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A Comparison of The Stress Levels Between Athlete and Non-Athlete First Year Medical Students of De La Salle Medical and Health Sciences Institute S.Y. 2018-2019

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Abstract

Medical students are predisposed to a high level of stress since the medical profession involves the lives and well-being of the people and is inherently demanding and stressful. To prevent this, specific means of reducing stress is necessary. Physical activities, such as sports, are acknowledged to have stress-reducing properties because of the increased released of endorphins, also known as the happy hormone. In relation, this study was conducted to compare the stress levels of the athlete and non-athlete first year medical students of De La Salle Medical and Health Sciences Institute (DLSMHSI). From first year medical students who are eligible to participate in the study, a total of 129 respondents, consisting of 86 non-athletes and 43 athletes, were chosen though a stratified random sampling. The Global Physical Activity Questionnaire (GPAQ), which utilizes metabolic equivalents (MET) in determining the level of physical activity, was used as a basis in classifying the first year students as an athlete or non-athlete [(9)]. Moreover, Perceived Stress Scale-14 (PSS-14) was used to determine the stress level of the respondents. In addition, the demographic profile of the respondents (i.e. age, sex, place of residence, religion, nationality) will also be recorded in the study as they can be considered confounders in the study. Utilizing Whitney-U Test,

Pearson Correlation, and Linear Regression, it was found that athlete first year medical students have lower stress levels compared to non- athletes. Hence, it was concluded that physical activity like sports has a protective property against stress.

Keywords: Physical Activity, Stress Levels, First Year Medical Students

Introduction

Stress is the state of mental or emotional strain resulting from adverse or many demanding circumstances. Emotionally and physiologically challenging experiences are also regarded as stress [(1)]. As the medical profession is mostly involved in the lives and well-being of people, and is inherently demanding and stressful, medical students are among the most distressed. The stress experienced by the medical students can be attributed to different factors. Sreedevi et al. (2015) explained that medical students underwent through a significant amount of strain due to a variety of reasons which include poor examination performance, trouble in understanding the subject matter, lack of appreciation to work done, shortage of time to study, competition against fellow students, and bulky content to be learned [(2)]. Aside from the academic-related stressors which contributes to the bulk of the stress, Gazzaz et al. (2018) also mentioned struggles in commute and uncertainties about the future as possible stressors [(3)]. It is due to the combination of these stressors that medical students are predisposed to stress.

A plethora of studies acknowledged that sports offered stress-reducing properties. Its effect involved the release of stress-related hormones like endorphins and cortisol. In doing sports, there is an increase of the levels of endorphin, which is also called the happy hormone, and a decrease of cortisol, also called the stress hormone, causing a decrease in the over-all stress levels of a person [(4)]. In a different study, Azizi (2011) compared the intensity of stress of athlete students and non-athlete students and pointed out that athletes reported a significant decrease in the levels of stress compared to non-athletes [(5)]. Thus, it can be assumed that sports can be a probable means for medical students in dealing with their stress.

Taking the findings of these studies in the context of the life of medical students, the investigators aimed to characterize the relationship of physical activities on the stress levels of this population. Specifically, this focuses on first year medical students as they are more predisposed to stress since they are still adjusting to their new environment. With the use Perceived Stress Scale (PSS), an easy-to-use questionnaire with established acceptable psychometric properties, this study compared the stress levels of the athletes and non-athletes. Should the study verify the relationship between stress levels and sports involvement, it can give insight to the institution to provide avenues for students to engage in physical activities for the reduction of their stress. Moreover, there is a lack of local resources, and the study would give insight to such variables in a Philippine setting. Thus, it was due to these circumstances that this study was conducted.

Figure 1 shows the concept from which this study was based upon. The paradigm shows by determining the stress levels of the athlete and non-athlete first year medical students and comparing them, the relationship between stress and sports involvement can be determined. This concept is based upon the study of Azizi (2011) where it was found that athletes reported a significant decrease in the levels of stress compared to non- athletes [(5)].

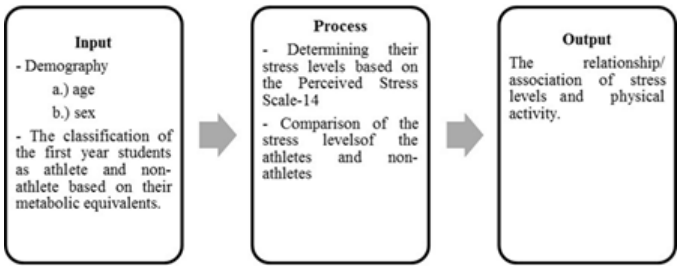

Figure 1: The Paradigm of the Study

Since the study is limited to the nature of cross-sectional study designs wherein the exposure and outcome are assessed simultaneously, there is no concrete evidence of a temporal relationship between the two variables.

Classification of the first years into athletes and non-athletes is solely based on the metabolic equivalents (METs) in minutes determined after letting the respondents answer the Global Physical Activity Questionnaire (GPAQ). Selection bias was prevented by stratified random selection of participants after identifying the athletes and non-athletes of the population. Moreover, stress levels in the study were based on the scores computed after the respondents answered the Perceived Stress Scale-14 (PSS-14) questionnaire.

General objective of this study is to determine if there is a significant difference between the stress levels of the athlete and non-athlete first year medical students of DLSMHSI S.Y. 2018-2019. Specific objectives of this study are to measure the stress levels of the first year medical student athletes and non-athletes of DLSMHSI S.Y. 2018-2019, and to compare the stress levels of the non-athlete respondents to the athlete respondents among first year medical students of DLSMHSI S.Y. 2018-2019. This study could serve as a basis in understanding the relationship of physical activities and stress not only among the first year medical students but also among all medical students in general. The result of this study can give insight to the institution and other medical schools to utilize physical activities as an intervention in improving the stress levels and overall mental health of the students. Moreover, findings and recommendations of this study can be a motivation for other researchers to pursue a variety of other studies regarding stress levels and physical activities. In relation, this study could be a source of bibliographical entries, reference materials, or be used for related literatures as needed.

Methodology

Research Design

The study dealt with the analysis of the relationship between physical activities and stress levels. A cross-sectional analytic study was used since both variables were assessed simultaneously. Pure quantitative method was also employed in this study since the study required quantification of the stress levels of the athlete and non-athlete respondents. Results were then compared to determine if the stress levels of athlete and non-athlete respondents have a significant difference. Physical activity was the independent variable (exposure) in the study, while stress level was the dependent variable (outcome). In relation, demographic factors like age, sex, religion, nationality, and residence were viewed as confounders in the study.

Site of the Study

The study was conducted in Auditorium 1 of the College of Medicine building of De La Salle Medical and Health Sciences Institute, City of Dasmariñas, Cavite, Philippines.

Inclusion and Exclusion Criteria of Respondents

To be eligible to participate in this study, one must be a regular first year medical student of DLSMHSI S.Y. 2018-2019, or first year medical students of DLSMHSI that have returned from a leave of absence but still

follow the subject sequence of the prescribed curriculum of S.Y 2018-2019. In addition, first year medical students which are minors (below 18) should have parental consent to participate in the study. And thus, irregular first year medical students of DLSMHSI S.Y. 2018-2019 and first year students below 18 with no parental consent were not included. Hence, from the list of the regular and irregular first year students obtained from the student council, only 304 were eligible to participate in the study.

Sampling

According to American Psychological Association, 62% are the estimated student athletes with reduced stress levels whereas 33% are the estimated student non-athletes with reduced stress levels. Using this literature, the sample size, with a ratio of 2:1 unexposed/exposed, was computed using OpenEpi online software at 95% confidence level and 80% power (Appendix A). Based on the results, a total of 117 respondents (78 non-athletes and 39 athletes) were chosen from the sample population. However, to account for possible dropouts, a buffer of 10% of the calculated sample size were added. Hence, a total of 129 respondents (86 non-athletes and 43 athletes) were chosen for the study.

Randomized stratified sampling method was used to select the respondents. Global Physical Activity Questionnaire (GPAQ) was done to classify the first year medical students into athletes and non-athletes. The researchers informed the respondents about the purpose and objective of the study. Respondents read and agreed to an informed consent (Appendix B) and were assured that participation was voluntary and their responses would be kept confidential. However, out of the 129 chosen respondents, only 122 participated in the final data collection of the study.

Data Gathering Tools

Two questionnaires were used in this study, the GPAQ or Global Physical Activity Questionnaire (Appendix B) and the survey questionnaire which included the demographics and the PSS-14 (Appendix C).

GPAQ is a 16-item questionnaire which classifies physical activity into low, moderate, and high based on the total metabolic equivalent (MET) minutes (Appendix B). It assessed physical activity in terms of the intensity (vigorous and moderate), duration (in minutes per day), and frequency (how many days a week). Total metabolic equivalent was obtained through summation of the MET minutes of each activity. MET minutes of each activity were obtained by multiplying the values for intensity, duration, and frequency. The value of intensity for vigorous activities were 8 and 4 for moderate activities.

The survey questionnaire was composed of two parts, the demographics and PSS- 14 (Appendix C). Included in the demographics were profile of the respondents in terms of age, sex, religion, residence, and nationality. Perceived Stress Scale-14 item (PSS-14) was developed by Cohen et al. (1983) [8]. It is an easy-to-use questionnaire with established psychometric properties that measures the types of stressful events perceived. It is a 14- item self-reported instrument with five-point scale (0=never, 1= almost never, 2=sometimes, 3=fairly often, 4= very often). PSS scores were obtained by reversing the scores on the seven positive items (e.g., 0=4, 1=3, 2=2, etc.) and then summed across all 14 items. Items 4,5,6,7,9,10 and 13 were the positively stated items.

Data Gathering Procedure

On the second semester of S.Y. 2018-2019, data was collected from the first year medical students. GPAQ was used as a preliminary test to classify the first year

medical students into athletes and non-athletes. The sole criterion to be classified as athlete or non-athlete was the metabolic equivalent (MET) minutes. Those who have at least 600 MET minutes were considered as athletes, while those who have not reached 600 MET minutes were classified as non-athletes.

A stratified sampling method was used to select the 86 non-athlete and 43 athlete first year medical students that were included in the study, but only 122 respondents participated. The levels of stress of the 122 respondents were measured using the Perceived Stress Scale-14 (PSS) which is a standardized and psychometrically acceptable questionnaire. Responses of the respondents regarding their profile were encoded in the SPSS using numerical codes, while their stress levels were encoded as is (Appendix D). Appropriate statistical procedures were used to determine the relationship between physical activity and stress levels.

Figure 2 shows the schematics of the data collection procedure of the study.

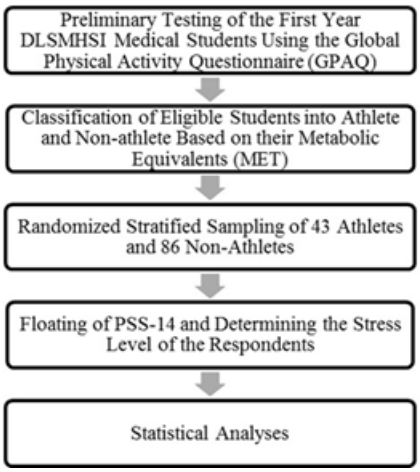

Figure 2: The Schematic Diagram of the Study

Statistical Treatment and Data Analyses

The data gathered was analyzed using inferential statistics. The analysis of the data, tables, and graphs were generated using STATA 15 IC, and R 3.5.2. Primarily, checking of the normality of the data was done using a Shapiro-Wilk Test. The result of the test served as a basis in conducting a Whitney U Test, a non-parametric test since the data on the PSS scores of the athlete and non-athlete are not normally distributed on both groups. But since the overall PSS score of the respondents are normally distributed, Pearson's Correlation and linear regression were also done determine the coefficient and establish a correlation between physical activity and stress levels. Figure 3 shows the data analysis procedure of the study.

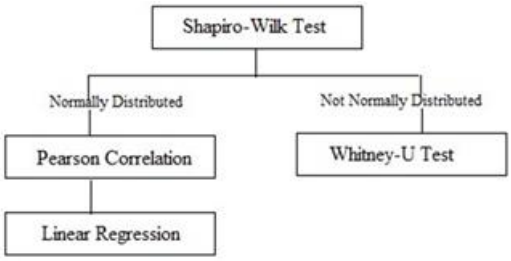

Figure 3: The Plan for Statistical Analysis

Study Outcome

This study was conducted to know the effect of physical activities to the stress levels of the respondents. A lower mean of the athlete medical students as compared to non-athlete students and a p value of less than 0.05 will indicate a possible lowering effect of physical activities to the stress levels of the said students. If a lowering effect will be observed, physical activities like sports can be used as a measure to decrease the stress levels of the students, specifically medical students, and to improve their mental health in general.

Ethical Considerations

Researchers asked for the informed consents of all the students who are willing to participate in the study. They were informed about the purpose, objectives, and other information regarding the study and potential impact of their participation. Additional information was provided in the event that the participants become distressed in any way during their participation.

Participation was voluntary and participants were free to withdraw from the study at any time without negatively impacting their involvement in future services or the current program and relationships with any of the researchers or research bodies involved. The researchers also ensure to preserve and protect the confidentiality and anonymity of the respondents and guarantee them that the study will not harm them in any way. Any information about the participants or the information they have given were not published nor accessed by people other than the researchers. The researchers only asked for information and responses relevant to the conduct of the study.

Results and Discussion

A. Profile of Respondents

Aside from physical activity, demographic factors such as age, sex, nationality, and religion can be regarded as determinants of stress [6][7]. The table below shows the profile of the respondents according to classification, age, sex, religion, and nationality.

Table 1: The Demographic Profile of the Respondents

		Frequency	Percentage (%)
Classification	Non-athlete	79	64.75%
	Athlete	43	35.25%
	Total	122	100%
Age	18-20	31	25.41%
	21-23	79	64.75%
	24-26	8	6.56%
	27 and above	4	3.28%
	Total	122	100%
Sex	Male	47	38.50%
	Female	75	61.50%
	Total	122	100%
Religion	Roman Catholic	97	79.50%
	Born-Again	15	12.30%
	Hindu	4	3.30%
	Others	5	4.10%
	None	1	0.80%
	Total	122	100%
Nationality	Filipino	111	91.00%
	Half-Filipino	4	3.30%
	Indian	5	4.10%
	Chinese	1	0.80%
	Rwandese	1	0.80%
	Total	122	100%

The table shows that in terms of demographics, an overwhelming majority of the respondents are from ages 21-23, female, Filipino, and Roman Catholic. It is inferred that since the demography of the respondents are relatively similar, the confounding effect of these variables to the stress levels are minimal, and not significant. Moreover, the table also shows that there were 79 (64.75%) respondents who had a metabolic equivalent of 600 below and were classified as non-athletes, while there were 43 (35.25%) respondents who had a metabolic equivalent of 600 above and were classified as non-athletes. As GPAQ which was used to determine the metabolic equivalents is a multi-domain questionnaire, the metabolic equivalents obtained using it not only includes physical activity from recreation but also from work, school, and transportation. As such, it is inferred that quality of physical activities (low, moderate, or intense) done in these instances contribute and add to the total metabolic equivalents of the respondents as opposed to no physical activity done. Taking this into account, at least a moderate intensity activity such as walking should be done for at least 30 minutes for 5 days or 25 minutes for 7 days to have a higher than 600 metabolic equivalent and have clinically significant physical activity.

The Stress Levels of the Respondents: The stress levels of the respondents were obtained from the Perceived Stress Scale (PSS) Questionnaire. Conducting a Shapiro-Wilk Test, the histogram of the PSS Scores of non-athlete and athlete medical students shown in Figure 4, was obtained.

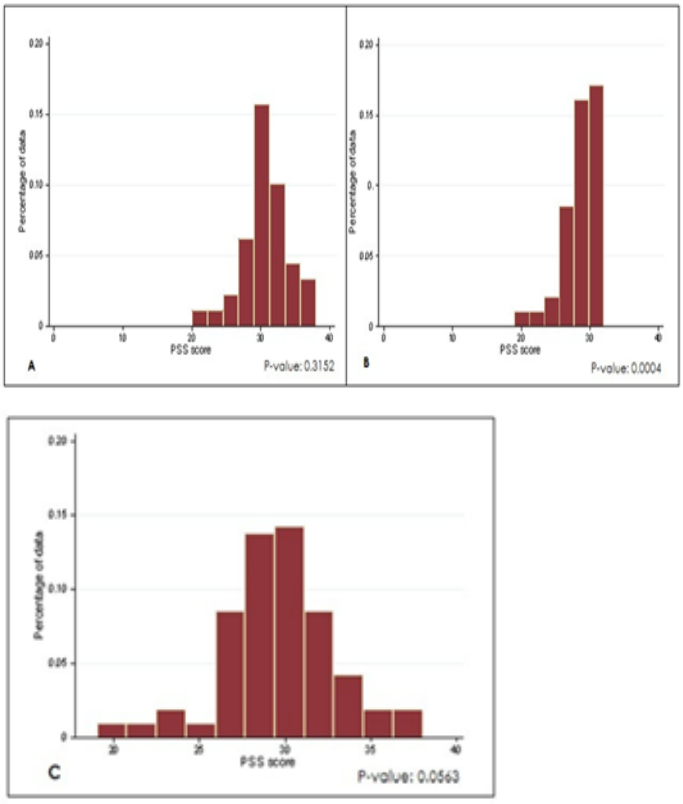

Figure 4: PSS Scores of the Non-Athlete(A) and Athlete(B) Medical Students, and Overall (C)

Based on the histogram, the PSS scores, and therefore the stress levels, of the non-athlete respondents range from 20-38. With reference to the histogram in Figure 4A, which is bell-shaped, and the P-value, which is 0.3152, the PSS scores of the non-athletes are normally distributed and not significantly different with each other. In contrast, the stress levels of the athlete students range from 19-32. Based on the shape of the histogram (skewed) in Figure 4B, and the P-value which is 0.0004, it is inferred that the PSS scores of the athlete students are not normally distributed and significantly different with each other. But looking at the histogram of the overall PSS scores of the respondents in Figure 4C, it is seen that the PSS scores are normally distributed as evident with a P- value of 0.0563.

The Effect of Physical Activity to Stress Levels

As the PSS scores of the non-athlete and athlete medical students are not normally distributed, a non-parametric test, Whitney-U Test, was necessary to determine if there is a significant difference between the mean values of the two groups. Table 4 shows the summary of the Whitney-U Test performed on the PSS scores of the respondents.

Table 2: Summary Statistics of the Whitney-U Test

Student classification	Number of observations	Mean PSS score	Standard error	Minimum PSS score	Maximum PSS score
Non-athlete	79	30.41	3.50	20	38
Athlete	43	28.37	2.60	19	32

*P-value: 0.0004

The table reveals that the PSS score of the non-athlete respondents has a mean score of 30.41 and ranges from 20-38. In contrast, the PSS score of the athlete respondents is lower with a mean score of 28.27 and range of 19-32. With reference to the P-value, 0.0004, which lower than the alpha value which 0.05, it is inferred that there is a significantly lower stress levels in athlete respondents in comparison to the non- athletes.

Further statistical analysis was done to establish the correlation between PSS score and physical activity, which are the variables of the study. Pearson's Correlation of the variables resulted to a P-value of 0.0011 and r of -0.2916. Based on the negative value of r, it is established that physical activity is inversely correlated with PSS score. This means that the PSS score tends to decrease when the student is an athlete, and the PSS score tends to increase when the student is non-athlete. Also, since the compute P- value is less than 0.05, then at 5 % level of significance, it is plausible to say that the inverse correlation between PSS score and physical activity is statistically significant.

In relation to this result of Pearson's Correlation, a linear regression analysis of the variables was conducted to predict the lowering effect of physical activity to the stress levels of the respondents. Table 5 shows the result of the linear regression of the variables

Table 3: Summary Statistics of Linear Regression

Variables	Coefficient	Standard error	t statistic	P-value
Physical Activity	-2.0330	0.6090	-3.34	0.001
(Intercept)	30.4051	0.3615	84.10	<0.0001

P-value of the model: 0.0011 (F statistic: 11.14)

The table shows that the linear regression analysis resulted to a linear regression model of Y= 30.4051-2.0330x, wherein Y is the PSS score, and x is the physical activity. Since the obtained P-value is 0.0011, which is less than 0.05, it is inferred that the model is significant.

The statistically significant linear regression model signifies that if a randomly sampled student is a non-athlete, his/her estimated PSS score is 30.4051. However, if the student is an athlete, the PSS score decreases by 2.0330, on the average. This effect further establishes the role of physical activity as protection against stress as one major stress-reducing property of sports or physical activity was the release of endorphins

that acted as pain relievers and happy hormones to the body when they interacted with receptors found on the brain [4].

Summary of Findings

Majority of the respondents are from ages 21-23, female, Filipino, and Roman Catholic. Out of 122, 79 (64.75%) respondents were non-athletes, while there were 43 (35.25%) respondents were non-athletes. The PSS scores of the non-athlete respondents range from 20-38 while the stress levels of the athlete students range from 19-32. There is a significantly lower stress levels in athlete respondents in comparison to the non-athletes, and the PSS score decreases by 2.0330 if the respondent is an athlete.

Conclusion

In light of the findings of this study, the stress levels of the athlete first year medical students, as measured by the PSS score, is lower compared to the stress levels of the non-athletes. It was also found that physical activity is inversely proportional to the PSS score. The PSS score tends to decrease if a student is considered an athlete, while the PSS score tends to increase if a student is considered a non-athlete. Hence, the more they engage to physical activities such as sports, the lower their stress level will be. Thus, to a degree, it can be said that physical activity is an effective way of coping up with stress among the first year medical students.

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J Public Health 14 (2), S. 66–70. DOI: 10.1007/s10389-006-0024-x.

Appendix A

Computation of The Sample Size

Sample Size:X-Sectional, Cohort, & Randomized Clinical Trials	
Two-sided significance level(1-alpha):	95
Power(1-beta, % chance of detecting):	80
Ratio of sample size, Unexposed/Exposed:	2
Percent of Unexposed with Outcome:	33
Percent of Exposed with Outcome:	62
Odds Ratio:	3.3
Risk/Prevalence Ratio:	1.9
Risk/Prevalence difference:	29

	Kelsey	Fleiss	Fleiss with CC
Sample Size - Exposed	35	34	39
Sample Size-Nonexposed	69	68	78
Total sample size:	104	102	117

References

Kelsey et al., Methods in Observational Epidemiology 2nd Edition, Table 12-15
Fleiss, Statistical Methods for Rates and Proportions, formulas 3.18 &3.19
CC = continuity correction
Results are rounded up to the nearest integer.
Print from the browser menu or select, copy, and paste to other programs.

Results from OpenEpi, Version 3, open source calculator--SSCohort
Print from the browser with ctrl-P
or select text to copy and paste to other programs.

Appendix B

Global Physical Activity Questionnaire (Gpaq),

Research Subject Information, And Consent Form

A COMPARISON OF THE STRESS LEVELS BETWEEN ATHLETE AND NON-ATHLETE FIRST YEAR MEDICAL STUDENTS OF DLSMHSI S.Y. 2018-2019

INVESTIGATORS. Acosta, Cailipan, De Leon, Kusi, Miranda, Mun, Nitura, Ocampo, Patel, Ruiz, Servida, Simon, Tiro, Tolentino

PURPOSE. The purpose of this study is to compare the stress levels between athletes and non-athletes among the first year medical students of DLSMHSI S.Y. 2018-2019.

PROCEDURES. If you agree to be in this study, you will be asked to answer a questionnaire. The interview will include questions about the duration and intensity of an activity you consider your greatest physical activity involvement. The questionnaire will take approximately 5 minutes to complete. If you are randomly chosen, you might also be asked to participate in a second 14-item self-administered questionnaire about your stress levels of the last month. That will take about 5-10 minutes to complete.

RISKS. You may feel uncomfortable answering some of the questions, which may gather information that can be considered as private, and from possible recall of the recent events relating to the questions. The participants are not at risk of any physical harm throughout the study period.

BENEFITS. This study can be a tool for self-reflection on how participants cope with their day to day tasks as a medical student. This could also be used to promote awareness that "stress" is not as superficial as being "tired" as perceived by many, but is something that is influenced by a lot of factors.

TOKEN OF APPRECIATION. A token of appreciation in the form of light snacks and motivational bookmarks will be given to you after the interview.

CONFIDENTIALITY. Any information obtained in this study and that can be identified with you will remain confidential and will be disclosed only with your permission. Your responses can be linked to your personal information only through a numeric code that will be kept secure and encrypted by the researchers. The study will focus on the average answers of the whole respondent group and not specifically on anyone's answers.

VOLUNTARY PARTICIPATION AND WITHDRAWAL. Taking part in this study is completely voluntary. It is up to you whether or not you decide to participate. If you decide to participate, you will be asked to sign the consent form. Despite signing the form, you are still free to withdraw at any time. Your decision will not result in any penalty or loss of benefits to which you are entitled.

QUESTIONS. Please ensure that you complete the form in full. If you have any questions and/or concerns regarding the study, please feel free to ask the interviewers or you may contact Rio Tolentino (tolentinorio03@gmail.com, 09274142806) or Van Jerwin Mercado (vanjerwin.mercado@gmail.com).

CERTIFICATE OF CONSENT

To be answered by the participant:
I have fully read the foregoing information and I have had the opportunity to address my concerns to the persons involved. The questions I asked have been answered satisfactorily. I therefore consent voluntarily to participate in this research.

Printed Name of Participant: _____

Signature of Participant: _____

Date: _____

INVESTIGATORS:

Acosta, Adrian Gabriel
Cailipan, Aimee V.
De Leon, Marc Cedric C.
Kusi, Abigail A.
Miranda, Mohammad Amir V.
Mun, Jang Won D.
Nitura, Joshua S.
Ocampo, Kathleen F.
Patel, Siddharth B.
Ruiz, John Michael F.
Servida, Aubrey Rose B.
Simon, Camille Francesca C.
Tiro, Shasta Grace D.
Tolentino, Rio Mae A

To be answered by the researcher taking the consent:
I have accurately read out the information to the potential participant, have dealt with the questions, and made sure that he/she understands the proceedings of this study. I thereby confirm that the participant was given the opportunity to ask questions which I answered with the best of my ability. I confirm that no force or coercion was used and that the consent was freely given.

Printed Name of Researcher: _____

Signature of Researcher: _____

Date: _____

This consent form will be kept by the researcher for at least three years beyond the end of the study.

_____

For participants below 18 years old, the parental consent is needed. Please have your parent sign this form before returning it to investigators.

I hereby allow my son / daughter, _____, to participate in this study.

_____ _____
Guardians/ parents signature over complete name **Date: Day / Month / Year**
(ONLY IF you are below 18 years old)

NAME:_____ **CODE:** _____

Direction: Fill out the necessary Information

Question	Response	Code
Work		
Does your work involve vigorous-intensity activity that causes large increases in breathing or heart rate like *[carrying or lifting heavy loads, digging or construction work]* for at least 10 minutes continuously? *[INSERT EXAMPLES] (USE SHOWCARD)*	Yes 1 No 2 *If No, go to P 4*	P1
In a typical week, on how many days do you do vigorous-intensity activities as part of your work?	Number of days ⌊_⌋	P2
How much time do you spend doing vigorous-intensity activities at work on a typical day?	Hours : minutes ⌊_⌋⌊_⌋ : ⌊_⌋⌊_⌋ hrs mins	P3 (a-b)
Does your work involve moderate-intensity activity, that causes small increases in breathing or heart rate such as brisk walking *[or carrying light loads]* for at least 10 minutes continuously? *[INSERT EXAMPLES] (USE SHOWCARD)*	Yes 1 No 2 *If No, go to P 7*	P4
In a typical week, on how many days do you do moderate-intensity activities as part of your work?	Number of days ⌊_⌋	P5
How much time do you spend doing moderate-intensity activities at work on a typical day?	Hours : minutes ⌊_⌋⌊_⌋ : ⌊_⌋⌊_⌋ hrs mins	P6 (a-b)
Travel to and from places		
The next questions exclude the physical activities at work that you have already mentioned. Now I would like to ask you about the usual way you travel to and from places. For example to work, for shopping, to market, to place of worship. *[Insert other examples if needed]*		
Do you walk or use a bicycle (pedal cycle) for at least 10 minutes continuously to get to and from places?	Yes 1 No 2 *If No, go to P 10*	P7
In a typical week, on how many days do you walk or bicycle for at least 10 minutes continuously to get to and from places?	Number of days ⌊_⌋	P8
How much time do you spend walking or bicycling for travel on a typical day?	Hours : minutes ⌊_⌋⌊_⌋ : ⌊_⌋⌊_⌋ hrs mins	P9 (a-b)

Physical Activity, Continued		
Question	**Response**	**Code**
Recreational activities		
The next questions exclude the work and transport activities that you have already mentioned. Now I would like to ask you about sports, fitness and recreational activities (leisure). *[Insert relevant terms].*		
Do you do any vigorous-intensity sports, fitness or recreational (leisure) activities that cause large increases in breathing or heart rate like [running or football] for at least 10 minutes continuously? *[INSERT EXAMPLES] (USE SHOWCARD)*	Yes 1 No 2 *If No, go to P 13*	P10
In a typical week, on how many days do you do vigorous-intensity sports, fitness or recreational (leisure) activities?	Number of days ⌊_⌋	P11
How much time do you spend doing vigorous-intensity sports, fitness or recreational activities on a typical day?	Hours : minutes ⌊_⌋⌊_⌋ : ⌊_⌋⌊_⌋ hrs mins	P12 (a-b)
Do you do any moderate-intensity sports, fitness or recreational (leisure) activities that cause a small increase in breathing or heart rate such as brisk walking, [cycling, swimming, volleyball] for at least 10 minutes continuously? *[INSERT EXAMPLES] (USE SHOWCARD)*	Yes 1 No 2 *If No, go to P16*	P13
In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational (leisure) activities?	Number of days ⌊_⌋	P14
How much time do you spend doing moderate-intensity sports, fitness or recreational (leisure) activities on a typical day?	Hours : minutes ⌊_⌋⌊_⌋ : ⌊_⌋⌊_⌋ hrs mins	P15 (a-b)
Sedentary behaviour		
The following question is about sitting or reclining at work, at home, getting to and from places, or with friends including time spent sitting at a desk, sitting with friends, traveling in car, bus, train, reading, playing cards or watching television, but do not include time spent sleeping. *[INSERT EXAMPLES] (USE SHOWCARD)*		
How much time do you usually spend sitting or reclining on a typical day?	Hours : minutes ⌊_⌋⌊_⌋ : ⌊_⌋⌊_⌋ hrs mins	P16 (a-b)

Appendix C

Survey Questionnaire

I. **Profile**- Fill out the necessary Information.

Name: _____ Age: _____ Gender: _____

Place of Residence (Permanent): _____

Religion: _____ Nationality: _____

II. **Perceived Stress Scale**

Check the answer box that corresponds to your response. Each response corresponds to a score.

In the last month...	Never 0	Almost Never 1	Sometimes 2	Fairly Often 3	Very Often 4
How often have you been upset because of something that happened unexpectedly?					
How often have you felt that you were unable to control important things in your life?					
How often have you felt nervous and stressed?					
How often have you dealt successfully with irritating life hassles?					
How often have you felt that you were effectively coping with important changes that were occurring in your life?					
How often have you felt confident about your ability to handle your personal problems?					
How often have you felt that things were going your way?					
How often have you found that you could not cope with all the things that you had to do?					
How often have you been able to control irritations in your life?					
How often have you felt that you were on top of things?					

Appendix D

Numerical Codes of the Responses

		Code
Classification Acc. To Physical Activity	Non-Athlete	0
	Athlete	1
Sex	Female	1
	Male	2
Religion	Roman Catholic	1
	Iglesia Ni Cristo	2
	Born-Again	3
	Hindu	4
	Protestant	5
	Pentecost	6
	Jainism	7
	Ronan 1	8
	None	9
Nationality	Filipino	1
	Half-Filipino	2
	Indian	3
	Chinese	4
	Rwandese	5