# Effect of Low Impact Exercises on Fatigue among Elderly Residing in a Selected Old Age Home: An Interventional Study

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**Abstract: Aim:** To evaluate the effect of low impact exercise on fatigue among elderly. **Design:** One group pretest posttest design. **Methods:** An Interventional study was conducted among elderly residing in a selected old age home in Thiruvananthapuram Kerala, India. A total of 50elderly were included in the study, which exceeded the minimum required sample size (n =48) calculated based on power analysis. Data was collected from samples based on the inclusion criteria by consecutive sampling method. The level of fatigue of participants was assessed using Fatigue Severity Scale (FSS) and those with FSS ≥36 was selected for the study. After the pre-assessment of fatigue, the elderly will be made to perform low impact exercises twice a day for 6 days per week for 4 weeks with a duration of 20 minutes each session. **Results:** A significant difference was found between the mean pre-test and post-test fatigue score with t=10.879 (p<0.0001).Statistically no significant association was found between fatigue among elderly and selected socio-personal variables such as age, gender, co- morbidities and family support (p>0.05). **Patient or Public Contribution:** Elderly residing in a selected old age home were made to perform low impact exercises

**Keywords:** Effect I Low Impact Exercises I Fatigue I Old age Homes I Elderly.

## 1 | Introduction

Growthandadvancementinageisinevitable[1]. Old age is a time when people move away from previous more desirable periods or times of usefulness[2].Aging is defined as a decrease in the biological functions and the ability of the organism to deal with metabolic stress[3].

As in the words of the report by Ministry of Health and Family Welfare 2023, the global statistics of elderly 60 years or above were 1.1 billion in 2022, comprising of 13.9 % of the total population of 7.9 billion, which is supposed to double to 2.1billion by 2050, with the share rising to 22% as part of the total population. In India the share of population60 years and above is projected to increase from 10.5% in 2022 to 20.8% in 2050. The pace of people getting old is moderate with the proportion of the old people is projected to increase from 20.8% in 2050 to 36.1% in 2100.The report also reveals that the percentage share of elderly population in Kerala was 16.5% in 2021 which will be increased to 22.8% in 2036[4].

The Technical Group on Population Projections for India and states 2011- 2036 reports that the elderly population in 2021 was 138 million, among which 67 million were males and 71 million were females[5]. According to the Report of the Technical Group on Population Projections for India and states 2011-2036, there are around 138 million elderly persons in India in 2021 among which 67 million were males and 71 million were females [5]. India is the second largest country to have elderly population with highest population in Kerala (16.5%), followed by Tamil Nadu (13.6%), Himachal Pradesh (13.1%) and Punjab (12.6%)[6].

According to WHO, the common health conditions associated with ageing include hearing loss, cataracts, refractive errors, back pain, osteoarthritis, COPD, diabetes, urinary in continence, falls, delirium, depression and dementia[7]. An analysis of the health problems among elderly in Himachal Pradesh revealed that the prevalence of health problems in elderly was 68.13% for arthritis, 66.26% vision impairment, 62.4% dementia, 52.53% hearing problem, 46.13% hypertension, 36.26% diabetes mellitus, 18.8% asthma, 9.46% UTI, with the highest mean percentage of 22.41[6].

A Systematic review and meta-analysis conducted of 21 studies involving 17843 participants were conducted to evaluate the prevalence of fatigue and perceived fatigability among elderly. This study shows that the prevalence of fatigue in older adults was 42.6% (95%CI, 26.2%-59.0%), perceived physicalfatig ability was 58.2% (95% 49.2%-67.2%) and mental fatigability was 24.0% (95% CI, 21.2%- 26.8%). The study also reveals that prevalence of fatigue was 39.1% in females and 40.7% in males, perceived physical fatigability was 60.3% in females and 58.8% in males and the perceived mental fatigability was 26.3% in females and 22.2 % in males[8].

The North American Nursing Diagnosis Association (NANDA) defines fatigue as an overwhelming sustained sense of exhaustion and decreased capacity for physical and mental work at usual level[9]. A study was done in Turkey to assess fatigue and habitual physical activity habits of elderly living in rest homes and to find association between these two factors, 124 elderly who were selected underwent a questioning session for 20

mins followed by calculation of their weekly calorie consumption. Cognitive function was then assessed using Mini Mental Status Scale (MMSS). The results of the study showed that fatigue was a significant symptom among elderly which affected their physical activity levels (p<0.00)[10].

A systemic review done on 153 articles from USA, Sweden, Italy, Netherlands, Canada, China, Brazil, Poland, Turkey and France, to assess chronic illness and fatigue among elderly revealed that consequences of fatigue were tiredness, sleepiness (r=0.4), depression (r=0.36), anxiety (r=0.32), worse sense of purpose in life (r=-0.22), poor self-care(p=0.004) and an increased b-amyloid load (p=0.016)[11]. Another Cross-sectional study done in Italy to assess fatigue in are presentative population of 1, 055elderly and to evaluate its association with functional impairment, functional limitation and disability. The results of the study pointed towards higher prevalence of disability of instrumental activity of daily living (23.3% in men and 17.9% in women) and associated with poor handgrip strength, slower walking speed, inability to walk 400 m and disability in doing activity of daily living (ADL)[12].

The new trends in society like young generations moving to abroad countries in search of better pay jobs, changing family structures and urbanization have resulted in the rise of old age homes in India. Moreover, due to modernization which gave birth to nuclear families, the elderly people are often left behind with nobody to take care. In such cases the old age homes offer shelter and care for the elderly. Yet the elderly are mostly notable to adjust with the change in environment which will lead to reduced levels of activity and depression. The caregivers within households are increasingly being replaced by paid caregivers and volunteer or other service providers[13]

## 2 | Methods and Materials

### 2.1 | Study Design

A Pre test Post test design was employed to evaluate the effect of low impact exercises on fatigue among elderly residing in a selected old age home in Thiruvananthapuram, Kerala, Data collection was done from 03-02-25 to 28-02-25

### 2.2 | Sample Size Calculation

A power analysis was conducted to determine the minimum sample size required to estimate fatigue with a Z-value corresponding to the power of the study, 80%.

$$N = \frac{(1.96+0.84)^2}{(1.625)^2} = 47.504 \cong 48$$

### 2.3 | Participants and Sampling

Samples were selected based on the inclusion criteria by consecutive sampling method. The level of fatigue of participants was assessed using Fatigue Severity Scale (FSS) and

those with FSS ≥36 was selected for the study. After the pre-assessment of fatigue, the elderly will be made to perform low impact exercises twice a day for 6 days per week for 4 weeks with a duration of 20 minutes each session. The session starts with deep breathing exercises of 5 counts, proceeded with upper limb and lower limb exercises, each with a count of 10, for 10 minutes. After a 1min break, the session is repeated for another 10 minutes and ends with deep breathing exercise. After completing 4 weeks, a post assessment of fatigue was done to assess using the same scale.

### 2.4 | Data Collection

The Researcher conducted the main study after obtaining ethical clearance from the Institutional Review Board (IRB) KIMSHEALTH, Thiruvananthapuram and getting permission from the authority of the study setting. The purpose of the study was explained using Participant information sheet and informed consent was obtained from the study participants. Data collection was done for a period of one month. 50 Samples were selected based on the inclusion criteria by consecutive sampling method. The level of fatigue of participants was assessed using Fatigue Severity Scale (FSS) and those with FSS ≥36 was selected for the study. After the pre-assessment of fatigue, the elderly will be made to perform low impact exercises twice a day for 6 days per week for 4 weeks with a duration of 20 minutes each session. The session starts with deep breathing exercises of 5 counts, proceeded with upper limb and lower limb exercises, each with a count of 10, for 10 minutes. After a 1min break, the session is repeated for another 10 minutes and ends with deep breathing exercise. After completing 4 weeks, a post assessment of fatigue was done to assess using the same scale.

#### 2.4.1 | Structured Interview Schedule

Structured Interview Schedule to assess the socio-personal variables such as age, gender, co-morbidities and family support.

#### 2.4.2 |Fatigue Severity Scale

Fatigue Severity Scale, a standardized tool developed by Krupp at 1988 was taken for assessing the level of fatigue among elderly residing in old age homes. The tools were translated into Malayalam by the investigator and was validated by language experts.

The Fatigue Severity Scale assesses the Level of Fatigue among Elderly.

FSS is a 7- point Likert scale ranging from strongly disagree to strongly agree.

(Strongly disagree:1, Disagree:2, Somewhatdisagree:3, Neutral:4, Somewhat agree: 5, Agree:6, Strongly agree:7)

| Level of Fatigue | Score |
|---|---|
| Absent | < 36 |
| Present | ≥ 36 |

### 2.5 | Ethical Considerations

The Researcher conducted the main study after obtaining ethical clearance from the Institutional Review Board (IRB) KIMSHEALTH, Thiruvananthapuram and getting permission from the authority of the study setting.

### 2.6 | Data Analysis

Data was analyzed using descriptive and inferential statistics

**Descriptive statistics**

Frequency, mean and standard deviation to describe fatigue and selected socio demographic variables among elderly.

**Inferential statistics**

•Paired 't' test to evaluate the effect of low impact exercises on fatigue among elderly.

•Chi-square test to find the association between low impact exercises and fatigue among elderly and selected socio demographic variables.

## 3 | Results

The meanpre test scores were 53.52±10.919 and in the post test score it was 27.94±11.905 There is a significant difference between the mean pretest and posttest fatigue score with t=10.879 (p<0.0001). Therefore, low impact exercises, were found to be effective in reducing fatigue among elderly. There was no significant association between fatigue and selected socio-personal variables such as age (H02a), gender (H02b), and family support (H02d). Hence the null hypothesis H02a, H02b, and H02d were accepted. The association between fatigue and co morbidities cannot be computed as it is a constant variable.

### 3.1 | Selected socio personal variables and Fatigue Severity Scale

There was no significant association between fatigue and selected socio-personal variables such as age (H02a), gender (H02b), and family support (H02d). Hence the null hypothesis H02a, H02b, and H02d were accepted. The association between fatigue and co morbidities cannot be computed as it is a constant variable.

The mean pre test scores were 53.52±10.919 and in the post test score it was 27.94±11.905 There is a significant difference between the mean pretest and posttest fatigue score with t=10.879 (p<0.0001). Therefore, low impact exercises, were found to be effective in reducing fatigue among elderly.

### 3.2 | Hypothesis 1

There is significant difference in the pre-test and post test score of fatigue among elderly
There was no significant association between fatigue and selected socio-personal variables such as age(Ho2a), gender (Ho2b), and family support (Ho2d). Hence the null hypothesis Ho2a, Ho2b, and Ho2d were accepted. The association between fatigue and comorbidities cannot be computed as it is a constant variable

**Table 4: Mean, standard deviation and 't' value of pretest and post-test Levels of fatigue**

| | Mean | Standard Deviation | df | t value | Sig(2-tailed) |
|---|---|---|---|---|---|
| **Pretest score of fatigue** | 53.52 | 10.919 | 49 | 10.879*** | < 0.001 |
| **Post test score of fatigue** | 27.94 | 11.905 | | | |

Table 4 shows that there is a significant difference between mean pretest and post test scores of fatigues with t =10.879 (p<0.001). Therefore, low impact exercises were found to be effective in improving fatigue among elderly.
Hence the null hypothesis (Ho1) is rejected.

### 3.3 | Hypothesis 2

There is significant association between low impact exercises on fatigue among elderly and socio personal variables such as age, gender, co-morbidities and family support.

The meanpre test scores were 53.52±10.919 and in the post test score it was 27.94±11.905
There is a significant difference between the mean pretest and posttest fatigue score with t=10.879 (p<0.0001). Therefore, low impact exercises, were found to be effective in reducing fatigue among elderly.

**Table 5: Chi-square value showing association between fatigue among elderly and age**

| Variable | Category | Frequency | df | χ2 |
|---|---|---|---|---|
| **age** | 60-69 | 18 | 2 | 0.783 |
| | 70-79 | 22 | | |
| | 80-89 | 10 | | |

Table 5 shows that the Chi-square value is 0.783 and hence there is statistically no significant association between fatigue among elderly with age (p>0.05). Hence the null hypothesis ($H_{o2a}$) was accepted

**Table 6: Chi-square value showing association between fatigue among elderly and gender Variable**

| Variable | Category | Frequency | df | χ2 |
|---|---|---|---|---|
| **gender** | Male | 15 | 1 | 5.357 |
| | Female | 35 | | |

Table 6 shows that the Chi-square value is 5.357 and hence there is statistically no significant association between fatigue among elderly with gender (p>0.05). Hence the null hypothesis (Ho2b) was accepted

**Table 7: Chi-square value showing association between fatigue among elderly and Co- morbidities**

| Variable | Category | Frequency | df | χ2 |
|---|---|---|---|---|
| **Co-morbidities** | Present | 46 | Not computed (constant variable) | Not computed (constant variable) |
| | Absent | 4 | | |

Table 7 shows that the Chi-square value cannot be computed asitisa constant variable.

**Table 8: Chi-square value showing association between fatigue among elderly and family support**

| Variable | Category | Frequency | df | χ2 |
|---|---|---|---|---|
| **Family support** | Present | 33 | 1 | 1.426 |
| | Absent | 16 | | |

Table 8 shows that the Chi-squarevalueis1. 426 and hence there is statistically no significant association between fatigue among elderly with family support (p>0.05). Hence the null hypothesis ($H_{o2d}$) was accepted.

## 4 | Discussion

The discussion of the study is in regard to the findings obtained from the statistical analysis of the data based on the objectives.

The present study was designed to assess the effect of low impact exercises on fatigue among elderly residing in old age homes. The objectives of the study were achieved by a quantitative approach using the One group pre-test posttest design. Consecutive sampling was used to select the samples. The study was conducted among 50 elderly residing in Bethel Gram-Bethel home for the Aged, Mukkola, Thiruvananthapuram.

The findings of the study have been discussed with reference to the objectives and with the support of other studies.

The first objective was to assess fatigue among elderly. In the present study all the participants (50) who had fatigue were included. The findings of the present study is supported by a survey done in Turkey among 124 elderly residing in old age homes to evaluate fatigue and habitual physical activity. 40.3% of the study participants reported fatigue. The study results showed that fatigue was a common complaint among elderly and higher fatigue was associated with lower activity levels18.

The second objective was to evaluate the effect of low impact exercises on fatigue among elderly. The mean pretest scores were 53.52±10.919 and in the posttest score it was 27.94±11.905 The findings were significant at p<0.0001, suggesting that low impact exercises were found to be effective in reducing fatigue among elderly.

The study finding is supported by an interventional study was conducted on the effect of chair based aerobic exercises on cardiovascular endurance and fatigue among elderly people selected from an old age home in Ahmedabad. 42 participants were selected through convenient sampling, out of which 32 participants completed the study. The participants were divided into two groups, control group (n=15) and interventional group (n=19). The control group was made to do stretching exercises on the chair and interventional group was made to do chair based aerobic exercises for 5 days per week in a duration of 8 weeks. Six-minute Walk test and FACIT scale were used to evaluate the cardiovascular endurance and fatigue. The mean change in 6-minute walk distance in pre and post training among interventional group were 279.84±50.22 and 388.26±55.40 (p=0.001) respectively and control group were 272.80±61.73 and 292.40±63.93 (p=0.001) respectively. The mean change in fatigue for the interventional group in pre and post training were 16.53±2.78 and 39.37±(p=0.001) respectively and control group were 16.87±2.13 and 19.67±2.38 9p=0.001) respectively. The results show a significant improvement in the cardiovascular endurance by improving the 6 MWD after training and a reduction in fatigue. Thus, the study concludes that chair based aerobic exercises are effective in improving the cardiovascular and reducing fatigue in elderly[17].

The third objective was to assess the association between fatigue among elderly and selected socio personal variables. The results show that there is no association between fatigue and selected socio personal variables such as age ($\alpha^2$=0.783, P>0.05), gender ($\alpha^2$=5.357, P>0.05) and family support ($\alpha^2$=1.426, P>0.05 the association between fatigue and co morbidities cannot be computed as it is a constant variable.

A Quantitative cross-sectional study was carried out in Greece to explore the role of fatigue and perceived social support to medication adherence among elderly with Musculo-skeletal disorders. Among the 145 participants of the study, 51 were males and 94 were females, to whom one hundred and fifty questionnaires were distributed. The study

showed that there is a negative correlation of Physical fatigue to medication adherence and social support gained from significant others and family[27].

A Cross-sectional interviewer -assisted survey was carried out in Los Angeles among 199 ambulatory older residents of a single residential care facility to examine the epidemiology of fatigue symptoms in relation to their demographic and medical characteristics. The study concludes that no significant relationship was present between fatigue and age, sex, or the number of medical diagnoses[14].

### 4.1 | Socio personal variables

Thereisnosignificantassociationbetweenlowimpactexercisesonfatigue among elderly and selected socio personal variables such as age ($H_{o2a}$), gender ($H_{o2b}$), co- morbidities ($H_{o2c}$) and family support ($H_{o2d}$)

### 4.2 Fatigue Severity Scale

The mean pre test scores were 53.52±10.919 and in the post test score it was 27.94±11.905,There is a significant difference between the mean pretest and posttest fatigue score with t=10.879 ($p<0.0001$). Therefore, low impact exercises, were found to be effective in reducing fatigue among elderly.

## 5 | Implications for Policy and Practice

The findings of the study have several implications in the field of nursing practice, nursing education, nursing administration and nursing research.

**Nursing Practice**

- Nurses must ensure that elderly engage in low impact exercises on a daily basis.
- Nurses should be skilled enough to identify symptoms among elderly and help them to practice low impact exercises.
- Nurses should promote more public awareness on the increased prevalence of fatigue among elderly and importance of low impact exercises in reducing fatigue
- Nurses who are working in geriatric wards, old age homes and in community setting can encourage elderly to perform low impact exercises
- Nurses can educate the caregivers of old age homes on how to assist the elderly to perform low impact exercises

**Nursing Education**

- Nursing curriculum should include the concept of low impact exercise as an intervention for fatigue among elderly.
- Various educational programs can be conducted highlighting the problems faced by elderly due to fatigue.

**Nursing administration**

Nursing administrators should organize various programs highlighting the problems faced by elderly.

Nurse administrators can conduct in-service education regarding the prevalence of fatigue among elderly and the effect of low impact exercises on fatigue

- Continuing Nursing Education (CNE) which includes hands-on training on low impact exercise to nurses for enhancing their competency to manage fatigue in elderly.
- Nurse administrators should promote policies of hospital that ensures a holistic care for elderly.

**Nursing Research**

- Research studies can be done to find out various factors that can lead to fatigue in the elderly.
- Research studies to be conducted to assess the effect of alternative interventions on fatigue in various settings.
- Emphasize on other problems faced by elderly and its management

## 6 | Limitation

- The study was confined to elderly in old age home in Bethel Gram -Bethel home for the Aged.
- It was difficult to draw generalization due to small sample size
- Long term adherence to the low impact exercise could not be assessed due to the short duration of the study

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