

# Effect of 1, 2, and 6-Minute Walk Test on Fatigue Level in Early Rehabilitation and Recovery Among Geriatric After Cabg and Its Impact on Their Quality of Life - An Observational Study

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## ABSTRACT

**Background:** Geriatrics population is susceptible for CABG and the early rehabilitation provided to patients affecting the functional capacity, fatigue level and QOL of patients. The different walk test is commonly performed to enhance and functional capacity after the CABG but the effect of different walk test on fatigue level and QOL is not clear till now so present study was conducted to evaluate the effect of different walk test on fatigue level and QOL in early rehabilitation after CABG.

**Methods:** Total 90 subjects participated in the study. All the participants were divided into 3 different groups and all were observed for three different walk tests. Convenient sampling method was used to recruit the participants in the study. After the walk test fatigue level was evaluated of participants and on the 7 day of discharge the QOL was assessed using IGQOL inventory scale.

**Result:** Result shows that 6 MWT was very exhausted for the participants ( $188.83 \pm 31.628$ ) but the 1,2 MWT ( $167.47 \pm 12.970$ ,  $127.53 \pm 16.201$ ) did not leads to tiredness among the participants. The subjects who were fatigue had poor QOL and not able to complete the conventional treatment protocol also. Overall, all the walk test helps to improve the functional capacity of CABG participants, but its effect is different on fatigue level and on QOL in different groups.

**Conclusion:** The study concludes that 6 MWT leads to fatigue and impaired QOL among geriatrics follow by early rehabilitation and the 1,2 MWT is not associated with fatigue and leads to better QOL in comparison with the subjects with 6 MWT.

**Keywords:** Walk test, CABG, Quality of life, Fatigue, Geriatrics

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## INTRODUCTION

With the development of medical intervention and improved healthy lifestyles, the average life span of human beings is increasing; therefore, the number of elderly people is also growing.<sup>1</sup> Therapid growth of the elderly population has increased the need for improved geriatric care.<sup>2</sup> According to the World Health Organization (WHO), Geriatrics refers to medical care for older adultsof the age 65 or above.<sup>1,3</sup>

According to recent statistics, the share of the population aged 60 years and over will increase from 1 billion in 2020 to 1.4 billion followed by 2050.<sup>4</sup> Whereas, In 2022, there were 149 million people aged 60 and above, which was about 10.5% of India's population.<sup>5</sup>The elderly are at higher risk for multiple health challenges.<sup>6</sup> Non-communicable diseases (NCDs) are highly prevalent in later life of life and heart disease are common out of these. According to

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NCDs, heart disease contributes around 7.8% in older age group.<sup>6</sup>

An increasing number of older patients are being referred for coronary artery bypass grafting (CABG) for cardiovascular diseases.<sup>7</sup> Geriatric patients have a greater burden of risk factors like fatigue and reduced functional levels that can adversely affect patient recovery and quality of life.<sup>8,9</sup> Decreased functional capacity is the expected outcome in patients following CABG which has given rise to fatigue.<sup>10</sup> Fatigue occurs partly due to the lack of postoperative physical activity.<sup>11</sup> Hence, the early rehabilitation has a significant role to lower in-hospital mortality, total hospitalization costs, length of ICU stay, and fatigue which has improved the quality of life and functional capacity in the geriatric patients.<sup>12</sup> A study reported that early rehabilitation improves overall cardiorespiratory fitness and reduce the post operative complications.<sup>13</sup>

In clinical practice, different tests are used to evaluate cardiorespiratory fitness, generally requiring sophisticated equipment and treadmills or cycle ergometers that are not always readily available, especially in resource-constrained settings.<sup>14</sup> For this reason, tests based on the ability to perform daily living tasks, such as walking, are becoming more and more widespread and studied.<sup>15</sup> Timed walking tests are widely used to evaluate functional exercise performance, as they are likely to measure the ability to undertake the activities of day-to-day life.<sup>16</sup> Tests used to assess functional capacity are the Six-Minute Walk Test (6MWT), Two-Minute Walk Test (2MWT) and One-Minute Walk Test (1MWT).<sup>17,18</sup> These tests are simple, objective, and reproducible measurements of functional capacity for the clinical evaluation of patients with various forms of cardiovascular diseases and are extensively used after CABG.<sup>18,19</sup> Therefore, submaximal stress testing is recommended to be done prior to discharge in post-cardiac surgery patients.<sup>20</sup> 6MWT, 2MWT and 1MWT demonstrated an intraclass correlation of 0.97, 0.985 and 0.76 respectively in cardiovascular diseases.<sup>22,23,24</sup>

6MWT has been shown to be a valuable diagnostic tool in rehabilitation of cardiac surgery patients, this test may be very exhausting for some patients with severe cardiovascular diseases.<sup>18</sup> Furthermore, 2MWT and 1MWT are shorter in duration.<sup>25</sup> It can be used as an alternative in the clinical and therapeutic setting for post CABG cases,<sup>18,24,25</sup> and might help to reduce the

fatigue level and improves Quality of life after CABG in geriatric subjects.<sup>25</sup> Hence, the study was conducted to evaluate the effectiveness and to compare the effect of 6, 1 and 2 MWT on fatigue level in early rehabilitation and recovery among geriatrics after CABG and its impact on their quality of life.

### METHODOLOGY

#### Study setting

An observational study was conducted in department of physiotherapy. All the voluntary subjects were part of study. Data collection was done from May 2024 to July 2024.

#### Participant recruitment-

Both male and female age between 60 to 70 years who underwent for uncomplicated CABG were included in the study. Subjects who were suffering with any associated complications such as post CABG chest pain, history of any previous cardiac surgery, neurological and psychiatric disorder along with renal dysfunction were excluded from the study.

#### Sample size

Sample size was calculated with G power software with the effect size of 0.2, alpha error probability of 0.03 with the power of 0.97 and constant proportion of 0.5 and the final sample size for the study was 87 but 90 participants were recruited for the study on the basis of sample availability and according to inclusion and exclusion criteria. All the 90 participants were divided into 3 different groups for the observation; 30 participants were in each group.

#### Procedure of data collection

The subjects who underwent for CABG and ready to participate in the study were included in the study. After the CABG the rehabilitation is started at the next day after the surgery as inpatient rehabilitation. And patient will discharge from hospital around 7 days of surgery, considering this the observational study was planned. The study population (n=90) was divided in 3 groups. One group was observed for 6 MWT, second group was observed for 2 MWT and third group was for 1 MWT. All the participants of different groups were told to perform the three different walk tests on the 2, 3 and 5 days of surgery and the observation was done for all the three group participants. After the walk test fatigue level was checked for all participants and follow by that the post operative conventional treatment was delivered to participants during inpatient duration. And subjects

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were in close monitoring during the conventional rehabilitation. During the hospital discharge QOL of geriatrics was checked. And at the end the fatigue level and QOL of participants were assessed for all the three different groups.

### Outcome measure

- 1. Rate of fatigue-** ROF is self-administered reliable and valid outcome measure which is used to evaluate the rate of perceived fatigue among subjects. It is 11-point scale with 0 to 10 scoring where 0 indicate no fatigue and 10 represents extreme fatigue. All the subjects were asked to rate their level of fatigue honestly.<sup>26</sup>
- 2. The Indian geriatric QOL Inventory scale -** It is 4 domain 35 question scale, consists of physical, ADL, social and psychological components. It is used to evaluate the QOL of geriatrics subjects considering the Indian population. The scoring is based upon the percentage of total score.<sup>27</sup>

### DATA ANALYSIS

Data analysis was done using SPSS software version 20. All the data was entered in excel sheet and follow by SPSS software. Demographic and questionnaires data was evaluated with frequency and descriptive data evaluation method. The t test and ANOVA test was used to compare the all the three groups. There were no missing data was present in the study.

### RESULT

Total 90 subjects participated in the study out of that 42 were males and 48 were females. With the mean value of  $1.53 \pm 0.502$ . All the participants were of 60 to 70 years of age with the mean value of  $64.16 \pm 2.835$  as shown in table 1-

**Table 1: Demographic data**

| Characteristics   |        | Frequency (n) | Mean $\pm$ SD     |
|-------------------|--------|---------------|-------------------|
| Gender            | Male   | 42            | 1.53 $\pm$ 0.502  |
|                   | Female | 48            |                   |
| Age (60-70 years) |        | 90            | 64.16 $\pm$ 2.835 |

#### ➤ Fatigue level

The rate of fatigue scale was used to measure the fatigue level among participants according to findings the subjects who performed 6 MWT were extreme fatigue and most of participants were not able to complete the walk test after getting fatigue the participants were not able to complete the

conventional physiotherapy treatment. But the findings were different for the subjects who performed the 2MWT it was found that the subjects who performed 2MWT were less fatigue in comparison to the subjects with 6MWT. Total 18 participants were moderate fatigue and 12 were little fatigue. It was also found that these subjects were able to complete the walk test and conventional treatment also. Findings shows that the subjects who performed 1MWT were not much fatigue and able to complete the conventional protocol easily. As shown in table 2,3-

**Table 2: Fatigue level of participants**

|       | Fatigue level    | Frequency | Mean $\pm$ SD    |
|-------|------------------|-----------|------------------|
| 6 MWT | Total fatigue    | 10        | 4.33 $\pm$ 0.479 |
|       | Very fatigue     | 20        |                  |
| 2 MWT | Moderate fatigue | 18        | 2.60 $\pm$ 0.498 |
|       | Little fatigue   | 12        |                  |
| 1 MWT | Little fatigue   | 11        | 1.37 $\pm$ 0.490 |
|       | No fatigue       | 19        |                  |

**Table 3: Description of Walk test and conventional treatment**

| Walk test | Participants completed test | Participants not completed test | Participants completed conventional treatment | Participants not completed conventional treatment |
|-----------|-----------------------------|---------------------------------|---|---|
| 6 MWT     | 3                           | 27                              | 2   | 28  |
| 2 MWT     | 28                          | 2                               | 29  | 1   |
| 1 MWT     | 30                          | 0                               | 30  | 30  |

- Quality of life was examined by the Indian geriatrics QOL Inventory scale and the findings shows that the subjects who performed 6 MWT had the less QOL in comparison to the subjects who performed 1,2 MWT. Overall, the QOL of

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life was categorized into different percentage, as shown in table 4-

**Table 4: Quality of life of participants**

| Walk test | Percentage of QOL | Frequency | Mean ± SD    |
|-----------|-------------------|-----------|--------------|
| 6 MWT     | 50-60 %           | 18        | 1.40 ± 0.498 |
|           | 60-70 %           | 12        |              |
| 2 MWT     | 60-70 %           | 9         | 2.90 ± 0.712 |
|           | 70-80 %           | 15        |              |
|           | 80-90 %           | 6         |              |
| 1 MWT     | 70-80 %           | 18        | 3.40 ± 0.498 |
|           | 80-90 %           | 12        |              |

- Independent t test was conducted to compare the mean value of different walk test and results shows that all the tests are significant in nature. With the standard values of each walk test, As shown in table 5-

**Table 5: Independent t- test to compare mean**

| Walk test | Mean ± SD       | t- value | p-value |
|-----------|-----------------|----------|---------|
| 6 MWT     | 188.83 ± 31.628 | 31.701   | 0.040   |
| 2 MWT     | 167.47 ± 12.970 | 70.784   | 0.00    |
| 1 MWT     | 127.53 ± 16.201 | 43.117   | 0.00    |

- One way ANOVA test was conducted to compare the difference of all the three walk test and it was found that all the test are significant in nature and but the test is directly affecting the fatigue level, ability to receive the conventional treatment and quality of life of all participants.

**Table 6: ANOVA test**

| Within and between group | F-value | Significance level |
|--------------------------|---------|--------------------|
| 6 MWT                    | 19.043  | 0.030              |
| 2 MWT                    | 8.312   | 0.048              |
| 1 MWT                    | 4.996   | 0.042              |

### DISCUSSION

Present study was conducted to evaluate the effect of different walk test on fatigue level and QOL after the CABG. And it was found that different walk test is affecting the fatigue level differently and its effect on QOL and recovery period is also varies based upon the duration of walk test. All the findings are as follow –

#### ➤ 6 MWT, Fatigue and QOL

Present study findings shows that the subjects who were engaged to perform the 6 MWT were prone to fatigue and because of extreme fatigue level the subjects were not able to complete the test in initial 2 rounds of test. The fatigue level was not allowing the participants to complete their conventional physiotherapy protocol and overall, it leads to impaired or low level of QOL of participants. The findings suggested that the 6MWT is extreme exhausted for the geriatric's subjects in initial inpatient duration. And because of exhausted walk test the participants was not able to complete the conventional treatment and at the end it was affecting the QOL of participants. The extreme fatigue level was allowing the participants to complete the test as well as it was associated with chest pain, heaviness breathlessness among participants. And the findings suggested not to deliver the 6MWT immediate after the CABG instead of that 2 or 1 MWT is better alternative. The present study finding is not similar to previously conducted study. Fiorina et al conducted a study and the findings shows that 6 MWT is feasible and well tolerated by the older patients and the distance walked by the subjects is helps to improve the functional capacity of participants.<sup>28</sup> The another study findings shows that 6MWT is significantly related with QOL of geriatrics subjects.<sup>29</sup> The QOL of consisting of physical ,ADL ,social and psychological components and all these plays important role to regulate the QOL. According to present study finding the subjects who were not able to complete the 6 MWT were lacking at all 4 components of QOL and it leads to overall low QOL.

#### ➤ 2 MWT, Fatigue and QOL

According to present findings the 2 MWT is reliable, valid and convenient test which can be perform after CABG. Result shows that 2 MWT is beneficial to improve the functional capacity after CABG and follow by that the fatigue level among the participants were also less, all the participants were able to complete the test as well the conventional treatment also. It was also found that the subjects who performed the 2 MWT had improved and better QOL in comparison to the subjects with 6 MWT. So according to present findings the author strongly recommended to prefer 2 MWT to improve the functional capacity of CABG participants. According to a study conducted by dina et al. in 2004 the MWT is moderately effective to improve the functional

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capacity.<sup>18</sup> Another study conducted by Susan et al. in 2008 shows that early fatigue after the CABG hampers the recovery among the participants.<sup>31</sup> Other study findings show that 2 MWT can be used to replace the 6MWT if the participants are not able to perform the test but clarity was needed for its recommendations.<sup>16,30</sup> The present study findings fill the research gap and strongly recommend the 2 MWT after CABG for early intervention as it is not associated with fatigue and participants had improved QOL with no complications.

### ➤ 1 MWT, Fatigue and QOL

1 MWT was rarely performed walk test after CABG procedure in geriatrics or other population as the 2 MWT is easily used as its alternative but in present study both the tests were used to compare its effect as the evidence was lacking. Present study findings show that the subjects who performed 1 MWT were less fatigued and able to perform the conventional treatment as well and they had improved QOL. The findings are similar to 2 MWT. According to current findings it can be used as an alternative among the subjects as there are no complications associated with this test. A study conducted by Lucy et al. in 2024 compared different walk tests showing the effect of digital one minute walk test effect on cardiorespiratory functions.<sup>31</sup> Results show that the walk test with less time duration leads to less complications and it can be also performed in complicated situations also with precautions.

The study findings show that 6 MWT is exhausted for the post CABG subjects and it is showing the bimanual relationship with QOL and fatigue of participants. 6 MWT can be replaced with 2 MWT which is convenient and not associated with complications and 1 MWT can also be used for that but the use of 1 MWT is not much common in clinical practice after CABG. The present study strongly recommended to use 2 MWT in post CABG rehabilitation instead of 6 MWT to improve the QOL of geriatrics population.

### CONCLUSION

The study concludes that 1,2 MWT is convenient to conduct in post CABG conditions and it is not associated with fatigue and impaired QOL in geriatrics on the other side it was found that the subjects who performed 6 MWT were more prone for fatigue and also impaired QOL. The early rehabilitation after the surgery affects the functional

capacity of patients and their QOL significantly. So, it is recommended to perform 2 MWT during early rehabilitation and to avoid the complication and for better recovery and QOL among geriatrics.

**Limitations** – In present study 1 and 2 minute walk test was used as there was a mild difference between both tests findings but it was used to find out the difference between the participants.

**Future recommendations** – Present study can be re-design in form of RCT with new intervention.

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**Conflict of interest** - There is no conflict of interest.

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### **Ethical statement-**

Ethical was obtained from departmental ethical committee with the reference number of NIMS/PTOT/Ethical/May/2024/03.

**Informed Consent Statement-** A prior written consent was taken from all the participants and who was willing to participate in the study and after that recruitment was done for the study.

### **Data availability statement**

The datasets generated during and/or analyzed during the current study are available from the corresponding author on reasonable request.

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