JDSS Journal of Development and Social Sciences
www.jdss.org.pk

RESEARCH PAPER

Relationship between Sleep Quality, Junk Food Consumption and Physical Activity among Research Students of BS and M Phil of Private University

[1]Noor Warsi Khan   [2]Dr. Asif. Ali*

1. B.Sc. (Honors) Physical Education & Sports Sciences, Government College University, Lahore, Punjab, Pakistan
2. Associate Professor, Chairperson, Department of Physical Education & Sports Sciences, Government college University, Lahore, Punjab, Pakistan

| ***Corresponding Author:** | asif.ali@gcu.educ.pk |

ABSTRACT

The study aimed to find the relationship between the sleep quality, junk food consumption and physical among research students of BS and MPhil of private university and the association of physical activity on junk food consumption among BS and MPhil research students. 429 research students from Lahore (Pakistan), participants took part in this cross-sectional research both males and females. The Pittsburgh Sleep Quality Index (PSQI), International Physical Activity Questionnaire (IPAQ-SF), junk food consumption questionnaire and demographic questions was used to collect data. The study finding showed that BS student reported higher amount of junk food consumption compared with M. Phil students. There was no significance difference between sleep quality and physical activity between BS and MPhil research students. The findings of this study are critical for encouraging the students to engage in physical activity and reduced the consumption of junk food.

Introduction

A In recent years, the students are facing crucial time regarding their health and well- being of the individual. As young adults who pursue higher education facing difficulties that have some effects on their physical health and social-life. Factors that involve in the well-being of university students are their sleep quality, physical quality and junk food consumption. Good sleep quality, healthy physical activity and good food intake plays a vital role in enhancing academic performance, also help to develop a good healthy habitual life. So, it is crucial to study the relationship between SQ, PA, and junk food consumption among university students by revealing the possible links between these variables. This study focused on the important connection between sleep quality, physical activity and junk food consumption the ways in which they influence the lives of universities research students. Sleep is a cognitive state that is an important part of everyone's life. We spend almost one-third of our living spent sleeping. The majority of individuals are unaware of the significance of this essential activity. Sleep is not merely a means of passing time when a person is physically inactive. Sleep is essential for normal motor and cognitive function, even though its particular functions remain unknown (Lemma et al., 2012). Sleep is one of the physiological and fundamental requirements of every individual, and its quality is correlated with health. Changes in a person's physical and social circumstances can instinctively affect their sleep duration and quality. Sleep can have a significant effect on an individual's health (Badicu, 2018). Sleep is an essential physiological process, and sleep disorders have a detrimental effect on health. We spend sleeping most of our lives; therefore, the state of our "sleep health" is a vital concern throughout our lives. Sleep disorders have become an increasingly prominent public health concern over time. We can

include insufficient sleep and subpar sleep quality among these sleeping disorders (Gutta et al., 2019).

According to report Yilmaz et al. (2017), over the past few decades, university students' sleep patterns have changed, affecting their sleep. In adolescents and young adults, sleep disorders are a common health concern. It is commonly believed that university students do not sleep enough. According to relevant studies, sleeping disorders are prevalent among college students at various frequencies and levels. Poor sleep quality negatively impacts academic achievement and bad physical health. In another study, it was discovered relationship between SQ and health of university students with poor sleep quality are more at risk for disorders.

A lot of different memories seem to be strengthened and stabilized by sleep. Not getting enough sleep affects not only how well memories stick, but also how they are stored. All of these thinking skills are very important during higher education, which is often seen as the most difficult time to learn in a person's life. Students in particular are supposed to remember a lot of complicated facts in a relatively short amount of time (Ahrberg et al., 2012).

Physical activity is most commonly important need to meet the demand of the modern lifestyle. It influences our health and daily performance and can reduce healthcare costs (Nowak et al., 2019). Physical activity has been recognized as a health-promoting factor. A physical active lifestyle effects health in every aspect (Sjøgaard et al., 2016). According to World Health Organization (2010) PA is the physiological exercise by body that uses body power. It is important to note that one in five individuals around the globe is completely inactive (Dumith et al., 2011). Akinci (2021) concluded that without consideration of physical fitness students has issues with their body mass and energy level. Only by changing lifestyle would be able to prevent low fitness (DeBar et al., 2011). By, promoting dietary modifications and increase in their physical exercise (Andersen et al., 2006). Kwan et al. (2012) noticed that there is obvious fall in physical activity after enrolling in universities, and according to several academics. One-third of students are already physical unactive after going to university life (Bray & Born, 2004).

Junk foods are foods that are easy to get, generally cheap, and don't have much nutritional value. These foods have more calories, more salt, and more saturated fat than others. They also have less iron, calcium, and fiber. Fast food, carbonated drinks, chips, sweets, and candies are all examples of junk foods (Bohara et al., 2021). The term "junk food" refers to foods that are typically low in nutritional value. Most of the calories in junk food come from sugar or fat, and they don't have much protein, vitamins, or minerals. Most bad foods are high in fat and low in other good things for you. Fast food, chips, candy, gum, sweet treats, sugary carbonated drinks, and alcoholic drinks are all types of junk food. Depending on what they are made of and how they are made, things like hamburgers and pizzas can be healthy or unhealthy. Most of the time, junk food is made up of highly processed foods. Elite people tend to consume more junk food, while people with a smaller budget may see fewer foods, especially certain ethnic foods, as junk food (Arora et al., 2019). One of the biggest nutrition issues for teenagers is their habit of eating unhealthy snacks, or "junk food," which has low nutritional value and a lot of fat and sugar. Frequent snacking on bad foods has connected health problems, like a higher rate of obesity, and other long-term diseases among young people (Karimi-Shahanjarini et al., 2012).

Literature Review

The current study focused on exploring the relationship of sleep quality, physical activity and junk food consumption among BS and MPhil research students in private university.

Global Perspectives on health and well-being

Kosendiak et al. (2023) studied aimed to examine the relationship between the same variables in students from all years at the Wroclaw Medical University participated in the study between October 2020 and March 2021. The study's goal was to determine the connection between a few factors, including gender and levels of physical activity, and the medical students' sleep quality throughout the epidemic. The final results included $N = 696$ replies from October and $N = 652$ from March. The sleep quality and the physical activity was assessed. Results showed an increase in walking activity among male students at the medical institution when comparing physical activity in both study periods and between genders. The quality of sleep and duration of sleep also effected significantly in both genders.

Lemma et al. (2012) a survey in two Ethiopian universities. $N = 2,817$ students were enrolled in the study. There are strong correlations between indicators of psychosocial status and poor sleeper among Ethiopian university students. Students at universities will probably perform better academically and have better mental health if they get better sleep. Academic performance may be enhanced by educational campaigns aimed at preventing the accumulation of long-term sleeping disorders at universities.

Promoting healthy lifestyle

Faught et al. (2017) conducted research to evaluate the diet, sleep quality and physical activity of sample N = 4253 students and their parents participated in a survey regarding. Discovered that student academic achievement is substantially correlated with lifestyle choices rather than body weight. Promoting adherence to accepted guidelines for a healthy lifestyle may help school-aged children achieve better health and academic results. Multiple lifestyle behaviors that are the focus of school-based health promotion activities may have a higher impact on academic achievement than a single one.

The Junk food industry has long attempted to make its products more accessible, and this effort is still going strong today as evidenced by the proliferation of retail establishments in locations such as office buildings, department stores, and airports. A significant percentage of the rise in consumption can be attributed to the increased provision of convenience (Boyer & Yang, 2017).

Contradiction to the study

Boylan et al. (2017) report that between 2010 and 2015, sample $N = 7565$ children and 6944 both had complete data on their intake of junk food. Junk food consumers were more likely to be allowed to eat snacks whenever they wanted, receive sweets as rewards three times a week. There were few eat junk food frequently in 2015 than there were in 2010. The first study to develop and assess a comprehensive summary indicator of young people's junk food consumption in Australia. The findings suggest that fast food is unhealthy.

Singh et al. (2021) designed research to explore the junk food consumption, sleep quality and physical activity of the sample $N = 627$ adolescents were randomly chosen for a cross-sectional study. Data were gathered using a self-administered structural questionnaire. Utilizing reliable techniques, anthropometric data (including an adolescent's BMI), sleep characteristics, food practices, and physical activity levels were evaluated.

The findings call for rapid lifestyle changes to lower overweight/obesity among Nepalese teenagers. Adolescents must be encouraged to adopt healthy lifestyle behaviors by providing supportive environments at home and school.

Material and Methods

Research Design

The research implemented a descriptive cross-sectional research design and correlational design research to explore the predictive relationship sleep Quality, physical activity and junk food consumption between BS and M.Phil. research students of private universities.

Sample

The present study recruited a sample of students N = 186 (Male, n = 105, Female, n= 79) with age between 21 and 25 years. Students from BS (under graduation) and M.Phil. (post-graduation) were included, BS students (61.4%), M.Phil. students (38.6%) from both genders.

Inclusion Criteria

- Only those male and female students were included who were studying in BS (under graduation) and M.Phil. (post-graduation).

- The age group from 21-25 was included in the study.

Exclusion Criteria

- Students of Matric and Intermediate were not included

- Students of BS who were not doing research

- Students who are Physically challenged

Instruments

Following instruments were used for the purpose of collecting data from different private universities of Lahore, Pakistan.

Pittsburgh Sleep Quality Index

Buysse et al. (1989) developed the PSQI that was used in this study. This instrument was designed to identifies individuals sleep quality. The instrument was used after getting the permission from the authors. The components scores range from 0 to 3. A PSQI score greater than 5 indicates poor sleep quality. This questionnaire distinguishes between good and poor sleepers.

International Physical Activity Questionnaire

The International Physical Activity Questionnaire (IPAQ) used in the study was developed by Craig et al. (2017). In this study, IPAQ instrument was used to collect data that provides on physical activity level. This was a self-administration Questionnaire consisted on four-set questions. The questionnaire was used after getting permission from the author. The scale internal reliability was (α = .80).

The IPAQ inquiries three different types of exercise performed across four different areas. This questionnaire describes the intensity of physical activity as Metabolic. Each question must require at least 10 minutes of exercise to answer the esc item.   All results

were reported in MET-minutes per week. Three levels of PA were divided in low, moderate, and high levels of physical activity.

Junk Food Consumption

The junk food consumption questionnaire was developed by Sequeira et al. (2014) was used in this study. This questionnaire was used to measure consumption junk food of individuals. This study determines the level of junk food consumption and reasons for junk food consumption among students. The questionnaire was used after getting consent through the author.

Data Collection

Firstly, the authors' consent was obtained before any instrument could be used in the study. According to the criteria of inclusion and exclusion, a demographic sheet was created to collect data from the participants. Unlike online data filing, where questions were sent to respondents by mail or other electronic means, all the data were gathered directly through participant physically. The researcher sought participants by using purposive sampling. They were told the study's goals and objectives and given assurances about the privacy of the data collected. The participants were given the standardized PSQI, IPAQ, and Junk Food Consumption Questionnaire.

Ethical Guidelines

The research was conducted with the stated relevant ethical issues in mind.

- Approval was taken from the department for conducting this research.

- For conducting this research consent was taken from the authors of research instruments.

- Participants were guaranteed the privacy of the data collected.

- Participant's identity was not exposed and the information collected was analyzed statistically by averaging out the data information.

Result and Discussion

Table 1
Demographics Characteristics of the Participants

Variables	f (% age)	M	SD
University			
1	112 (26.1)		
2	117 (27.3)		
3	117 (27.3)		
4	83 (19.3)		
Qualification			
BS	256 (59.7)		
M.PHIL	173 (40.3)		
Age in years		23.20	1.75
Gender			
female	167 (38.9)		
male	262 (61.1)		
Marital Status			
married	26 (6.1)		
unmarried	403 (93.9)		

Do you live in Hostel?	
Yes	142 (33.1)
No	287 (66.9)
Family Income	
Less than 50k	55 (12.8)
50k-1 lakh	160 (37.3)
1lakh-1.50lakh	117 (27.3)
More than 1.5lakh	97 (22.6)
Body Mass Index (BMI)	
Under weight	74 (17.2)
normal weight	257 (59.9)
overweight or obsess	81 (18.9)
Obesity level 1	17 (4.0)

Note: N = 429, f = frequency, *% = percentage, M = mean, SD = standard deviation, 1=* NCBA, *2= UOL, 3= UMT, 4=LGU*

Table 1 presents the results of descriptive analyses conducted on various demographic variables. The gender variable consisted of 167 females and 262 males, accounting for 38.9% and 61.1% respectively. The study included 19 and 31 years of aged comprising (*M=* 23.20 years, *SD* = 1.75). The qualification variable consisted of BS and M.Phil. students, with 59.7% and 40.3 % respectively. There were 256 BS students and 173 M.Phil. students. The marital status variable indicated that 6.1% of the participants are married (*f* = 26 participants), while 93.9 % are unmarried (*f* = 262 participants). The participants that lived in hostel are 33.1 % (142 participants) and those who were not lived in hostel are 66.9% (*f* = 287 participants). The monthly income variable had four categories: Less than 50k, 50k-1 lakh, 1lakh-1.50lakh and more than 1.5lakh. The frequencies for these categories were 55, 160, 117 and 97 with percentages of 12.8%, 37.3%, 27.3% and 22.6%. Lastly, the BMI had four classifications was underweight, normal weight, over weight and Obesity. The frequencies for those categories were 74, 257, 81 and 17 with percentage of 17.2%, 59.9%, 18.9% and 4.0% respectively

Table 2
Correlation of Sleep Quality, Junk Food Consumption and Physical Activity

	Variables	*M*	*SD*	1	2	3	4	5	6	7	8
1.	Sleep Quality	1.62	.49	-	-.08	.17**	.00	.09	.11*	.00	.00
2.	Physical Activity level	2.32	.98		-	-.40**	-.16**	-.35**	-.25**	.17**	.12*
3.	JF-1	2.51	1.19			-	.02	.42**	.47**	-.09	-.08
4.	JF2	2.06	.91				-	.58**	.07	.09	.02
5.	JF-3	3.05	1.21					-	.34**	.05	.02
6.	JF-4	2.32	1.10						-	-.03	-.04
7.	JF-5	2.31	.99							-	.66**
8.	JF-6	2.24	1.05								-

Note: N=429, M= Mean, SD= Standard deviation JF-1: personal opinion on junk food, JF-2= Junk food intake Before coming to university, JF-3= Eating junk food now days, JF-4= replacing regular meal with junk food, JF-5= Concerned effect of Junk food on health, JF6= Preference of healthy Alternatives

*P <.05, **P <.01.

Table 2 indicates the results of *Pearson-Product Moment* analysis. The results indicate significant positive relationship between Sleep Quality, personal opinion on junk food (*r* = .17, *p* < .05), replacing regular meal with junk food (*r* = .11, *p* < .05). high score of

sleep quality and junk food consumption indicates poor sleep quality and high eating behavior. This implies positive relationship between their scores of sleep quality and junk food consumption but the impact was negative. This means that individuals who get better sleep quality was more concerned about junk food consumption.

The results indicate significantly negative correlation between physical activity level, personal opinion on junk food (r = -.40, p < .05), junk food intake before coming to university (r = -.16, p < .05), eating junk food now days (r = -.35, p < .05), replacing regular meal with junk food (r = -.25, p < .05). the high scores of physical activities indicate high activity level. The showed inverse relationship with the scores of physical activity and junk food intake but has positive impact. This means that individuals who perceive their physical activity well were more likely to consumes low junk food. The results are significantly positive correlation with concerned effect of junk food on health (r = .17, p < .05) and preference of healthy alternatives (r = .12, p < .05). The trend of the relationship was significantly positive and the impact was also positive and exhibit higher level of concerned the effect of junk food on their heath.

Table 3
Regression Coefficients of Physical Activity on Junk Food Consumption in BS and MPhil Research Students

Dependent Variables (Junk Food Factors)	Predictor Variable	B	β	SE	R^2	P
Personal opinion on junk food	Physical Activity	-.48	-.40	.05	.16	.000
Eating junk food now days	Physical Activity	-.35	-.35	.05	.12	.000
Replacing regular meal with junk food	Physical Activity	-.28	-.25	.05	.06	.000

Note: N = 429

*****P < .001.

Simple linear regression was implied to access the association of physical activity on junk food consumption. The regression analysis yielded the inverse relationship between research student of BS and MPhil in physical activity on junk food consumption (see table 3). The level of activity and junk food consumption reduced as the score reduced. The physical activity variable shows value of R^2 was .16 with 16% variance in the personal opinion on junk food with F (1, 427) = 80.81, p < .001. This result suggest physical activity has a significant negative association with personal opinion on junk food (see table 3).

The physical activity variable shows value of R^2 was .12 with 12% variance in the eating junk food now days with F (1, 427) = 58.50, p < .001. This result suggest physical activity has a significant negative association with eating junk food now days (see table 3).

The physical activity variable shows value of R^2 was .06 with 06% variance in the replacing regular meal on junk food with F (1, 427) = 27.86, p <.001. This result suggest physical activity has a significant negative association with replacing regular meal with junk food (see table 3).

The study findings show that research students of BS and MPhil physical activity and junk food consumption were significant. Physical activity increase research students concerned and reduced the intake of junk food consumption. So, increase in physical activity can make students more conscious about their junk food consumptions.

Table 4
Comparison Scores of Sleep Quality, Physical Activity and Junk Food Consumption between BS and M.Phil. Students

Variables	BS		M.Phil.		t	p	Cohen's d
	M	SD	M	SD			

Sleep Quality	1.61	.49	1.64	.48	-.59	.553	0.061
Physical Activity	2.27	.95	2.38	1.03	-1.12	.264	0.09
JF-1	2.64	1.22	2.32	1.11	2.74	.006	0.40
JF2	2.10	.93	2.00	.87	1.10	.274	0.11
JF-3	3.07	1.21	3.01	1.21	.53	.599	0.04
JF-4	2.32	1.10	2.31	1.09	.08	.940	0.00
JF-5	2.35	1.01	2.25	.97	1.05	.292	0.10
JF-6	2.35	1.03	2.09	1.07	2.54	.011	0.24

Note: N = 429, M = Mean*, SD=* Standard deviation, JF-1: personal opinion about junk foods, JF-2= Junk food intake Before coming to university, JF-3= Eating junk food now days, JF-4= replacing regular meal with junk food, JF-5= Concerned effect of Junk food on health, JF6= Preference of healthy Alternatives

To compare sleep quality, junk food consumption and physical activity of BS and MPhil students an independent sample t-test was performed. There was a significant difference in the junk food-1 which is personal opinion about junk food. Table 4.4 revealed significant mean differences on junk food component-1 with t (429) = 2.74, *p* < .05. Findings showed that the BS Students reported higher significant subjective sleep quality (*M* =2.64, *SD* = 1.22) compared to the M.Phil. students (*M* = 2.32, SD = 2.74). The effect size value was 0.40 (< 0.50) which shows small impact.

There was a significant difference in the junk food component-6 which was preference for healthy alternative. Table 3 revealed significant mean differences on junk food component-6 with t (429) = 2.54, *p* < .05. Findings showed that the BS students reported higher significant preference for healthy alternative (*M* =2.35, *SD* =1.03) compared to the M.Phil. students (*M* =2.09, *SD* =1.07). The effect size value was 0.24 (<.50) which showed impact was small.

Discussion

The aim of research was to explore the effects of physical activity level with junk food consumption, sleep quality and determining the relationship between sleep and junk food among research students of BS and M.Phil. students. The results showed that BS student reported higher amount of junk food consumption compared with M.Phil. students. There was no significance difference between sleep quality and physical activity between BS and MPhil research students. In addition, poor sleep was related with increased junk food consumption among this population.

Firstly, it was founded that junk food consumption was significantly higher in BS students as compared with M.Phil. research students. Finding of the research was similar to the previous that also showed, despite being aware of its negative implications junk food was common among young adults, both in males and females as research conducted by Khan et al. (2021) revealed that young people were more attracted towards Junk food. Moreover, Sequeira et al. (2014) showed that students of undergraduate were shown higher desire in eating junk food than graduate students. Furthermore, it was found that 55.2% of young adolescents consumed fast food minimum 1 day a week globally. The overall prevalence of junk food was reported higher in young adolescents (Li et al., 2020).

Secondly, research finding revealed that there was significantly negative association of physical activity with junk opinion, junk food intake and junk food concerned suggesting that increase in physical activity decreased the junk food consumption. Whoever, no association was found between PA level and SQ. Finding revealed that high level physical activity provides a supportive and nurturing environment that fosters the reduction of the junk food consumption. The study by Holliday and Blannin (2017), examined the impact of physical activity on junk food consumption discovered that PA was associated with low level of junk food consumption in Students. Moreover, research conducted by Beer et al. (2017), showed the connection between exercise motivation and post-exercise food

consumption, students reported more controlled motivation to exercise were less likely to support the consumption of unhealthy snacks and beverages after engaging in an acute exercise session. According to study, by controlled the potential confounding factors junk food intake was showed to be strongly associated to poor physical health Zahra et al. (2014). As a result, of this research confirmed that physical activity predicts lower level of junk food consumption that targets the intervention of physical health and well-being.

Implications

Health education programs should introduce that focuses on the risk of consumption of junk food and tell the positive benefits of physical activity to young adults' students. Universities should create fitness program and fitness faculties that help students to engage in physical exercise. Policy makers and university management, professors and their parents should focus on promotion of sports to foster physical activity and to reduce the eating unhealthy food such as higher level of behaviours towards junk food among young students.

Through Sports promoting culture and educational programs should introduced that reduced the eating of unhealthy food and encourage the healthy life style and well-being.

Limitation

The study may have had a poor response rate, with just a minority of the targeted subjects participating. Limited resources or difficulty in recruiting participants results in small sample sizes of private university, therefore finding cannot be apply to other public universities students. The study may have had a poor response rate, with just a minority of the targeted subjects participating.

Future Reconditions

The study seems to imply used cross-sectional design, in which data was gathered at a specific time. Time was short as research demands time-intensive data collection, posing limitations on comprehensiveness and depth. Longitudinal studies might provide further information about the relationship between SQ, PA and junk food intake. Longitudinal study can impact the change in the eating junk food consumption. Moreover, it will be more fascinating to find difference between gender males and females.

Conclusion

This study explores and predictive relationship of sleep quality, physical activity and junk food consumption in research students. Moreover, this study investigates the findings with regards to association between physical activity and junk food consumption. It was discovered that there was inverse association in both BS and MPhil students showed higher level of physical activity reduced consumption of junk food. Conducting research on sleep quality, physical activity and junk food consumption in BS and MPhil research students was crucial for gaining a deeper understanding of their interrelationships, developing targeted interventions and promoting good sleep, well-being and healthy eating.

Reference

Ahrberg, K., Dresler, M., Niedermaier, S., Steiger, A., & Genzel, L. (2012). The interaction between sleep quality and academic performance. *Journal of psychiatric research*, *46*(12), 1618-1622.

Akinci, Y. (2021). *Health Related Fitness Physical Education Intervention: Effects On Students' Fitness Knowledge Physical Activity And Physical Fitness Levels*. Akademisyen Kitabevi.

Andersen, L. B., Harro, M., Sardinha, L. B., Froberg, K., Ekelund, U., Brage, S., & Anderssen, S. A. (2006). Physical activity and clustered cardiovascular risk in children: a cross-sectional study (The European Youth Heart Study). *The Lancet*, *368*(9532), 299-304.

Badicu, G. (2018). Physical activity and sleep quality in students of the Faculty of Physical Education and Sport of Braşov, Romania. *Sustainability*, *10*(7), 2410.

Beer, N. J., Dimmock, J. A., Jackson, B., & Guelfi, K. J. (2017). Providing Choice in Exercise Influences Food Intake at the Subsequent Meal. *Medicine and science in sports and exercise*, *49*(10), 2110-2118.

Bohara, S. S., Thapa, K., Bhatt, L. D., Dhami, S. S., & Wagle, S. (2021). Determinants of junk food consumption among adolescents in Pokhara Valley, Nepal. *Frontiers in Nutrition*, *8*, 109.

Boyer, R. R., & Yang, L. L. (2017). Establishing a Food Safe Market: Considerations for Vendors at the Farmers Market. *Food Safety for Farmers Markets: A Guide to Enhancing Safety of Local Foods*, 145-166.

Boylan, S., Hardy, L., Drayton, B., Grunseit, A., & Mihrshahi, S. (2017). Assessing junk food consumption among Australian children: trends and associated characteristics from a cross-sectional study. *BMC Public Health*, *17*, 1-9.

Bray, S. R., & Born, H. A. (2004). Transition to university and vigorous physical activity: Implications for health and psychological well-being. *Journal of American College Health*, *52*(4), 181-188.

Buysse, D. J., Reynolds III, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry research*, *28*(2), 193-213.

Craig, C., Marshall, A., Sjostrom, M., Bauman, A., Lee, P., Macfarlane, D., Lam, T., & Stewart, S. (2017). International physical activity questionnaire-short form. *J Am Coll Health*, *65*(7), 492-501.

DeBar, L. L., Schneider, M., Drews, K. L., Ford, E. G., Stadler, D. D., Moe, E. L., White, M., Hernandez, A. E., Solomon, S., & Jessup, A. (2011). Student public commitment in a school-based diabetes prevention project: impact on physical health and health behavior. *BMC Public Health*, *11*, 1-11.

Dumith, S. C., Hallal, P. C., Reis, R. S., & Kohl III, H. W. (2011). Worldwide prevalence of physical inactivity and its association with human development index in 76 countries. *Preventive medicine*, *53*(1-2), 24-28.

Faught, E. L., Ekwaru, J. P., Gleddie, D., Storey, K. E., Asbridge, M., & Veugelers, P. J. (2017). The combined impact of diet, physical activity, sleep and screen time on academic

achievement: a prospective study of elementary school students in Nova Scotia, Canada. *International Journal of Behavioral Nutrition and Physical Activity*, *14*, 1-13.

Gutta, S., Shenoy, J., Kamath, S. P., Mithra, P., Baliga, B. S., Sarpangala, M., & Srinivasan, M. (2019). Light emitting diode (LED) phototherapy versus conventional phototherapy in neonatal hyperbilirubinemia: a single blinded randomized control trial from coastal India. *BioMed Research International*, *2019*.

Holliday, A., & Blannin, A. (2017). Appetite, food intake and gut hormone responses to intense aerobic exercise of different duration. *Journal of Endocrinology*, *235*(3), 193-205.

Karimi-Shahanjarini, A., Rashidian, A., Majdzadeh, R., Omidvar, N., Tabatabai, M. G., & Shojaeezadeh, D. (2012). Parental control and junk-food consumption: a mediating and moderating effect analysis 1. *Journal of Applied Social Psychology*, *42*(5), 1241-1265.

Khan, S. K., Alwi, K. K., & Nadeem, N. (2021). Eating Out: Fast Food Consumption and its Impact on Health of Young Generation of Karachi. *International Journal of Experiential Learning & Case Studies*, *6*(1), 39-49.

Kosendiak, A. A., Adamczak, B., Kontek, S., Kuźnik, Z., Roman, M., Gostkowski, M., & Niedziółka, A. (2023). Level of Physical Activity, Sleep Quality and Use of Personal Protective Equipment of Students at Wroclaw Medical University during the COVID-19 Pandemic. *International Journal of Environmental Research and Public Health*, *20*(3), 2406.

Kwan, M. Y., Cairney, J., Faulkner, G. E., & Pullenayegum, E. E. (2012). Physical activity and other health-risk behaviors during the transition into early adulthood: a longitudinal cohort study. *American journal of preventive medicine*, *42*(1), 14-20.

Lemma, S., Gelaye, B., Berhane, Y., Worku, A., & Williams, M. A. (2012). Sleep quality and its psychological correlates among university students in Ethiopia: a cross-sectional study. *BMC psychiatry*, *12*, 1-7.

Li, L., Sun, N., Zhang, L., Xu, G., Liu, J., Hu, J., Zhang, Z., Lou, J., Deng, H., & Shen, Z. (2020). Fast food consumption among young adolescents aged 12–15 years in 54 low-and middle-income countries. *Global health action*, *13*(1), 1795438.

Nowak, P. F., Bożek, A., & Blukacz, M. (2019). Physical activity, sedentary behavior, and quality of life among university students. *BioMed Research International*, *2019*.

Sequeira, A., Sowmya, A., Thomas, B., Mahajan, C., & Kumar, C. (2014). A study on junk food consumption behavior among college students. *Developmental psychology ejournal*.

Singh, D. R., Sunuwar, D. R., Dahal, B., & Sah, R. K. (2021). The association of sleep problem, dietary habits and physical activity with weight status of adolescents in Nepal. *BMC Public Health*, *21*, 1-17.

Sjøgaard, G., Christensen, J. R., Justesen, J. B., Murray, M., Dalager, T., Fredslund, G. H., & Søgaard, K. (2016). Exercise is more than medicine: The working age population's well-being and productivity. *Journal of Sport and Health Science*, *5*(2), 159-165.

World Health Organization, t. (2010). *Global recommendations on physical activity for health*. World Health Organization.

Yilmaz, D., Tanrikulu, F., & Dikmen, Y. (2017). Research on sleep quality and the factors affecting the sleep quality of the nursing students. *Current health sciences journal*, *43*(1), 20.

Zahra, J., Ford, T., & Jodrell, D. (2014). Cross-sectional survey of daily junk food consumption, irregular eating, mental and physical health and parenting style of B ritish secondary school children. *Child: care, health and development*, *40*(4), 481-491.