

Correlation between Physical Activity Levels and Psychological Well-Being Levels in Health Care Workers

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Abstract: *COVID-19 outbreak came with various life threatening issues and the health care workers were the ones most affected by this with longer working hours, fear of the virus, stressful job. And are therefore under increased physical and psychological pressures. This study was done to assess and understand the Correlation between physical activity levels and psychological well-being levels in health care workers, using the IPAQ scale and the PGWBI scale. The results were then analyzed and showed a positive correlation.*

Keywords: COVID-19, Healthcare workers, Physical Activity, Psychological well-being

1. Introduction

Pandemics always come up with various life-threatening issues. COVID-19 outbreak came up with the same issues along with certain other problems involving public, administrative and healthcare sector concerns. Depending on the care that is needed, a person staying in the hospital may interact with many different staff members every day. A **hospital care team** includes many different practitioners which includes- Attending physician, Residents, interns, and medical students, Specialists, Nurse practitioners Patient care technicians, Physical therapists, Occupational therapists, Hospital pharmacists, Dieticians. [1]

Healthcare workers are working day and night just to protect the citizens despite being at high-risk exposure. Physical, Social, economic, psychiatric and many other factors are responsible for deteriorating the health of these frontline healthcare workers.

Healthcare professionals dealing with COVID-19 are under increased psychological pressure such as longer working hours, greater exposure to the virus, fear of being a carrier of the virus to the family, staying away from the family. They even experience high rates of psychiatric morbidity because of these factors.

Psychological well-being refers to inter and intra individual levels of positive functioning that can include one's relatedness with others and self-referent attitudes that include one's sense of mastery and personal growth. Subjective well-being reflects dimensions of affect judgments of life satisfaction. [2] Taking care of the mental health of providers directly affects their ability to fully serve their patients. Keeping a positive attitude is very important for the health care workers to give their best while looking after the people who are in need. A calm and stable mind is required to make the best choices in times of a pandemic. Psychological wellbeing has an important impact on individuals' performance.

Physical activity is very important, since it has multiple beneficial effects on physical, mental and spiritual health and wellness. Healthcare workers make up a physically and mentally burdened group with the rotating work shift, demanding tasks, together with family related issues make

the physical activity hard to planned and performed and with the long working hours because of the pandemic it is impossible.

Despite of all the complications and toil health care workers are facing, still they are managing to put forth their best efforts in serving the community.

Physical activity is defined as any voluntary bodily movement produced by skeletal muscles that require energy expenditure. Physical activity encompasses all activities, at any intensity, performed during any time of day or night. It includes exercise and incidental activity integrated into daily activity. [3]Lack of physical activity is associated with a range of negative health outcomes such as heart disease, type 2 diabetes, cholesterol, high blood pressure and even obesity. Whereas increased physical activity can improve physical as well as mental health.

The Harmful Effects of Not Getting Enough Physical Activity, Not getting enough physical activity can lead to heart disease even for people who have no other risk factors. It can also increase the likelihood of developing other heart disease risk factors such as coronary artery disease, ischaemic heart disease, including obesity, high blood pressure, high blood cholesterol, and type 2 diabetes. [4] Physical activity helps control blood sugar (glucose), weight, and blood pressure and helps raise "good" cholesterol and lower "bad" cholesterol. Adequate physical activity can also help reduce the risk of heart disease and nerve damage, which are often problems for people with diabetes. Physical inactivity may increase the risks of certain cancers, which may contribute to anxiety and depression. There is a likely higher risk of cardiovascular diseases and people engaging into physical activity are less likely to develop coronary heart disease. [5] People who are active are less likely to be overweight or obese and the skeletal muscles mass levels would be maintained. Physical inactivity is also linked to high blood pressure and elevated cholesterol levels. Studies assessing the relation of physical activity with psychological well-being in various populations in different population. The relationship between physical activity and mental health in a sample of the UK public: A cross-sectional study during the implementation of COVID-19 social distancing measures. Which concluded that the present sample of UK adults,

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those who were physically active have better overall mental health. Owing to the cross-sectional design of the present study the direction of the association cannot be inferred [6]. Enhancing Subjective Well-Being through Physical Activity for the Elderly in Korea: A Meta-Analysis Approach this study Concluded that the results of the current meta- study clearly indicates that regular physical activity brings psychological health benefits in older adults. In particular, physical activity in elderly people brings a greater level of subjective well-being in terms of self-efficacy, which is an important element of sustainable participation in physical activity. [7]

Need of the study

To assess and understand the correlation between physical activity and psychological well-being in health care workers.

Physical activity levels would be proportional to the psychological well-being Levels. If there are low levels of physical activity this would directly affect the levels of well-being.

Physical activity stimulates the release of feel-good brain chemicals. There is release of endorphins and other neurotransmitters when a person indulges into exercising. Physical activity also releases dopamine, norepinephrine and serotonin. These hormones play an important part in regulating the mood. [12]

Regular exercising helps improve one's appetite, sleep patterns, balance your body's stress hormones levels such as adrenaline. Adrenaline plays a crucial role in fight-or-flight responses response.

Aim and Objective

The aim of the study is to correlate the physical activity levels with psychological well-being level in health care workers.

Objectives

- 1) To assess physical activity levels using IPAQ long form in health care workers.
- 2) To assess psychological well-being in health care workers using Psychological General Well-being Index (PGWBI)
- 3) To correlate the physical activity levels and psychological well-being levels in health care workers.

2. Methodology

The questionnaire was sent in Google forms format and 50 responses were recorded. The form had 3 parts:

1st part of the form was the **consent form** and the **demographic data** consisting of age and BMI of the participants was recorded. Scales used were the IPAQ long form and psychological general well-being index for assessment.

2nd part of the form was **The International Physical Activity Questionnaires (IPAQ)** Long version has 5 activity domains asked independently. The purpose of the questionnaires is to provide common instruments that can be used to obtain internationally comparable data on health-related physical activity.

3rd part of the form was **The Psychological General Well-being Index (PGWBI)** questionnaire, which includes 22 items, allows to measure stress level by self-perceived evaluation Questions cover 6 aspects: anxiety, depressed mood, positive well-being, self-control, general health and vitality. Each scale includes 3–5 items.

The PGWBI global score represents the sum of all items and ranges from 0 to 110. Higher scores indicate greater psychological well-being.

Research approach- cross sectional

Study design- observational

Duration of study- 6months

Sample size- 50 health care workers

Inclusion criteria

Health care workers working in a clinical setting for over 3months during COVID-19 which includes doctors, physiotherapists, ward boys, nurses, emergency medicals, dental professionals, laboratory technicians.

Exclusion criteria

- Individuals with any pre-existing psychological conditions
- Individuals not working during the pandemic.
- Recent surgery, fracture or any musculoskeletal or neurological illness hindering the physical activity levels.

3. Review of Literature

1. Biddle SJH, Fox K, Boutcher S. Physical activity and psychological well-being editors. London, England: Routledge; 2003. The 'feel-good' effect of physical activity is widely reported among participants. Physical Activity and Psychological Well-Being represents a research consensus on the relationship between physical activity and aspects of mental health, providing an overview of the case for the role of exercise in the promotion of psychological well-being. Topics covered includes* anxiety and stress* depression* mood and emotion* self-perceptions and self-esteem* cognitive functioning and ageing* psychological dysfunction. This book is invaluable reading for students and researchers working in the exercise, sport and health sciences, and for health and clinical psychologists. It is also a foundation text for health promotion and health service professionals, particularly those working the area of mental health. [8]

2. Lindwall M, Gerber M, Jonsdottir IH, Börjesson M, Ahlberg G Jr. The relationships of change in physical activity with change in depression, anxiety, and burnout: a longitudinal study of Swedish healthcare workers. Health Psychol. 2014; 33(11):1309–18.

Objective: The purpose of the present study was to examine whether intraindividual changes in physical activity were

correlated with intraindividual changes in mental health (depression, anxiety, and burnout)

Results: Baseline levels of physical activity were moderately associated with baseline levels of mental health [11]

Conclusions: Changes in physical activity were associated with, and travelled together with, changes in depression, anxiety, and burnout across time. Changes in physical activity, and not only current or previous levels of activity, may be important to consider in preventive work linked to mental health within this population.

3. Kim ES, Kubzansky LD, Soo J, Boehm JK. Maintaining healthy behavior: A prospective study of psychological well-being and physical activity. *Ann Behav Med.* 2017; 51(3):337–47.

Although higher psychological well-being has been linked with a range of positive biological processes and health outcomes, the prospective association between psychological well-being and physical activity among older adults has been understudied.

4. Maugeri G, Castrogiovanni P, Battaglia G, Pippi R, D’Agata V, Palma A, et al. The impact of physical activity on psychological health during COVID-19 pandemic in Italy. *Heliyon.* 2020;6(6):e04315.

Objective: The present study aimed to examine changes in the physical activity levels during self-quarantine in Italy, and the impact of exercise on psychological health.

Conclusion: Based on this scientific evidence, maintaining a regular exercise routine is a key strategy for physical and mental health during a forced rest period like the current coronavirus emergency. [9]

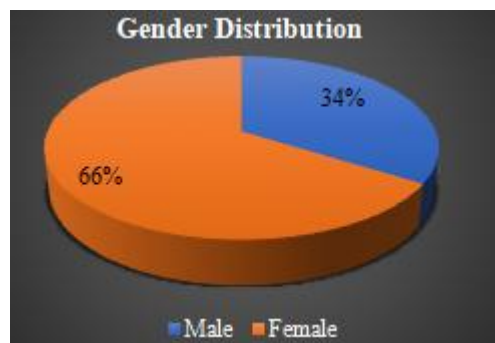
5. Saxena S, Van Ommeren M, Tang KC, Armstrong TP. Mental health benefits of physical activity. *J Ment Health.* 2005; 14(5):445–51.

Background: Public health discussions of physical activity have tended to focus on physical health benefits rather than mental health benefits.

Aim: This article provides a commentary on the potential benefits of physical activity on mental health.

Conclusions: The article summarises key literature that describes physical activity as an intervention that may be helpful for the promotion of mental health and wellbeing, the prevention and treatment of common mental disorders, and as a strategy in psychosocial rehabilitation for persons with severe mental disorders. [10]

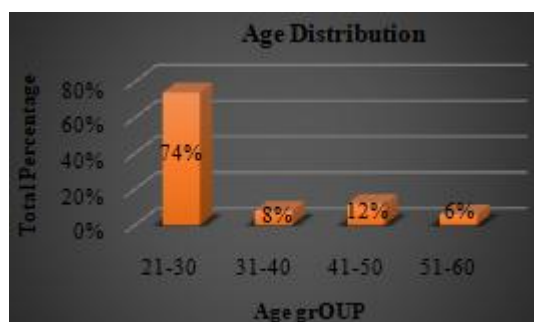
4. Data Analysis



Graph 1: Gender Distribution

Gender	Percentage	Total Number
Male	34%	17
Female	66%	33

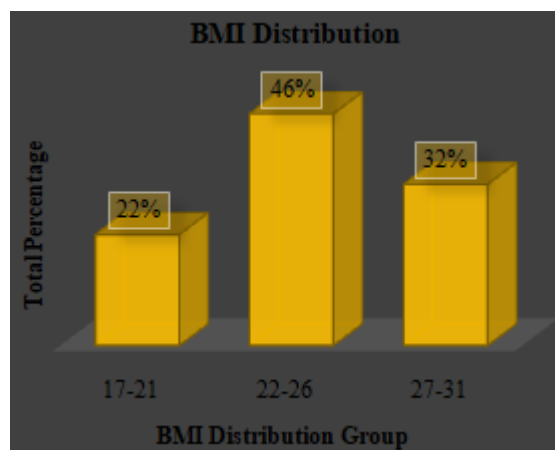
Inference: 34% of the health care workers were males and rest (66%) were females.



Graph 2: Age Distribution

Age Group	Total Percentage	Total number
21-30	74%	37
31-40	8%	4
41-50	12%	6
51-60	6%	3

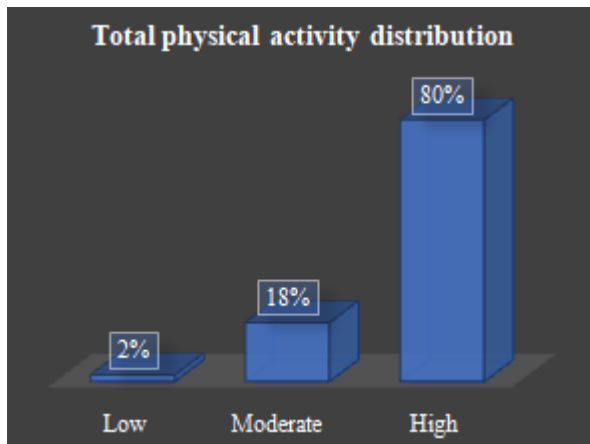
Inference: 74% of the health care workers were in the age group of 21-30years, 12% of them fall under the age group of 41-50years. There are 8% of participants who fall under the age group of 31-40years and the rest 6% are in the age group of 51-60years.



Graph 3: BMI Distribution

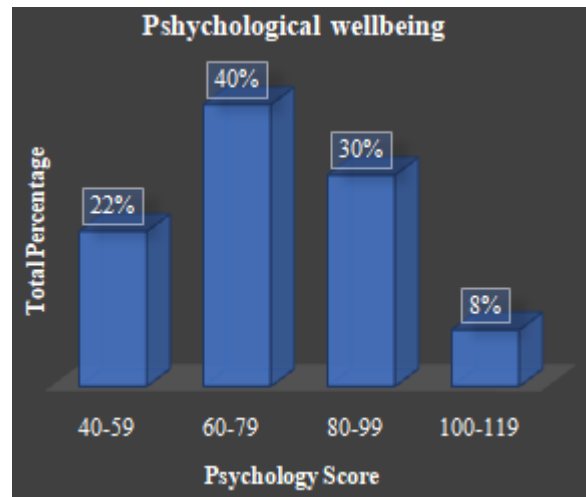
BMI Distribution	Percentage	Total number
17-21	22%	11
22-26	46%	23
27-31	32%	16

Inference: This graph depicts the BMI Distribution of the study where, 22% of the health care workers fall under the BMI of 17-21kg/m² (normal).46% of them fall under 22-26kg/m² BMI (normal) and 32% of the health care workers fall under 27-31kg/m² (overweight).



Graph 4: Total Physical Activity Levels

Inference: 2% of the recorded responses showed **low** levels of physical activity, 18% of the health care workers showed **moderate** physical activity and 80% of them reported **high** physical activity.



Graph 5: Psychological Wellbeing

Psychological Wellbeing	Percentage	Total number
40-59	22%	11
60-79	40%	20
80-99	30%	15
100-119	8%	4

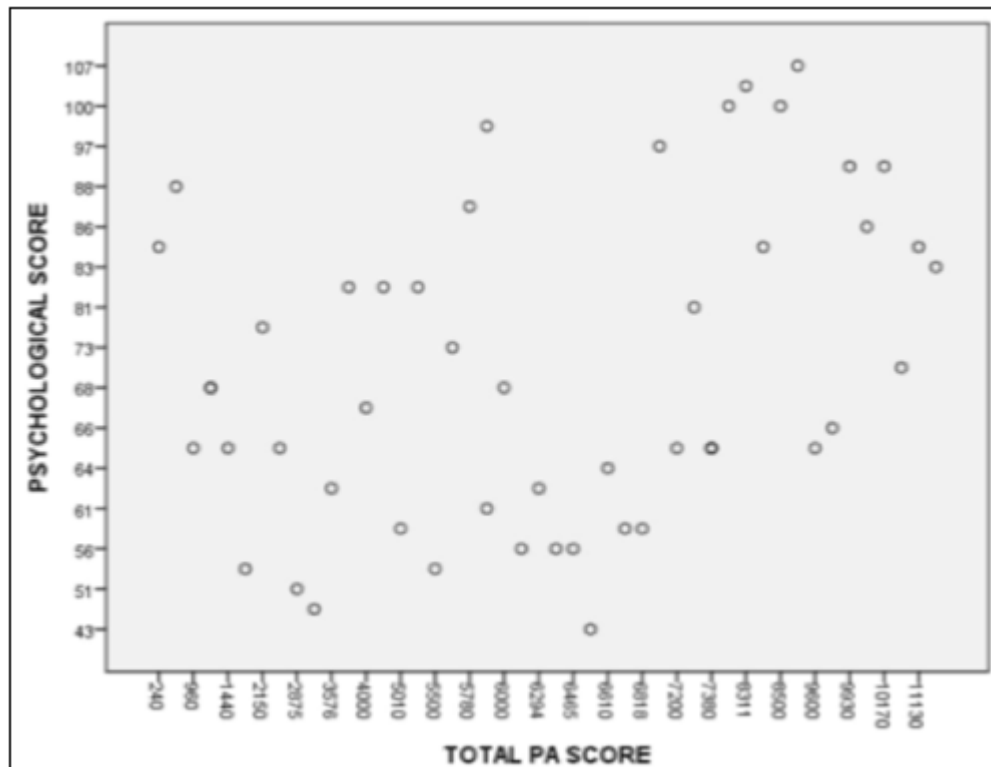
Inference: The above graph shows the psychological well-being scores (greater the score better outcome) that has been recorded. 22% of them reported a score ranging between 40-59. 40% of the health care workers reported scores between 60-79, 30% of them recorded the scores between 80-99 and the rest (8%) recorded the psychological well-being scores ranging between 100-119.

Graph 6: Correlation between Physical Activity Levels and Psychological Wellbeing Levels

Correlations				
		Total PA Score	Psychological Score	
Spearman's rho	Total PA Score	Correlation Coefficient	1.000	.325*
		Sig. (2-tailed)	.	.021
		N	50	50
	Psychological Score	Correlation Coefficient	.325*	1.000
		Sig. (2-tailed)	.021	.
		N	50	50

*. Correlation is significant at the 0.05 level (2-tailed).

Inference: 32% of the samples show low positive correlation between physical activity levels and psychological well-being levels.



Graph 7: Scatter Plot Correlating Physical Activity Levels and Psychological Wellbeing Levels

Inference: A low positive Correlation is seen between physical activity levels and psychological well-being levels in health care workers.

5. Discussion

The study was carried out to understand the correlation between the physical activity levels and psychological well being levels in health care workers. As in times of COVID19, health care workers are the ones who are facing high levels of physical as well as psychological stressors with longer working hours, fear of carrying the virus to family, staying away from their loved ones, and spending maximum time treating patients with the fear of testing positive. The study included health care workers working for over 3months in the COVID set up. According to graph 1 that shows the gender distribution of the study, majority of the participants were females with over 66% and 34% of them were males. The 2nd graph shows us the age Distribution of the health care workers in the study where 74% of them fall under the age group of 21-30 years of age and 12% of the subjects fall in the age group of 41-50years. 6% and 8% of the health care workers belong to the age group of 51-60years and 31-40years respectively. BMI of an individual plays an important role in physical activity levels, if a person is overweight it gets difficult for him to meet the physical activity levels which in turn would even affect his psychological well-being. No physical activity can get many health problems along. Graph no 3 describes the BMI of the study participants where majority of the health care workers i.e. 46% of them reported their BMI between 22-26kg/m². 22% of them reported to fall under the BMI Of 17-21kg/m² and 32% of them recorded their BMI under 27-31kg/m² category. Physical activity stimulates the release of feel-good brain chemicals. There is release of endorphins and other neurotransmitters when a person indulges into

exercising. Physical activity also releases dopamine, norepinephrine and serotonin. These hormones play an important part in regulating the mood. Regular exercising helps improve one's appetite, sleep patterns, balance your body's stress hormones levels such as adrenaline. Adrenaline plays a crucial role in fight-or-flight responses response [12]. With the help of IPAQ long form physical activity levels of the health care workers were calculated. Graph 4 shows us shows the distribution based on categorical scoring that says 80% of them have a high levels of physical activity i.e. a minimum of 3000METs. 18% of the health care workers fall under the category of moderate physical activity i.e. a score of minimum 600METs and only 2% of the participants reported low levels of physical activity.

The psychological well-being Levels were assessed using the psychological general well-being index(PGWBI) which says higher the scores better the well-being. According to the graphical representation of graph 5, 40% of the health care workers reported scores ranging between 60-79, 30% of them fall under the scores 80-99 and 22% of them reported low level of psychological well-being score of 40-59. Only 8% of the health care workers reported a score of over 100.

The Correlation of physical activity levels and psychological well-being levels was done using the spearman's rank correlation, which showed a low positive correlation of 0.32. The correlation study shows that 32% of the samples in the study reported that there is a significant correlation in their physical activity levels and psychological well-being levels. The low positive correlation of the study possibly could be because of the small sample size. A good mental well-being is of utmost importance as it helps in giving the best performance and when the health care workers are under such stress maintaining a positive attitude is very important.

Engaging in daily physical activity would help them to improve their psychological well-being as this releases the feel good hormones. This would help them in keeping their mind and body uplifted and give their 100% in their jobs. According to the study that was done in Korea on the Elderly population, Overall, regular participation in physical activity is an effective way of promoting subjective well-being among older adults in Korea. [7] which means that the samples were made to engage in physical activity which showed improvements in their subjective well-being.

Another study from the mental health journal shows the potential benefits of physical activity on mental health. The study concludes that physical activity as an intervention that may be helpful for the promotion of mental health and wellbeing, the prevention and treatment of common mental disorders, and as a strategy in psychosocial rehabilitation for persons with severe mental disorders. [10] As both these studies show that there is a strong relation between physical activity and mental well-being in various samples both are trying to explain us that staying physically active would not just help us in keeping the Harmful and prolonged disorders like blood pressure, heart disease and cholesterol under control but would also help in altering our mood and psychological well-being levels. Engaging in physical activity would also improve our appetite and sleep patterns. A study published by the Cambridge University press states the role of exercise in the treatment of mental health, and in improving mental well-being in the general population. use of physical activity as a means of upgrading life quality through enhanced self-esteem, improved mood states, reduced state and trait anxiety, resilience to stress, or improved sleep. The study suggests that moderate regular exercise should be considered as a viable means of treating depression and anxiety and improving mental well-being in the general public. [13]

6. Conclusion

- 1) The physical activity levels of the health care workers show that 2% of the health care workers have recorded low levels of physical activity. Majority of them recorded high physical activity i.e. 80% and 18% of them recorded moderate levels of physical activity.
- 2) The psychological well-being level in health care workers shows that (greater the score better outcome) 22% of them reported a score ranging between 40-59. 40% of the health care workers reported scores between 60-79, 30% of them recorded the scores between 80-99 and the rest (8%) recorded the psychological well-being scores ranging between 100-119.
- 3) Based on the responses recorded and statistical analysis a low positive correlation between the physical activity levels and psychological well-being levels in health care workers is seen.

7. Clinical Implications

As physiotherapists we can guide such individuals to indulge into regular exercises to maintain a balanced well-being. Guide them with basic 30-50 mins of full body exercises to maintain agility and flexibility. Regular

exercising would help in maintaining a good body, avoiding many lifestyle disorders and not just mental well-being. Maintaining an exercise regime to improve the activity levels would be a perfect way to overcome the everyday stressors and to even maintain good psychological levels.

8. Limitations

As the study was a cross-sectional type of study carried out in times of COVID19 the health care workers are exposed to greater physical and psychological stressors that may alter the results.

Limitations related to the difficulty to interpret or generalise the results because the studied population is very different from the population treated in normal life.

The sample size of the study was small.

The questionnaire was very lengthy for the health care workers to fill.

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IPAQ Long Form

Part 1: Job-Related Physical Activity

The first section is about your work. This includes paid jobs, farming, volunteer work, course work, and any other unpaid work that you did outside your home. Do not include unpaid work you might do around your home, like housework, yard work, general maintenance, and caring for your family. These are asked in Part 3.

1) Do you currently have a job or do any unpaid work outside your home?

Yes No → Skip to PART 2: TRANSPORTATION

The next questions are about all the physical activity you did in the **last 7 days** as part of your paid or unpaid work. This does not include traveling to and from work.

2) During the last 7 days, on how many days did you do vigorous physical activities like heavy lifting, digging, heavy construction, or climbing up stairs as part of your work? Think about only those physical activities that you did for at least 10 minutes at a time.
_____ days per week

No vigorous job-related physical activity → Skip to question 4

3) How much time did you usually spend on one of those days doing vigorous physical activities as part of your work?
_____ hours per day _____ minutes per day

4) Again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate physical activities like carrying light loads as part of your work? Please do not include walking.
_____ days per week

No moderate job-related physical activity → Skip to question 6

5) How much time did you usually spend on one of those days doing moderate physical activities as part of your work?
_____ hours per day _____ minutes per day

6) During the last 7 days, on how many days did you walk for at least 10 minutes at a time as part of your work? Please do not count any walking you did to travel to or from work.
_____ days per week

No job-related walking → Skip to PART 2: TRANSPORTATION

7) How much time did you usually spend on one of those **days walking** as part of your work?

_____ hours per day _____ minutes per day

Part 2: Transportation Physical Activity

These questions are about how you traveled from place to place, including to places like work, stores, movies, and so on.

8) During the last 7 days, on how many days did you travel in a motor vehicle like a train, bus, car, or tram?
_____ days per week

No traveling in a motor vehicle → Skip to question 10

9) How much time did you usually spend on one of those days traveling in a train, bus, car, tram, or other kind of motor vehicle?
_____ hours per day _____ minutes per day

Now think only about the **bicycling** and **walking** you might have done to travel to and from work, to do errands, or to go from place to place.

10) During the **last 7 days**, on how many days did you bicycle for at least 10 minutes at a time to go **from place to place**?
_____ days per week

No bicycling from place to place → Skip to question 12

11) How much time did you usually spend on one of those days to **bicycle** from place to place?
_____ hours per day _____ minutes per day

12) During the last **7 days**, on how many days did you **walk** for at least 10 minutes at a time to go from **place to place**?
_____ days per week

No walking from place to place → Skip to PART 3: HOUSEWORK,

House Maintenance, And Caring For Family

13) How much time did you usually spend on one of those days **walking** from place to place?
_____ hours per day _____ minutes per day

Part 3: Housework, House Maintenance, and Caring For Family

This section is about some of the physical activities you might have done in the **last 7 days** in and around your home, like housework, gardening, yard work, general maintenance work, and caring for your family.

14) Think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do **vigorous** physical

activities like heavy lifting, chopping wood, shovelling snow, or digging in the **garden or yard**?

_____ days per week

No vigorous activity in garden or yard → *Skip to question 16*

- 15) How much time did you usually spend on one of those days doing **vigorous** physical activities in the garden or yard?

_____ hours per day _____ minutes per day

- 16) Again, think about only those physical activities that you did for at least 10 minutes at a time. During the last **7 days**, on how many days did you do **moderate** activities like carrying light loads, sweeping, washing windows, and raking in the **garden or yard**?

_____ days per week

No moderate activity in garden or yard → *Skip to question 18*

- 17) How much time did you usually spend on one of those days doing moderate physical activities in the garden or yard?

_____ hours per day _____ minutes per day

- 18) Once again, think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do moderate activities like carrying light loads, washing windows, scrubbing floors and sweeping inside your home?

_____ days per week

No moderate activity inside home → *Skip to PART 4: RECREATION, SPORT AND LEISURE-TIME PHYSICAL ACTIVITY*

- 19) How much time did you usually spend on one of those days doing moderate physical activities inside your home?

_____ hours per day _____ minutes per day

Part 4: Recreation, Sport, and Leisure-Time Physical Activity

This section is about all the physical activities that you did in the **last 7 days** solely for recreation, sport, exercise or leisure. Please do not include any activities you have already mentioned.

- 20) Not counting any walking you have already mentioned, during the last 7 days, on how many days did you walk for at least 10 minutes at a time in your leisure time?

_____ days per week

No walking in leisure time → *Skip to question 22*

- 21) How much time did you usually spend on one of those days walking in your leisure time?

_____ hours per day _____ minutes per day

- 22) Think about only those physical activities that you did for at least 10 minutes at a time. During the last 7 days, on how many days did you do vigorous physical activities like aerobics, running, fast bicycling, or fast swimming in your leisure time?

_____ days per week

No vigorous activity in leisure time → *Skip to question 24*

- 23) How much time did you usually spend on one of those days doing vigorous physical activities in your leisure time?

_____ hours per day _____ minutes per day

- 24) Again, think about only those physical activities that you did for at least 10 minutes at a time. During the **last 7 days**, on how many days did you do **moderate** physical activities like bicycling at a regular pace, swimming at a regular pace, and doubles tennis in your **leisure time**?

_____ days per week

No moderate activity in leisure time → *Skip to PART 5: TIME SPENT SITTING*

- 25) How much time did you usually spend on one of those days doing moderate physical activities in your leisure time?

_____ hours per day _____ minutes per day

Part 5: Time Spent Sitting

The last questions are about the time you spend sitting while at work, at home, while doing course work and during leisure time. This may include time spent sitting at a desk, visiting friends, reading or sitting or lying down to watch television. Do not include any time spent sitting in a motor vehicle that you have already told me about.

- 26) During the last 7 days, how much time did you usually spend sitting on a weekday?

_____ hours per day _____ minutes per day

- 27) During the **last 7 days**, how much time did you usually spend **sitting** on a **weekend day**?

_____ hours per day _____ minutes per day

This is the end of the questionnaire, thank you for participating.