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Effect of Physical Activity on Quality of Life for College Students: A Comparative Gender Study

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Effect of Physical Activity on Quality of Life for College Students: A Comparative Gender Study

by

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LIST OF ABBREVIATIONS

CDC- Center for Disease Control and Prevention

GPAQ- Global Physical Activity Questionnaire

HRQoL- Health related quality of Life

MET- Metabolic equivalence of task

WHO- World health Organization

ABSTRACT

Purpose

The purpose of this study was to examine the relationship between physical activity levels in college students and health related quality of life scores. Additional analysis was used to determine whether more of a relationship exists between female or male students' in terms of activity versus quality of life.

Methods

Students for this study were gathered through their involvement in kinesiology based organizations on campus. Two surveys were utilized, the Global Physical Activity Questionnaire and the Health Related Quality of Life survey. Students were also asked to record their gender, which allowed for the second analysis. After scoring the activity levels via the World Health Organization's scoring template, the data was analyzed using correlation coefficients to determine if relationships existed.

Results

In a sample size of 24, the Pearson's correlation value between the HRQoL survey and the total MET minute values was 0.410. The significance of the two variables was p= 0.047. Further comparison of these two surveys between male and female participants yielded varying answers. Pearson's correlation for female respondents only (n=17) was 0.375 and p= 0.138. For male respondents only (n=7), Pearson's r value was equal to 0.496, and p= 0.258.

Conclusion

Overall examination of the data allowed for the conclusion that the two variables (physical activity and health related quality of life) were significantly related, with a positive correlation value. However, limited participation and an uneven distribution of female to male participants made it more difficult to compare significant gender differences. However, positively correlated trends were exhibited by the existing data. More research should be conducted in this area, with a larger sample size. This will allow for the inclusion of more participants, and yield more varied responses.

CHAPTER I

PURPOSE OF STUDY

This thesis examined physical activity levels on a college campus as it pertains to health related quality of life. Specifically, the research looked at how individuals who are considered physically active according to the criteria establishment by the World Health Organization, differ in quality of life ratings compared to individuals who are not physically active. A more focused look at the results have allowed for a comparison that can be seen in the results between the female and male populations at a public, four year university. This comparison is an interesting aspect of the study because it examines if males and females experience the same effects to their health related quality of life with similar levels of physical activity.

Physical activity is an important aspect of daily life, and numerous studies have examined the effect that being active has on one's perceived quality of life. For example, Anokye, Trueman, Green, Pavey, and Taylor, (2012) found that certain diseases occur less frequently in individuals who incorporate physical activity into their daily routines, effectively improving health-related quality of life. This concept has been researched across many different social groups, with researchers looking at the effects of physical activity on different aspects of life beyond physical health, including how physical activity impacts the mental health of an individual. For example, physical activity has been shown to have effects comparable to prescribed antidepressants on patients with depression (Lindegård, Jonsdottir, Börjesson, Lindwall, & Gerber, 2015). It is possible to study physical activity levels in college-aged individuals in order to assess whether or not activity helps to decrease the stress that students feel. College students may be more susceptible to decreased physical activity due to new life stressors including higher academic demands, financial concerns, and social uncertainty (Joseph, Royse, Benitez, & Pekmezi, 2014). College students are an appropriate test group to examine the impact of exercise on stress.

Breaking the focus group down further to males and females can lead to a greater understanding of how males and females differ in regard to how physical activity impacts health related quality of life. While the health of females have been shown in previous studies to have a stronger correlation to stressful

situations, the health ratings of men revealed that they are more directly impacted by physical activity (von Bothmer & Fridlund, 2005). By comparing physical activity levels of male and female students versus their health related quality of life scores, it is possible to determine if one gender exhibits more of a correlation between the two variables.

I hypothesized that the relationship between levels of physical activity and perceived health related quality of life would be independent of sex. In other words, males and females with similar levels of physical activity would have the same health related quality of life score depending on levels of activity. On the other hand, I hypothesized that there will be a noticeable difference in health related quality of life levels in individuals with high activity levels, compared to students with low levels of physical activity. These analyses made use of two different surveys, distributed among students on the University of Southern Mississippi's campus. Then, statistical testing was utilized to make comparisons of the data in order to arrive at a conclusion.

CHAPTER II

LITERATURE REVIEW

Health Related Quality of Life

Health related quality of life (HRQoL), which encompasses factors such as mental, physical, and social well-being, plays a large role in determining an individual's overall health (Anokye et al., 2012). Health related quality of life is a self-perceived value, and therefore is a direct indication of how satisfied or dissatisfied an individual is with their own health. Therefore, this value gives health care providers, or researchers, an important insight into the mind of an individual. The ratings for HRQoL can be determined via a survey, which take the various factors, such as physical and psychological well-being, into account. Health related quality of life reports are strongly rooted in self-perception of the individual being surveyed regarding their physical and emotional well-being (Nakamura, Teixeira, Smirmaul, Sebastiao, Papini, Gobbi, & Kokubun, 2014). In addition to Health Related Quality of Life surveys, well-being indexes have also become more significant in promoting positive health activities. This has led to governmental policies which promote physical activity as a way to advance quality of life (Sato, Jordan, & Funk, 2014). Hence, these surveys have assisted healthcare professionals in determining how patients feel about their well-being, which can contribute to formulating a care plan.

Physical Activity

When analyzing the importance of physical activity, one must remember that a number of diseases, including heart disease and diabetes, are associated with physical inactivity (Souto Barreto, 2015). It is possible for an individual to perform physical activity, which is linked to improve HRQoL, in any area of life (i.e. - leisure activity vs work related activity) (Pedisic, Greblo, Phongsavan, Milton, & Bauman, 2015). Activity levels can be ranked by the World Health Organization, based on the amount of, and the frequency with which activity is performed. The World Health Organization is an organization that functions as a part of the United Nations, and the main goal of this institution is to maintain guidelines regarding public health. For example, it is reported by the World Health Organization that to

be considered physically active, one must achieve one hundred and fifty minutes of mild physical activity each week (Souto Barreto, 2015).

When HRQoL scores for physically active individuals and inactive individuals are compared, most research has shown that increased activity yields more positive results; life satisfaction scores tend to increase with continuing physical activity (Pedisic, Greblo, Phongsavan, Milton, & Bauman, 2015). This trend seems logical, due to the fact that physical activity increases the amount of endorphins released, which in turn lowers stress levels. However, certain studies have also shown that a higher than average physical activity level could also lead to lower quality of life results (Nakamura et al., 2014). This could be a possible result of increase stress being put on the body by excessive physical activity.

Metabolic Equivalents

Another way to measure physical activity levels in an individual is via metabolic equivalent of task (MET) values. These numbers are commonly used in order to give standard values for intensity of activity, which are representative of the amount of energy that was exerted during any given activity per individual per minute (Haskell et al., 2007). More specifically, MET indicates the amount of oxygen that was used up by an individual for any given activity. For example, according to the WHO method of scoring MET minutes for vigorous activity, the total minutes are multiplied by the number eight (which represents the MET value for vigorous activity). On the other hand, moderate activity (which includes all travel) is given an MET value of four. This means that an individual can utilize twice as much energy with vigorous physical activity as opposed to moderate activity, in the same amount of time.

MET values are estimates, and MET minute values are utilized when tracking physical activity because they take into account not only the amount of activity being performed, but also the amount of energy being used. Haskell et al. (2007) notes that the standards for MET minutes, or physical activity standards in general, are denoted in order to give general guidance for the level of weekly activity that will be a benefit for an individual's health. Therefore, when using MET values to determine activity levels, and simultaneously determining HRQoL of the same individual, it should be possible to see how

the two values compare (i.e.- will higher levels of activity in one relate to healthier perceived quality of life levels).

College Students

College students today face various stressors in their daily lives, which could potentially impact their overall health. Studies have shown that as the amount of stress a student experiences increases, then the student experiences a decrease in quality of life (or perceived life satisfaction) (Holinka, 2015). This perceived decrease can lead to more significant health issues. It has been reported that in a group of college students who were surveyed, instances of depression were felt by over half of the group (Edman, Lynch, & Yates, 2014). Due to the extreme health related side effects that result from stress, such as episodes of depression, much research has been conducted in order to determine methods which may help individuals cut back on their levels of stress.

Physical activity can be an outlet for stress events by allowing individuals to channel their emotions in a healthy way (Johnson-Kozlow, Sallis, & Calfas, 2003). Figure 1 depicts various factors which can impact quality of life of a college student, relating to their physical activity habits, and the proposed linkage between all of these aspects (Joseph, Royse, Benitez, & Pekmezi, 2014). This particular figure was included in a study that looked at different factors, including self-esteem in terms of quality of life, which could lead to increases in physical activity for young adults. The findings revealed that, unlike middle-aged individuals, a juvenile population has a stronger correlation to physical self-esteem as the link between high physical activity levels and quality of life.

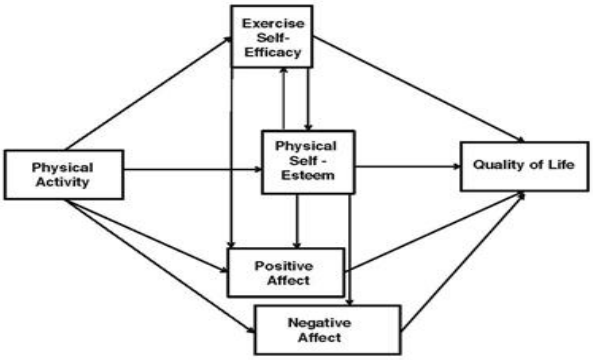


Figure 1. This figure depicts the connection between physical activity and quality of life (Joseph, Royse, Benitez, & Pekmezi, 2014).

Gender Differences

While research has been conducted to look at the effects of physical activity on college students' psyche, there has not been much focus on the differences between results of male and female students. It has been shown, through various studies that women are at risk for less positive attitudes regarding exercise when compared to males (Edman, Lynch, & Yates, 2014). This could lead to lower levels of physical activity among female populations due to the fact that women feel less comfortable actively seeking out means of physical activity. For example, women may be less likely to take part in recreational activity, or jobs that include a lot of physical activity. In addition, when looking at stress levels between the two genders, it has been reported that women face a greater amount of stress in their daily lives (Bouchard and Shih, 2013). These facts could have an impact on results gathered from any research involving gender differences when looking at physical activity effects on HRQoL. However, certain research suggests that higher health related quality of life results are more noticeable for women who participate in increased physical activity, more so than with males (Cash, Duncan, Beresford, McTiernan, & Patrick, 2013). Therefore, when comparing males partaking in more physical activity and males who had significantly less physical activity, there was not a noticeable difference in the HRQoL scores. Past studies have shown that females were more likely to have lower levels of activity, and reported poor mental health more often (VanKim & Nelson, 2013). However, VanKim and Nelson also state that males who met their activity goals were less likely to report poor mental health quality of life scores. These

conflicting views towards gender response to physical activity could benefit from further research and clarification.

Testing

One test that is commonly used to test an individual's perceived health quality of life score is the Center for Disease Control's Health Related Quality of Life Survey-4. This survey is composed of four basic questions, which examine measures such as physical health, mental health, and any recent limits that have affected physical abilities (Moriarty, Zack, & Kobau, 2003). The benefits of using a survey of this nature is that a researcher is able to discern how someone perceives their own health, and how it impacts their level of activity. Similarly, it not only takes physical health into account, mental health is factored in as one of the main components of an individuals perceived health score. This is beneficial because individuals experiencing frequent stress could indicate that with a lower mental health score.

One of the more frequently used physical activity surveys is the Global Physical Activity Questionnaire (GPAQ), which is a product of the World Health Organization. The GPAQ measures physical activity across different facets of life (work, recreation, and transportation) (Chu et al., 2015). This offers a more complete look at physical activity, which is helpful when assessing the effects that activity has on health related quality of life. The two subsets, work and recreation, are further broken down into moderate and vigorous activity for each category. This allows the researcher to identify the amount of energy, or MET values, for each separate activity.

Impacts of Activity on HRQoL

Being able to strengthen the claim that physical activity can lessen an individual's stress levels, illustrated by a higher Health Related Quality of Life value, would be beneficial to anyone who suffers from external stressors on a daily basis. This includes college students, who experience both positive and negative impacts of stress. Positive stress effects include behaviors such as energy and cheerfulness, while negative effects have more serious behavioral consequences such as depression and lethargy (Çivitci, 2015). College students could be more cognizant of ways that they can safely manage their stress, and improve their overall health. Similarly, by studying the impact that physical activity has on male versus

female college students' HRQoL ratings, this project will be able to illuminate a topic that has not been extensively explored before.

CHAPTER III

METHODOLOGY

Design

Surveys were used as the primary method for gathering data for this research project. In order to test the different factors (self-perceived health related quality of life and physical activity levels), two surveys were necessary. Surveys allow a researcher to collect information from a large group of individuals, and regarding many different topics (i.e. - health and activity). However, there was no guarantee that participants would provide answers that were honest, nor was it guaranteed that a large group of individuals would want to take the time to answer several questions.

The first survey measured individual's health related quality of life, and the second looked at levels of physical activity. This way, both physical activity, and health related quality of life data were collected. Survey collection took place at the University of Southern Mississippi. The target audience was a mixture of students, who are involved in various Kinesiology based groups on campus (i.e. - the exercise physiology club). These surveys were administered in person by the researcher. Ideally, the sample size would be at least 50. This value would allow for more accurate statistical testing.

Due to the fact that this research involves human participants, the project had to go to the Institutional Review Board (IRB) for approval. IRB is an ethics committee which is responsible for reviewing and approving certain studies (i.e. - with human or animal participants). Consent forms were signed by every student who agreed to participate, and these forms were kept anonymous to ensure complete anonymity of participants. Instead of using names for the analysis portion of the research, each participant was given a code, and the codes consisted of numbers, with either an F or an M to denote gender of the participant. The consent forms included a statement which indicated only individuals eighteen years or older should sign and participate, and that by signing the consent form, the individual was indicating that they were eighteen years of age or older.

Health Related Quality of Life

For the first part of the research, health related quality of life was measured by the Center for Disease Control and Prevention (CDC) Health Related Quality of Life- 4 survey. Also known as the "Healthy Days Measure," this survey is four questions based on general health of participants. This is beneficial due to the fact that shorter surveys are more likely to be filled out by participants (Porter, 2004). The questions range from asking an individual to rate their general health, to answering how many days in the past month poor health kept them from performing tasks (including both physical and mental health). Thirty unhealthy days is the proposed maximum value for unhealthy values (when both mental and physical health values are combined). This is the lowest score in terms of Health related quality of life. A poor health value of zero unhealthy days is equivalent to the highest healthy value (with no reported mental or physical values for poor health). Through various studies, the CDC's "Healthy Days Measure" has proven effective and dependable in terms of determining any possible health deficiencies (Moriarty, Zack, & Kobau, 2003). In terms of scoring this questionnaire, participant's responses were scaled on the number of days that they believe they were unhealthy over the past thirty days. Therefore, there is a thirty day maximum for each individual over the thirty days for each category (Moriarty, Zack, & Kobau, 2003). Then, the scores are typically averaged for a group in order to analyze the mean and make conclusions about the group being studied based on the values. When testing statistical significance, the Cronbach's alpha score for the Healthy Days Measure questionnaire was also calculated. This value is a measure of the consistency between different questions in a survey (Toet, Raat, & van Ameijden, 2005). Past research using a four item HRQoL survey, based on the CDC Healthy Days Model, stated that the usual standard for consistent questionnaires is 0.70, although this level can vary slightly to 0.60 (Toet, Raat, & van Ameijden). The first question of the CDC HRQoL survey is often excluded for consistency testing because it does not strictly account for unhealthy days. After completing the statistical test on SPSS programming to find Cronbach's alpha for the Healthy Days Measure was 0.42 for this study, after excluding the first question. When this value is calculated, factors such as variance of the overall score, and the variance between survey items, are taken into account (Trizano-Hermosilla & Alvarado, 2016).

Due to the fact that Cronbach's alpha strongly depends on variance, it can be inferred that there was little variation seen among the responses in this small sample size.

Physical Activity

The second aspect of the research was to assess physical activity. This was accomplished using the Global Physical Activity Questionnaire. The World Health Organization (WHO) uses this questionnaire to determine individuals' level of physical activity. This questionnaire allows one to determine factors such as type and amount of physical activity being carried out per individual through various tasks (including both work, recreation, etc). In order to score the data retrieved from these questionnaires, Metabolic Equivalents (METs) are given out for amount of physical activity depending on the level. METs are values that are assigned to activity in order to quantify the amount of energy used during activity (Jette, Sidney, & Blumchen, 1990). Vigorous physical activity was given eight METs, and moderate activity was given a value of four METs (Chu et al., 2015). Vigorous physical activity is anything which requires a large exertion of effort and leads to a very noticeable increase of heart rate. Moderate activity is classified under a general idea of anything that will lead to a mild increase in heart rate and includes activities such as walking, house hold chores, etc. The World Health Organization sets standards for levels of activity in order to classify individuals as being physically active: one-hundred and fifty minutes of moderate activity or seventy-five minutes of vigorous physical activity. Weekly MET minute values can also be used as a guide to measure whether an individual is physically active, and that value is reached if an individual achieves six-hundred METs or more when moderate and vigorous activity levels are combined. Once the questionnaire is complete, it is then possible to compile the results and use the World Health Organization standards for physical activity to rank participants from physically inactive to active. For this study, physical activity levels were scored based on MET minutes per week. This means that the MET values for vigorous or moderate activity (eight versus 4) were multiplied by daily minutes that the activity was performed, as well as the number of days a week that the activity was repeated. Then, total values were calculated for each individual participant, and these values were used to determine activity level of participants (high, moderate, or low).

Analysis

Once survey and questionnaire results were collected, each questionnaire must be scored. For the health related quality of life, which meant that the total number of healthy days were tabulated based on a time frame of thirty days and how many days the participant felt that they were in poor health. Then, the physical activity questionnaires were scored using the World Health Organization's values for physically active individuals. After this was completed, statistical tests were carried out in order to determine if relationships exist between physical activity levels and health related quality of life scores as well as the significance of the results. The HRQoL scores for the physically active versus physically inactive groups of participants were compared by using Pearson's correlation values, to determine the type of correlation that exists between these two variables. A linear regression T-Test was used to determine statistical significance for the entire sampled population. This value allowed for the rejection or acceptance of the null hypothesis (i.e- that the two tested variables are not related). Similarly, these tests were repeated when focusing on the averages for HRQoL between active and inactive individuals of male versus female students. Statistical significance alpha (α) value was set at $p \leq 0.05$.

CHAPTER IV

RESULTS

Physical Activity vs. HRQoL

The statistical comparisons between the physical activity responses and the HRQoL responses showed that a positive correlation (Pearson's r value), does exist between the variables. Similarly, it was determined that the two factors have a significance value.

For the entire sample of participants there was a moderate strength positive correlation ($r = 0.410$), which was statistically significant ($p = 0.047$) (Table 1)

Table 1 The Correlative values between HRQoL and total MET minutes (N=24).

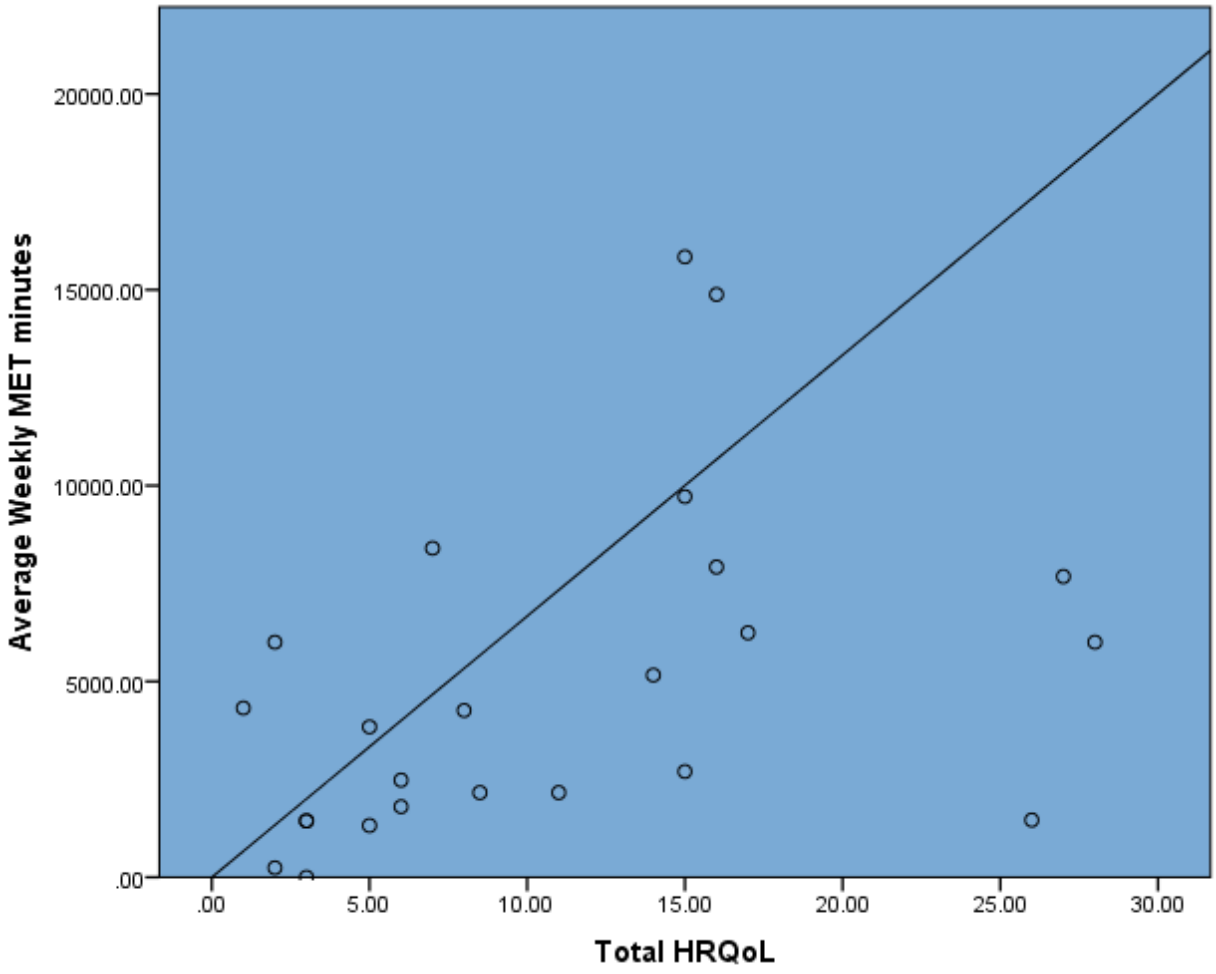
	HRQoL	MET minutes
Pearson's Correlation	1	0.410
Significance (2-tailed)		0.047
Pearson's Correlation	0.410	1
Significance (2-tailed)	0.047	

Similarly, averages and standard deviations were calculated for the results of the two surveys. The standard deviation of the entire population that was sampled, as well as the average values for the two different variables tested. There was a wide range of scores for MET minutes (0-15840) and HRQoL (1-28) which resulted in large standard deviations for both MET minutes and HRQoL. The possibility of outliers exists, however in the study the calculations of results included all scores.

Table 2 The Descriptive Statistical values the total population surveyed.

	N	Minimum	Maximum	Median	Average	Standard Deviation
HRQoL	24	1	28	8.25	10.81	8.13
MET Minutes	24	0	15840	4050	4894.17	4208.73

Figure 1. The test variables plotted.



The variables, when plotted show a slight trend towards a positive correlation. This trend is backed up by the values (r = 0.410).

Gender Differences

The average HRQoL score for female participants (n=17) was 10.67, while the average for male participants (n=7) was equal to 11.14. However, physical activity comparisons showed that male average MET minutes per week was equal to 6702.9 minutes. While the female weekly MET minute average was calculated as 4149.4 minutes. These values include both vigorous and

moderate activity for the three dimensions of life that were surveyed (work, travel/transportation, and recreation).

Figure 2 The average HRQoL scores on a comparison between male and female participants.

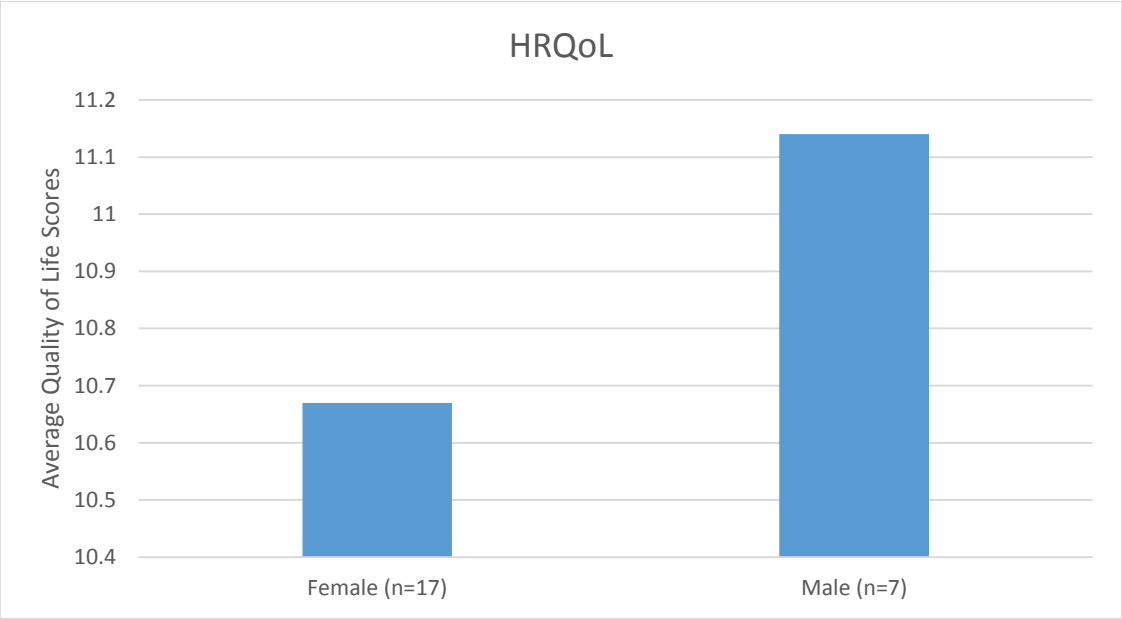
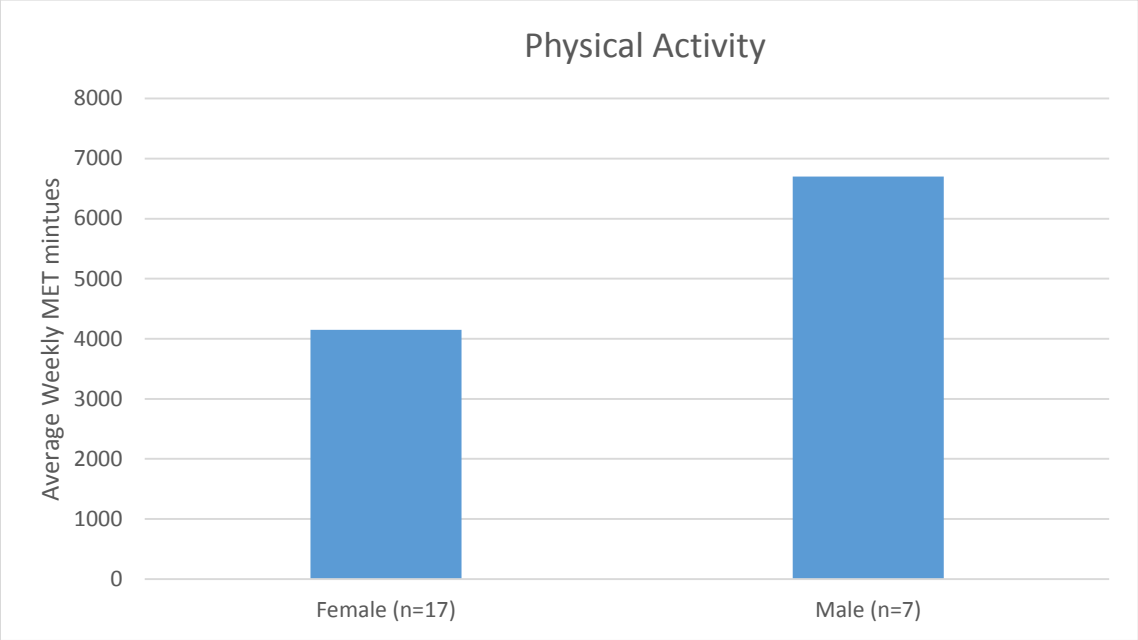


Figure 3 The different MET minute averages for male and female participants.



For males only, there was a moderate strength positive correlation value (r = 0.496); however, the correlation between physical activity levels and health related quality of life scores was not statistically significant p = 0.258 for males (Tables 3 & 4).

Table 3 The correlative statistics for the male participants (n=7).

	HRQoL	MET minutes
Pearson's Correlation (HRQoL)	1	0.496
Significance (2-tailed) (HRQoL)		0.258
Pearson's Correlation (MET minutes)	0.496	1
Significance (2-tailed)	0.258	

Table 4 The descriptive statistics for male participants (n=7).

	n	Minimum	Maximum	Median	Average	Standard Deviation
HRQoL	7	1	27	14	11.14	9.58
MET Minutes	7	0	15840	6000	6702.86	4820.17

For females only, there was a weak strength positive correlation, r = 0.375 between physical activity and health related quality of life scores; and like the males sampled, there was no statistical significance p = 0.138.

Table 5 The correlative statistics for female participants only (n=17).

	HRQoL	MET Minutes
Pearson's Correlation (HRQoL)	1	0.375
Signifcance (2-tailed) (HRQoL)		0.138
Pearson's Correlations (MET)	0.375	1
Significance (2-tailed) (MET)	0.138	

Table 6 The descriptive statistics for female participants (n=17).

	n	Minimum	Maximum	Median	Average	Standard Deviation
HRQoL	17	2	28	8	10.68	7.78
MET Minutes	17	240	14880	2480	4149.41	3837.92

Error- Standard Deviation

The standard deviation values for this study were calculated to determine how much variation was seen among the different groups sampled (i.e. - the whole population that was sampled, the males, and the females). In each case the standard deviations were large due to that wide range of scores.

Table 7 Standard deviations per gender sample group

	N=24 (Total)	n=7 (Males)	n=17 (Females)
HRQoL	8.13	9.58	7.78
MET	4208.73	4820.17	3837.92

CHAPTER V

DISCUSSION

This study found that there was a statistically significant relationship between physical activity levels and health related quality of life scores. The alpha value, which is the probability of rejecting the null hypothesis when it is true was set at $p \leq 0.05$. The alpha value was significance at $p= 0.047$, because it was lower than 0.05. This allowed for rejection of the null hypothesis, and conclusion that in the population tested there was a significant relationship between the physical activity levels and the scores for HRQoL. This means that the possibility of the correlation being the result of chance, is low. However, due to the fact that the relationship between physical activity and HRQoL, based on the data of this study, are positively correlated, higher physical activity levels are not corresponding to lower HRQoL scores. Due to the fact that a majority of the participants were considered physically active (either high or medium) based on the WHO standards, it is difficult to make determinations regarding the differences between the physically inactive and active individuals' HRQoL scores.

When these values were compared for female and male participants separately, interesting results were yielded. The data showed that while males have an overall higher level of physical activity, they also have an overall negative HRQoL score. Higher HRQoL scores correlate to poorer perceived health quality, due to the nature of the survey questions being based on total unhealthy days (Trizano-Hermosilla & Alvarado, 2016). On the other hand, female participants showed lower HRQoL scores, but lower overall MET minutes (less physical activity). Past research has shown that this is a difficult comparison to make, based on factors surrounding the two issues. For example, Edman, Lynch, and Yates (2014) determined that women are more prone to have negative attitudes about physical activity (especially recreationally) than men. This could explain the results of this study, with women having lower activity levels. Bouchard and Shih (2013) stated that women will face more stressors in their lives, which could impact mental aspects of HRQoL. This statement contradicts the findings of this research, in which men were physically more active, but women had healthier self-perceived quality of life scores. Similarly, VanKim and Nelson (2013), concluded that females not only completed less physical activity overall

compared to male counterparts, but that females also reported higher HRQoL based scores (equating to poorer health). These variations in results between male and female populations illustrate how fluid responses to questions about physical activity levels and HRQoL can be. Despite the positive trend seen in this study, males have higher activity levels and females have healthier HRQoL scores, neither group (males nor females) were statistically significant on their own.

Standard deviation can be used to determine how much the groups deferred from the average values for each tested variable (physical activity and HRQoL). When compared to the average survey scores per group, standard deviation values reveal that the most variation occurred in the female responses to the HRQoL survey. However, males deviated more than females in the amount of physical activity. These deviation values show that there was more male variation in the physical activity levels. This could be the result of one male participant, who had zero MET minutes, and could be considered a low activity outlier.

Limited participation, and an uneven distribution between males and females (majority of the participants, 17 of the 24 overall, were female), led to data that was not truly representative of the University of Southern Mississippi's population size. However, according to the University of Southern Mississippi's Factbook for 2014-2015, 9,344 of the 14,792 students enrolled were females (2014). Only 5,488 of the enrolled students in the 2014-2015 school year were males (The University of Southern Mississippi, 2014). Therefore, it can be concluded that it is logical to expect a higher number of female to male participants. One of the more influential aspects of this project was the process of data collection. Students could not be sampled in a class, which led to the method of sampling student organizations on campus. This could have been a factor which affected turnout of students due to the fact that students do not regularly attend extracurricular meetings if they are not necessary/mandatory. Low attendance of group activities led to low numbers of students completing the survey, which negatively affected the results of this study. Female participants greatly outnumbered the males who took part, and this made it difficult to determine any conclusive findings regarding gender differences between males and females

when it comes to activity levels and health related quality of life scores. It is possible that low student turnout resulted in the non-significant findings when looking at males and females separately.

Further research into this topic would need to be carried out in order to see if significant statistical variations remain when more participants take part in the study. Similarly, it would be beneficial to sample more students, in order to even out the numbers of male and female participants. This way, it could be determined if a greater sample size would lead to significant statistical values between physical activity and HRQoL in male and female students. In future trials, it will be important to collect more samples from students because the more students in the tested population, the more accurate the statistical values. For example, if more students were informed of the project and had been interested in joining the research, there would have been more data. A larger sample size would have allowed for more accurate representation of the students on the University of Southern Mississippi's campus. Similarly, by sampling a larger group of college students, one might expect to see greater variety in gender of participants.

Conclusion

This research attempted to discern whether a relationship could be found between the physical activity levels of college students, and their health related quality of life. Despite low turnout numbers for potential test subjects, the statistical data showed that in the groups tested, there was an overall positive trend between physical activity and HRQoL in the overall population sampled, as well as males and females. This indicates that, contrary to past research, as levels of physical activity increased the HRQoL scores were also increasing. Higher HRQoL scores correspond to poorer perceived health of an individual. In addition, due to low numbers of males in this study, the statistical comparisons between male and female college students did not reflect the idea that one group over the other had higher physical activity levels corresponding to healthier self-ratings. Because the data in this study was somewhat inconclusive, especially when considering the trends that were expected based on past research, this topic would benefit from more trials.

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APPENDIX I

INSTITUTIONAL REVIEW BOARD

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Phone: 601.266.5997 | Fax: 601.266.4377 | www.usm.edu/research/institutional.review.board

NOTICE OF COMMITTEE ACTION

The project has been reviewed by The University of Southern Mississippi Institutional Review Board in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data
- Collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to
- Maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must
- Be reported immediately, but not later than 10 days following the event. This should be reported
- to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months.

Projects that exceed this period must submit an application for renewal or continuation.
PROTOCOL NUMBER: 17020104
PROJECT TITLE: Effect of Physical Activity on Quality of Life for College Students: A Comparative Gender Study

PROJECT TYPE: New Project

RESEARCHER(S): Sarah Boozer
COLLEGE/DIVISION: College of Health
DEPARTMENT: Kinesiology
FUNDING AGENCY/SPONSOR: Kinesiology
IRB COMMITTEE ACTION: Exempt Review Approval
PERIOD OF APPROVAL: 03/01/2017 to 02/28/2018
Lawrence A. Hosman, Ph.D.
Institutional Review Board

APPENDIX II

Healthy Days Core Module (CDC HRQOL– 4)

Code:

1. Would you say that in general your health is

a. Excellent 1

b. Very good 2

c. Good 3

d. Fair 4

or

e. Poor 5

Don't know/Not sure 7

Refused 9

2. Now thinking about your physical health, which includes physical illness and injury, for how many days during the past 30 days was your physical health not good?

a. Number of Days _

b. None

Don't know/Not sure

Refused

3. Now thinking about your mental health, which includes stress, depression, and problems with emotions, for how many days during the past 30 days was your mental health not good?

a. Number of Days _ _

b. None

Don't know/Not sure

Refused

4. During the past 30 days, for about how many days did poor physical or mental health keep you from doing your usual activities, such as self-care, work, or recreation?

a. Number of Days _ _

b. None

Don't know/Not sure

Refused

APPENDIX III

Global Physical Activity Questionnaire (GPAQ)

WHO STEPwise approach to NCD risk factor surveillance

Surveillance and Population-Based Prevention
Prevention of Noncommunicable Diseases Department
World Health Organization
20 Avenue Appia, 1211 Geneva 27, Switzerland
For further information: www.who.int/chp/steps

GPAQ

Code:

Physical Activity			
Next I am going to ask you about the time you spend doing different types of physical activity in a typical week. Please answer these questions even if you do not consider yourself to be a physically active person. Think first about the time you spend doing work. Think of work as the things that you have to do such as paid or unpaid work, study/training, household chores, harvesting food/crops, fishing or hunting for food, seeking employment. [Insert other examples if needed]. In answering the following questions 'vigorous-intensity activities' are activities that require hard physical effort and cause large increases in breathing or heart rate, 'moderate-intensity activities' are activities that require moderate physical effort and cause small increases in breathing or heart rate.			
Questions		Response	Code
Activity at work			
1	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
2	In a typical week, on how many days do you do vigorous intensity activities as part of your work?	Number of days ⌊_⌋	P2
3	How much time do you spend doing vigorous-intensity activities at work on a typical day?	Hours : ⌊_⌋⌊_⌋ : ⌊_⌋⌊_⌋ minutes hrs mins	P3 (a-b)
4	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
5	In a typical week, on how many days do you do moderate intensity activities as part of your work?	Number of days ⌊_⌋	P5
6	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 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, etc.			
7	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
8	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
9	How much time do you spend walking or bicycling for travel on a typical day?	Hours : minutes ⌊_⌋⌊_⌋ : ⌊_⌋⌊_⌋ hrs mins	P9 (a-b)
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).			

10	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
11	In a typical week, on how many days do you do vigorous intensity sports, fitness or recreational (leisure) activities?	Number of days ⌊__⌋	P11
12	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)

Continued on next page

GPAQ, Continued

Physical Activity (recreational activities) contd.			
Questions		Response	Code
13	Do you do any moderate-intensity sports, fitness or recreational (leisure) activities that causes 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
14	In a typical week, on how many days do you do moderate-intensity sports, fitness or recreational (leisure) activities?	Number of days ⌊__⌋	P14
15	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 behavior			
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, travelling in car, bus, train, reading, playing cards or watching television], but do not include time spent sleeping. [INSERT EXAMPLES] (USE SHOWCARD)			
16	How much time do you usually spend sitting or reclining on a typical day?	Hours : minutes ⌊__⌋⌊__⌋: ⌊__⌋⌊__⌋ hrs min s	P16 (a-b)