



ISSN Print: 2664-7559  
ISSN Online: 2664-7567  
IJSHPE 2024; 6(2): 17-22  
[www.physicaleducationjournal.in](http://www.physicaleducationjournal.in)  
Received: 13-05-2024  
Accepted: 18-06-2024

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## A study on the effect of pain and physical activity on the health-related quality of life among elderly population during a global pandemic

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**DOI:** <https://doi.org/10.33545/26647559.2024.v6.i2a.140>

### Abstract

**Background and Objectives:** The coronavirus disease (COVID-19) is a pathology induced by a new coronavirus, severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). Generally, COVID-19 is identified as an acute disorder that could be fatal. The onset of this severe disease may lead to death because of the substantial damage to lung alveoli and the massive failure of the respiratory system to conduct its functional gas exchange. Age is another important factor, with the elderly population being at higher risk for the disease. Today, much more important than chronologically determined aging is successful aging. The latter is defined as the maintenance of physical and mental functioning and involvement with social and relationship activities. Quality of life is influenced by individual lifestyles and a healthy lifestyle includes regular exercise, considered one of the most important components. Good eating habits, adequate sleep, weight control, and limited consumption of alcohol and smoking are also included. Regular exercise is considered an important component for the development of a healthy lifestyle, because there is convincing evidence that it may benefit both physical and mental health.

**Methods:** This study was a questionnaire-based survey. A pilot study was conducted initially with 10% of the estimated sample size -15 subjects using the same procedure followed for main study. The study was done in a community set up where elderly population with age limit of 60 and above. The subjects were requested for participation as volunteers for the study. An informed written consent from the selected subjects was obtained after explaining the purpose of the study. The subjects were recruited based on inclusion and exclusion criteria with the help of the subjective self-reporting screening form.

**Results:** The relationship between VAS and SF-12 was directly proportional that is subjects with more pain had poor quality of life and the relationship between SF-12 and PASE was directly proportional, that is subjects with daily physical activity had better quality of life.

**Conclusion:** The study concludes that subjects who were complaining of more pain had poor quality of life compared to those who did not have pain and subjects who were physically active with moderate to high physical activity had better quality of life than those with low physical activity.

**Keywords:** Elderly, pandemic, COVID-19, Pain, Quality of life, Physical activity, SF-12 questionnaire, PASE questionnaire, VAS

### Introduction

Recently, in December 2019, the novel coronavirus disease (COVID-19) occurred in China and subsequently spread worldwide to become a global pandemic [6]. COVID-19 was declared a global pandemic by the World Health Organization on March 11, 2020. The COVID-19 pandemic and resulting social disruption has left many to struggle with changes to routines and feelings of uncertainty as the impact of the virus continues to unfold. (2) The coronavirus disease (COVID-19) is a pathology induced by a new coronavirus, severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2) [4]. Generally, COVID-19 is identified as an acute disorder that could be fatal. The onset of this severe disease may lead to death because of the substantial damage to lung alveoli and the massive failure of the respiratory system to conduct its functional gas exchange [6]. To date, there is no effective treatment for this infection. Therefore, prevention measures such as frequent hand washing, keeping physical distance, and wearing face masks have been widely implemented. According to world Health Organization (WHO) recommendations, most countries are implementing lockdown policies for all citizens except for essential services.

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This pandemic has not affected everyone equally. A WHO compilation of multiple studies reports a higher risk of acute symptoms and death by COVID-19 in people with underlying conditions such as hypertension, cardiopathies, pneumonia, and cancer. Age is another important factor, with the elderly population being at higher risk for the disease [4]. The aging process is characterized by the progressive reduction of homeostatic reserves of the many body systems. This decline starts around the fifth decade of life, and is influenced by factors such as genetics, diet, environment, and lifestyle. Some of these factors can be changed, improving or attenuating this process; but they cannot interrupt this process. Today, much more important than chronologically determined aging is successful aging. The latter is defined as the maintenance of physical and mental functioning and involvement with social and relationship activities. Quality of life is influenced by individual lifestyles and a healthy lifestyle includes regular exercise, considered one of the most important components. Good eating habits, adequate sleep, weight control, and limited consumption of alcohol and smoking are also included [5].

Regular exercise is considered an important component for the development of a healthy lifestyle, because there is convincing evidence that it may benefit both physical and mental health [6]. Research comparing groups of adults and elderly, as well as longitudinal research following up aging of a group of people, indicate that regular physical exercise favours physical capacity, resistance and flexibility, increase psychomotor speed, and neuropsychological performance [1]. Physical exercise is a powerful ally for improving health, as it acts efficiently on the elderly immune function. It was reflected in better systemic functioning, mainly preventing infectious diseases [9]. The lack of physical activity may lead to increased blood glucose levels, vulnerability to infection, cardiovascular disorders, cognitive dysfunction, and musculoskeletal disease [6]. Aging is associated with loss of muscle mass, decreased muscle strength, and impaired functional activity known as sarcopenia, which may be increased with this isolation, increase mortality, and reduce quality of life due to self-isolation and lack physical activity [6]. Physical exercise is seen as the main ally for health promotion, preventing and protecting the organism from several diseases. According to World Health Organization, there is a tendency of constant growth in the elderly population in the coming year. Additionally, it is well-established that the practice of physical exercise is essential for well-being among the elderly population [9].

**Objectives:** To assess the effect of pain on the health-related quality of life among elderly population living in community set up. To assess the effect of physical activity on the health-related quality of life among elderly population living in a community set up. To compare the effect of pain and physical activity on the health-related quality of life among elderly population.

### Methodology

**Source of Data:** Elderly population living in community set up from the selected places of Bengaluru

**Method of collection of data:** The data for the study was collected based on the following categories:

- **Study setting:** Community based study in the South and East zone of Bengaluru, Karnataka
- **Study subjects:** elderly population of age years and above with a BMI value less than 40.

- **Study design:** Cross sectional study.
- **Sampling technique:** Convenient sampling.
- **Study recruitment:** Community setup.

**Sample size calculation:** As per the prevalence of previous study, sample size  $n=150$

**Inclusion Criteria:** Subjects willing to participate and sign the written informed consent. Subjects in the age limit of 60 years and above in the community set up.

**Exclusion Criteria:** Subjects with other diseases affecting quality of life (e.g. cancer, moderate to severe chronic renal insufficiency, chronic respiratory diseases, cardiovascular diseases including uncontrolled hypertension, diabetes) and the presence of severe cognitive, visual or hearing impairments. Subjects with neurological disorders, /dysfunctions, psychiatric disorders, musculoskeletal disorders. Subjects who are terminally ill and bedridden. Subjects who have a BMI more than 40

### Materials Required

- Stationeries.
  - Consent form printouts.
  - Questionnaires print outs.
1. Physical activity scale for the elderly (PASE).
  2. SF 12 version 2 scale for Quality-of-life assessment.
- Weighing scale.
  - Stature meter.

### Outcome measuring tools

- Visual analogue scale for pain assessment.
- Physical activity scale for the elderly (PASE).
- Health-related quality of life SF 12 version 2 for Quality-of-life assessment among elderly population.

### Procedure

#### Pilot study

After obtaining an approval from the Institutional Ethics Committee (IEC) of R.V. College of Physiotherapy®, a pilot study was conducted initially with 10% of the estimated sample size -15 subjects using the same procedure followed for main study. The pilot study was done in the community setup of the North zone of Bengaluru.

#### Main Study

The study was done in a community set up where elderly population with age limit of 60 and above. The subjects were requested for participation as volunteers for the study. An informed written consent from the selected subjects were obtained after explaining the purpose of the study. The subjects were recruited based on inclusion and exclusion criteria with the help of the subjective self-reporting screening form. This study was a questionnaire-based survey that was done in south and east zone of Bengaluru, Karnataka. Demographic data of the subjects was conducted and recorded which included the name, age, and anthropometric measurements such as height and weight to calculate BMI of the subjects.

#### Scales used in the study were

1. The pain was assessed using visual analogue scale.
2. Physical activity scale for the elderly for assessing the physical activity of the subjects.

3. Health-related quality of life questionnaire SF 12 was used to assess the health-related quality of life among elderly population in a community set up.

The data were collected using direct oral interview method. The data was then be subjected to statistical analysis. The data collected for this study was analysed statistically as follows:

**Descriptive statistics**

All the categorical variables were presented in the form of frequency tables and graph wherever necessary. The quantitative variables were summarized using. Mean ± standard deviation with 95% confidence interval.

**Inferential statistics**

The prevalence of work-related musculoskeletal disorder among self-employed female tailors from selected places of Bengaluru.

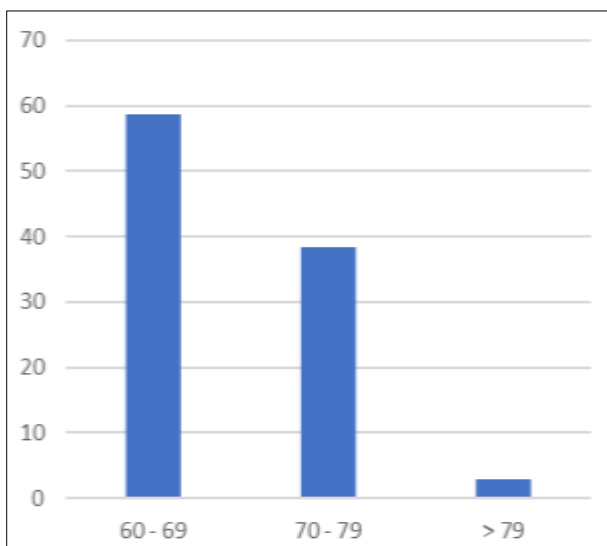
**Statistical software**

The data was entered using statistical software namely R Version 4.1.0, Microsoft Excel 2016 and Microsoft word 2016 was used to draw tables and graph. The data obtained from the study are analyzed statistically and the results are as follows:

**Table 1: Age Distribution**

Age (yrs.)	Frequency	Percent
60 - 69	58	58.6
70 - 79	38	38.4
> 79	3	3.0
Total	99	100.0

In this present study, it was observed that, out of 100 subjects studied, 58 (58.6%) were between the age group of 60-69 years, 38(38.4) were between the age group of 70-79 years and 3(3.0%) were above the age of 79.

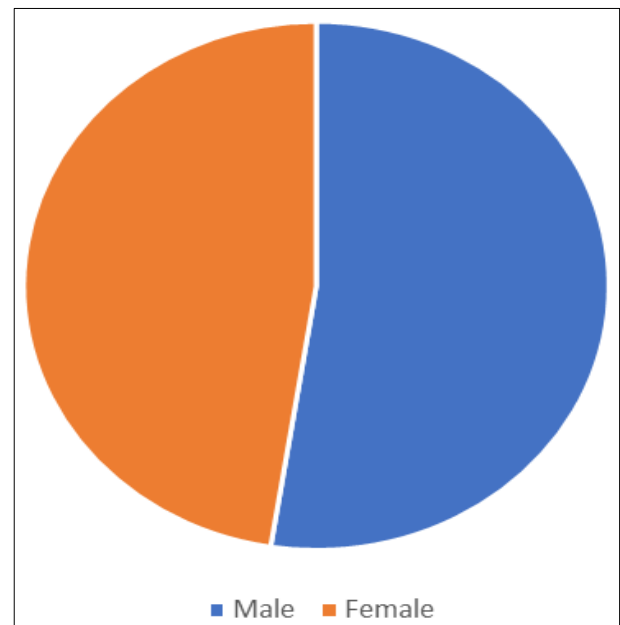


**Fig 1: Graphical Representation of Age Distribution**

**Table 2: Gender Distribution**

Gender	Frequency	Percent
Male	52	52.5
Female	47	47.5
Total	99	100.0

In the present study, it was observed that, out of 100 subjects studied, 52(52.5%) were of male gender and 47(47.5%) were of female gender.

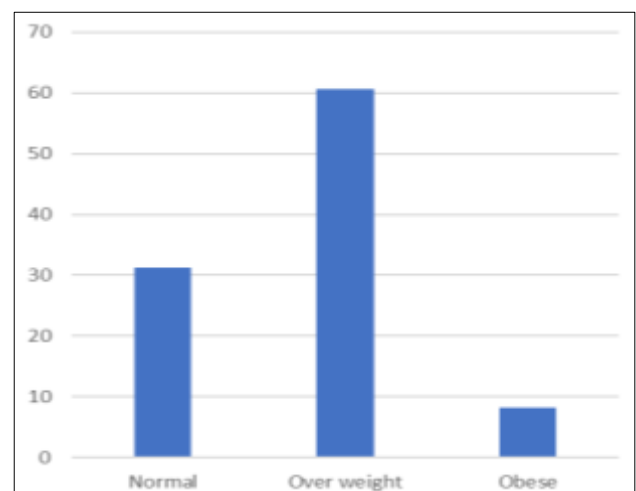


**Fig 2: Pie chart of Gender Distribution**

**Table 3: BMI Distribution**

BMI	Frequency	Percent
Normal	31	31.3
Overweight	60	60.6
Obese	8	8.1
Total	99	100.0

In the present study, it was observed that, out of 100 subjects studied 31(31.3%) were under normal BMI, 60(60.6%) were under the category of overweight and 8(8.1%) were under obese category of BMI.



**Fig 3: Graphical Representation of BMI Distribution**

**Table 4: Obesity Classification**

Obesity classification	Frequency	Percent
Normal	31	31.3
Pre obesity	60	60.6
Obesity class I	4	4.0
Obesity class II	4	4.0
Total	99	100.0

In the present study, it was observed that, out of 100 subjects studied 60(60.6%) were of pre obesity category, 4(4.0%) were of obesity class I category and 4(4.0%) were of obesity class II category.

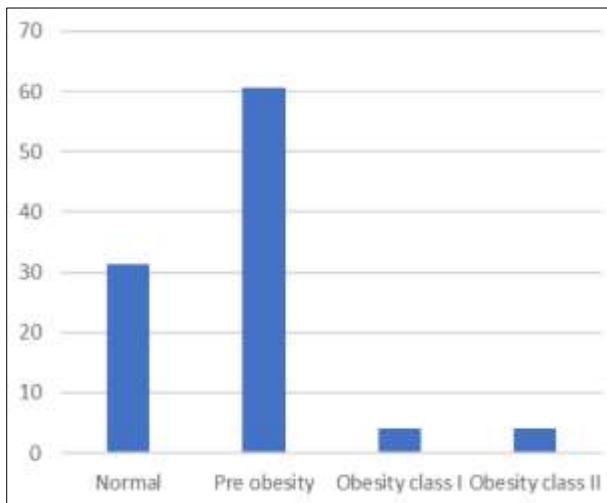


Fig 4: Graphical Representation of Obesity Classification

Table 5: SF-12 and vas scores

	Range	Mean	SD	SE (Mean)	LB	UB
Age (yrs.)	60.00 - 90.00	69.09	5.935	0.597	67.92	70.26
BMI	21.1 - 39.00	26.61	3.02	0.30	26.01	27.20
PCS score (X)	22.793 - 59.805	44.22	9.64	0.97	42.32	46.11
MCS score (Y)	21.128 - 69.649	49.62	8.03	0.81	48.04	51.21
VAS scale	1 - 8	4.35	1.77	0.18	4.00	4.70
PASE score	6.40 - 451.49	204.10	56.45	5.67	192.98	215.22

In this study, the mean  $\pm$  SD of

**Age:** was 69.09 $\pm$ 5.935 years with 95% confidence interval for population mean (67.92, 70.26). The range was from 60 - 90 years.

**BMI:** was 26.61 $\pm$ 3.02 with 95% confidence interval for population mean (26.01, 27.20). The range was from 21.1-39.

**PCS score:** was 44.22 $\pm$ 9.64 with 95% confidence interval for population mean (42.32, 46.11). The range was from 22.793 - 59.805.

**MCS score** was 49.62 $\pm$ 8.03 with 95% confidence interval for the population mean (48.04, 51.21). The range was from 21.128 - 69.649.

**VAS:** was 4.35 $\pm$ 1.77 with confidence interval for population mean (4, 4.70). The range was from 1 - 8.

**PASE score** was 201.10 $\pm$ 56.45 with confidence interval for the population mean (192.98, 215.22). The range was from 6.40 - 451.49.

**Regression model**

Considering MCS has dependent variable, a regression model was developed taking PCS as independent variable. The fitted model was MCS = 45.96+0.083\*PCS. Every one-unit score of PCS MCS has increased by 0.083. However, there the correlation between MCS and PCS was weak ( $r = 0.099$ ,  $P > 0.05$ ) which was not statistically significant. Further, through R-square we can observe that only 9.8% of change in MCS has caused by PCS.

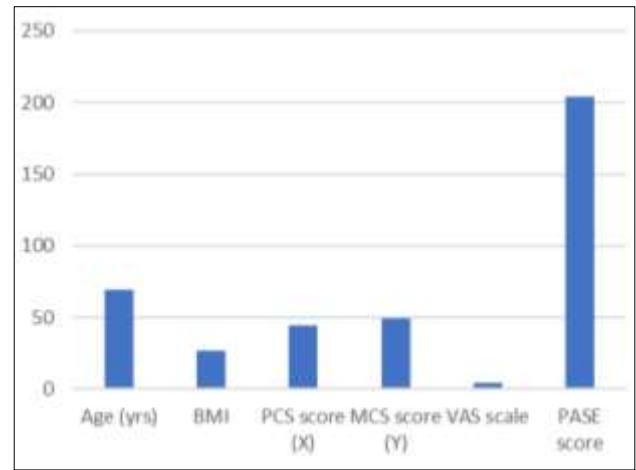


Fig 5: Graphical Representation of SF-12 and VAS Scores

Table 6: PASE score

PASE score	Frequency	Percent
Sedentary (0 - 40)	3	3.0
Light physical activity (41 - 90)	1	1.0
Moderate to intense physical activity (> 90)	95	96.0
Total	99	100.0

In the present study, it was observed that, out of 100 subjects studied 3(3.0%) were leading a sedentary lifestyle, 1(1.0%) were performing light physical activity and 95(96.0%) were performing moderate to intense physical activity.

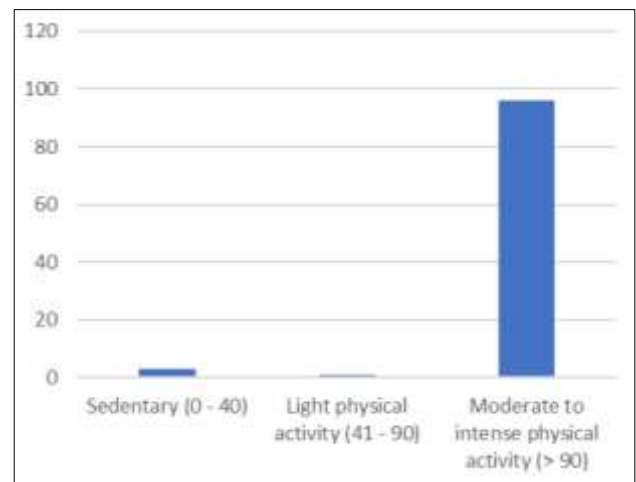


Fig 6: Graphical Representation of PASE SCORE

A cross-sectional study was conducted to measure the effect of pain and physical activity on health-related quality of life among elderly population during the global pandemic. The study group included subjects aged 65 years and above with BMI value less than 40. The pain perceived was measured using VAS, physical activity among the elderly population was measured using PASE and the quality of life was measured using SF-12 questionnaires.

A total of 150 subjects participated in this study after signing the informed consent forms. They were assessed for the variables along with the demographic data and the findings were recorded.

Research comparing groups of adults and elderly, as well as longitudinal research following up aging of a group of people, indicate that regular physical exercise favors physical capacity, resistance and flexibility, increase psychomotor

speed, and neuropsychological performance [1] Physical exercise is a powerful ally for improving health, as it acts efficiently on the elderly immune function. It was reflected in better systemic functioning, mainly preventing infectious diseases [9]. The lack of physical activity may lead to increased blood glucose levels, vulnerability to infection, cardiovascular disorders, cognitive dysfunction, and musculoskeletal disease [6] aging is associated with loss of muscle mass, decreased muscle strength, and impaired functional activity known as sarcopenia, which may be increased with this isolation, increase mortality, and reduce quality of life due to self-isolation and lack physical activity [6] Physical exercise is seen as the main ally for health promotion, preventing and protecting the organism from several diseases. According to World Health Organization, there is a tendency of constant growth in the elderly population in the coming year. Additionally, it is well-established that the practice of physical exercise is essential for well-being among elderly population [9].

The findings of the present study provide the importance of physical activity and maintaining a healthy lifestyle. The study shows that that 8.1% of the total population were obese, 60.6% were overweight while 31.3% were on normal scale of BMI, and out of the 8% obese population 4% were of obesity class I and 4% were of obesity class II.

According to PASE questionnaire used to measure the level of physical activity that each subject performed showed that 3% of the total population were having a sedentary lifestyle, 1.0% performed light physical activity whereas 96% of the total population performed moderate to intense physical activity.

### Limitations

Limitations include a modest sample size and potential for broader geographic scope. Employing regional language questionnaires and considering age-related systemic changes could have enriched the study's insights.

### Conclusion

The objectives of the study were to assess the effect of pain and physical activity on the health-related quality of life among elderly population during a global pandemic, to assess the effect of physical activity on the health-related quality of life among elderly population during a global pandemic, to compare the effect of pain and physical activity on the health-related quality of life among elderly population during a global pandemic.

Thus, the study concludes that subjects who were complaining of more pain had poor quality of life compared to those who did not have pain and subjects who were physically active with moderate to high physical activity had better quality of life than those with low physical activity

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