routinely engages in sports for at least 2 hours each week.

In conclusion, there are demographic differences in levels of physical activity among different age groups, genders, socioeconomic statuses, and geographic locations. These findings suggest that specialized interventions are required to support physical activity and healthy lifestyles among specific demographics. Prioritizing muscular strength is crucial for promoting healthy aging and addressing older individuals' inactive lifestyles. However, more studies are required to further understand these variations and create efficient strategies for boosting physical activity participation.

Demographic Differences in Health. Physical health is a vital component of individual and societal well-being. The physical health of different demographic groups varies widely. The current review of the literature looks at a number of research that analyze the disparities in physical health between various demographic groups. These studies offer insightful information on the variables that affect physical health outcomes in various groups.

In Sweden, Josefsson et al. (2016) studied self-rated health among older adults. The researchers found that self-rated health was generally good among this population, especially among those who were 65 to 79 years old. However, women had a tendency to assess their health worse than men, particularly among those between the ages of 65 and 79. This shows that gender differences may affect how people perceive their physical health.

Jaul and Barron (2017) emphasized the age-related natural decline in physical health. They mentioned that a decline in the immune system as well as hearing and vision loss are prevalent among older adults.

Chronic conditions such as cardiovascular disease, osteoporosis, and dementia are also more common among older adults. As the population ages and gets heavier, it is projected that the prevalence of osteoarthritis, diabetes, and related mobility disabilities would rise.

Hardoff (2013) looked into how media might affect teenagers' health issues. According to the study's findings, even though media is not the primary cause of any significant health issue, it plays a significant role in a number of adolescent health issues, such as aggressive behavior, sexual activity, drug use, obesity, sleep disorders, eating disorders, depression, suicide, and self-harm.

A study done by Ko et al. (2019) looked at how gender affected results for mental health. According to the study, men were more likely to express suicide thoughts as well as feelings of melancholy and loneliness. Women reported poorer ratings for quality of life, social support, and cognitive function. These findings show that there are differences in mental health outcomes depending on gender.

Moreover, both men and women's dietary and physical activity habits were significantly influenced by their personal values, body weight, and food safety concerns (Worsley et al., 2013). However, the way that these issues affected these relationships varied significantly between genders.

Wu et al. (2016) investigated gender disparities in teenagers' health risk behaviors and discovered that men are more prone to start arguments, drink alcohol, and engage in physical exercise than women. The latter were more prone to use harmful weight loss methods including laxative use and fasting.

When exploring the relationship between socioeconomic status (SES) and cardiovascular disease, Psaltopoulou et al. (2017) found that there is a gradient in the incidence, morbidity, and mortality of cardiovascular disease over the whole range of SES, which is determined by one's degree of education, line of work, or income.

Irala-Estevez (2000) discovered differences in food consumption between men and women after reviewing data from 11 European research. They revealed that among men in the highest and lowest SES groups, there was a difference in fruit intake of 24.3 gr/day/person. When it comes to women, the difference was much more noticeable.

Mejean et al. (2013) looked at how socioeconomic status affected food choices and way of life, as well as its relation to coronary heart disease and stroke in the Netherlands. Inequalities in these illnesses were found to be substantially explained by the socioeconomic distribution of food, smoking, and alcohol usage. These suggest that changing food and lifestyle choices among lower socioeconomic groups is crucial for enhancing population health.

When it comes to the association between type 2 diabetes and life expectancy at various socioeconomic status levels, type 2 diabetes is linked to a shorter life span (Walker et al., 2018).In conclusion, past literature shows that there are differences in physical health amongst demographic groups. These variations are influenced by different factors including age, gender, socioeconomic position, and lifestyle choices.

Reported Health Concerns Onboard. The long hours, restricted access to healthcare, isolation, and weariness that seafarers are subjected to while working on board can have a substantial negative influence on their health. This literature review covers the health issues onboard by looking at and summarizing the results of several studies.

Fatigue and Chronic Diseases.According to Jepsen et al. (2015), there are several risks associated with working at sea for tiredness, which raises the risk of chronic illnesses that are more common in seafarers. The authors outlined how exhaustion affects the autonomic, immunologic, and metabolic pathways that

contribute to the emergence of chronic illnesses in addition to impairing cognition and increasing the risk of accidents.

Cardiovascular Diseases. Several studies have looked into the prevalence of cardiovascular diseases among seafarers. Male seafarers under the age of 46 who had worked on various types of vessels had an increased death rate from cardiovascular disease (Eriksson et al., 2020). Moreover, working more hours and being older were independent predictors for at least two clusters of self-reported modifiable CVD risk factors (Sagaro et al., 2021),. According to Pougnet et al. (2013), the prevalence of hypertension among seafarers ranged from 8.2 to 49.7%, while the groups under study had hypercholesterolemia to varying degrees (25.1–42%).

Jepsen et al. (2016), then, demonstrated a rate of 24.2% with Metabolic Syndrome (MS) in Danish seafarers. In a 2-year follow-up of the same sample, this figure increased to 26.5% despite an intervention based on advice on healthy lifestyle.

Overweight and Obesity. Baygi et al. (2017) stated that the prevalence of overweight rose dramatically from 46.7% to 60.9%, while the prevalence of obesity did not change significantly throughout the study period. According to Nittari et al. (2019), approximately 40% of the subjects they looked at were overweight, and more than 10% of them were obese. Compared to the overall population of the same ethnicity, seafarers demonstrated an increased propensity for overweight and obesity. Only 0.2% of Greek mariners had significant obesity (Zakaria et al., 2018).

Other Health Concerns. Retnoningrum (2021) observed that longer working experience is correlated with dyslipidemia, while Pougnet et al. (2013) discovered that smoking prevalence among seafarers varied between 37.3 and 72.3%, and between 3.3 and 9.3% of the populations investigated suffered from diabetes. Numerous health issues, including exhaustion, chronic illnesses, cardiovascular diseases, overweight, obesity, smoking, and dyslipidemia, have been linked to sailors in the papers under consideration. According to the studies, sailors require access to a wide range of healthcare services, and to prevent and treat these health problems, efficient interventions must be put in place.

Methodology

Research Design. This study uses a multimethod research design. Specifically, a combination of comparative and correlational methods was used in this study. The comparative portion attempts to determine the differences of two groups using numerical data. According to Cantrell (2011) this is also appropriate in studies that involve the description of differences between groups without the use of any manipulation techniques in research. Comparative analyses were carried out to determine if there is a significant difference in their physical fitness scores if grouped based on their gender, socio-economic status, and program. Descriptive techniques were also used to present the physical fitness of the respondents on the aspect of muscle condition, physical conditioning, body composition, and muscular flexibility. Moreover, relationships and regression analysis were carried out in testing how does the independent variables predict the dependent variable of the study.

Population, Samples and Sampling Technique. In this research, 212 respondents were surveyed via google forms. The sample size was determined using Slovin's formula. They are 3rd year Marine Engineering and Marine Transportation Students of AIMS. They were chosen on the basis that these students need to be examined prior to their apprenticeship in international or local vessels.

Furthermore, simple random sampling was used in this research. This sampling method is a statistical technique in which everyone in the population has an equal chance of being selected as a research sample.

Research Instrument. In this research, a standardize questionnaire was used to yield a particular data:

1. **Perceived Physical Fitness Scale (PPFS).** This is a self-rated questionnaire developed by Abadie (1988) this aims to assess the respondents' perceived physical fitness. This questionnaire follows a 5-point Likert format (strongly agree, agree, undecided, agree, strongly disagree). It is composed of 12 statements that measure respondents' physical conditioning, flexibility, muscular strength/condition, and body composition. Scoring involves summation of the ratings endorsed by the respondents. Scores that fall below 12 suggest a low perception of one's fitness while scores beyond 12 suggest that perception of one's fitness is high. Its reliability was also measured in the study of Zamani et al. (2016) garnering a reliability coefficient of 0.97. This instrument has been widely used in determining perceived physical fitness since the date of creation. Several studies were published using this instrument. It was correlated with different variables such as body image, personality traits and physical activity (Abadie, 1988; Delignieres,1996; Zamani et al., 2016; Boroujeni et al., 2022) The utilization of this questionnaire shedded light on the determination of respondents' physical fitness. Prior to the actual data gathering, a pilot testing of the instrument was conducted. This was participated by 63 maritime students from the marine transportation department and marine engineering department of AIMS. Based on the reliability analysis, the instrument was found to be reliable with an Alpha Coefficient of 0.82. Moreover, the said students are advised not to participate in the actual data gathering.

   In terms of the variables that the researcher intends to measure, here are the following definition of the variables based on the items formulated by Abadie et al. (1988):

a. Muscular Condition - This refers to the self-rated capacity of the respondents to lift heavy objects with ease, perform daily activities, and describe their general muscle strength compared to their peers.

b. Body Composition - This refers to the respondents' description of their own bodies. Generally, this determines the respondents' perception of their weight and their need to either lose or gain weight.

c. Muscular Flexibility - This refers to the respondents' description of their general flexibility compared to their peers.

d. Physical Conditioning - This refers to the respondents' description of themselves in relation to their existing health condition and other manifestations of good health (e.g walking briskly for 20 minutes, doing exercise, etc.)

Data Records. The following records and documents are used to supply the additional data of the study:

1. **Body Mass Index.** This refers to the students' weight divided by their height. This is a measure that distinguishes individuals from underweight, healthy, overweight, and obese. This data is provided by the Health Services Unit of the institution. The acquisition of the said data helped the researcher in classifying students that are normal, overweight, and obese in terms of weight.
2. **Time Spent on Physical Activity.** This refers to the students self-reported number of hours spent in physical activity per week.

Data Gathering Procedure. Generally, respondents are given an electronic survey online. Respondents are initially asked to fill up a questionnaire about their personal information that formed part of the demographic variables of the study. After that, they are asked to fill out the questionnaire related to their physical activity and physical fitness. The data gathering was conducted for 2 weeks. The researchers as also full-time professors of the institution utilized their respective periods in disseminating the questionnaire. 10- 15 minutes were utilized by the respondents in answering the questionnaire. To ensure that ethical guidelines are not violated, the researcher ensures that the research protocols are carried out ethically by complying with the APA Ethical Guidelines for Research (2017).To ensure that the basic ethical policies of the institution are followed, it was ensured that the authors of this study are aligned in the topic. The authors are composed of a Marine Engineering Professor, Nurse, and a Psychology professional. Since this research is funded, the authors committed to full compliance of all research related documentation mandated by the CRID Office. In terms of accuracy of the data, the data borne out from this research is processed by the official statistician of the institution. For the evaluation, the CRID office selected reviewers that are aligned with the topic. These reviewers do not know the authors of this study during their review. In compliance with the APA Ethical guidelines, the researcher completed an informed consent form and data privacy consent form. Aside from these forms, the researcher conducted a brief orientation regarding their rights and obligations in participating in this study. A letter was also accomplished for the Center for Research and Institutional Development (CRID) and Registrar for permission in conducting the study. In terms of confidentiality, the researcher ensured that no traces of personal information were disclosed in the study. In the publication of this paper these data are not included. Furthermore, the researchers gave an option to respondents to withdraw for any reason when the respondent sees it fit.

Statistical Treatment and Analysis. Collected data are imported from Google forms and are cleaned and analyzed in SPSS v28. Furthermore, the following statistical methods are used in this study.

Descriptive Statistics. This technique is used in presenting the results for research question nos. 1-4. Generally, the frequency, percentage, weighted mean, and standard deviation are presented. This is to present the distribution of data based on the actual responses of the respondents.

Fisher's One Way ANOVA/T-Tests – These techniques are used to determine differences in physical fitness if grouped based on their program, gender, and socioeconomic class. To identify where these differences lie, Tukey HSD was used. This is a post hoc test that is considered conservative and flexible. It tries to eliminate type 1 error while maintaining its statistical power to detect differences among groups.

Multiple Correlation/ Regression – This technique was used in determining the relationship of the variables involved in the study. The said techniques was also used in determining if the identified independent variables are significant predictors of physical conditioning.

Results and Discussions

This research attempts to determine the current physical fitness state of the maritime students to devise strategies in preparing them prior to their onboarding on international and local vessels. With that the researcher determined the respondents' physical fitness based on the parameters of Abadie et al. (1988). Using the parameters of physical fitness of Abadie et al. (1988), the researchers hypothesized that muscular flexibility, body composition, and muscle condition are necessary for good physical

conditioning. The researchers also identified physical conditioning as its dependent variable since physical conditioning measures the respondents general physical functioning and current physical fitness. As cited, physical conditioning plays a crucial role in predicting musculoskeletal problems in the future (Wadsworth, L.T., 2007). Thus, determining the predictors of good physical conditioning may help in reducing these problems in the future. Considering the fact that, musculoskeletal health related concerns are prevalent on board (Sagaro et al., 2021). Moreover, as reviewed in the literature, physical activity plays a crucial role in predicting physical fitness of general populations. With that, the researchers have furthered the hypothesis by bringing into the equation variables such as physical activity and BMI in predicting the physical conditioning of the respondents.

This study utilized 212 respondents from the marine transportation and marine engineering program. Majority are males aged 19-21 and are classified under "lower middle income'' socioeconomic classification. Based on the results of the survey the respondents described themselves as having good muscular condition. This suggests that they can lift objects repeatedly with ease and they characterize themselves as more muscular than most individuals their age. They also reported that they don't tire easily. This is a good indicator of muscle condition. However, this is somehow expected, if their age is considered. From the studies of Degens, H., & Korhonen, M.T. (2012) they identified that aging is positively associated with increasing loss of muscle mass and force generating capacity. Thus, suggesting that muscle mobility is heavily affected if an individual increases in age. Moreover, in the research of McGregor et al. (2014) aging facilitates the decrease in muscle mass, muscle quality, metabolism, aerobic capacity, insulin resistance, fat infiltration, fibrosis and neural activation. Furthermore, the actual implications of good muscular condition was demonstrated by Ortega et al. (2012) the study suggested that good muscular condition at this stage is associated with a 20-35% lower risk of premature mortality. In terms of muscle flexibility, the respondents described themselves as very flexible individuals. This suggests that participants have no problems in extending their movements in a wide range of motion. Based on existing studies, muscle flexibility can be observed as a precursor in decreasing physical injuries (Behm, D.G et al., 2016) and enhance further one's muscular strength (Parmar et al., 2020). In terms of body composition, the respondents also described themselves as having good body composition. They don't describe themselves as overweight and they are reported to disagree that they need to lose weight. To put it simply, the result of the body composition component is a measure of the respondents' awareness of their need to be physically fit. In terms of physical conditioning, the respondents reported that they can walk briskly for 20 minutes with ease, they are in good physical condition, and they don't tire easily during exercise. This is an indicator of good physical health. Based on current studies, difficulty in walking for 20 minutes accompanied with gasping for air and tiredness is indicative of heart and lung problems (Vyas, V., & Goyal, A., 2020; Desai, D. S., & Hajouli, S., 2022). Therefore, it can be ruled out that the majority of the respondents have underlying heart and lung problems.

In terms of the relationship of the variables, the researchers identified significantly positive associations between muscular flexibility and muscular condition. This suggests that muscular flexibility and muscular condition are interrelated variables. This was supported in literature since existing studies have also proved that flexibility contributes to good muscle strength (Su, H et al., 2017). Muscular flexibility and physical conditioning are also positively associated with each other. This mirrors the existing findings stating that increasing flexibility enhances performance in physical activities (Opplert, J., & Babault, N., 2018). Other than that, muscular condition and body composition are observed to be positively associated with each other. While body composition is also positively associated with physical conditioning.

Based on the results of the multiple regression analyses, the independent variables identified in this study mainly: muscle flexibility, muscular condition, body composition, BMI, and time spent on physical activity significantly predicts the physical conditioning of the respondents. However, it is noteworthy that small decreases in body composition, and time spent on physical activity produced increases in physical conditioning. Thus, suggesting that a good score in body composition is not conclusive of a good body composition but an indicator of unawareness to one's physical health needs. The analysis identified the need to increase this variable to produce good outcomes in physical conditioning.

Overall, this research provided a general description of the physical fitness state of maritime students and highlighted the factors that influenced their physical conditioning. It emphasizes the contribution of muscular flexibility, muscular condition, body composition, physical activity, and BMI in maintaining good physical health among maritime students of AIMS.

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