



## A Study to Find the Effect of Physical Activity Level on Quality of Life in Different Stages of Cancer

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### KEYWORDS

Physical Activity, Cancer, Quality of Life, Stages of Cancer, Exercise

### ABSTRACT:

**Purpose:** In our recent study, we explored the relationship between physical activity and quality of life across various stages of cancer.

**Subjects and Methods:** This observational study involved 100 participants, selected according to specific inclusion and exclusion criteria. Participants were categorized into tumor, lymph node, and metastasis stages. They were required to complete the EORTC QLQ-C30 and the Godin Leisure-Time Physical Activity Questionnaire.

**Results:** The evaluation of both questionnaires showed a decline in components corresponding to the different cancer stages. The six components and five symptomatic scales of the EORTC QLQ-C30 demonstrated a significant difference (p-value < .00) across various cancer stages. Similarly, the Godin Leisure-Time Physical Activity Questionnaire indicated a significant reduction in physical activity (p-value < .000).

**Conclusion:** The study reveals how physical activity and quality of life decline at different stages of cancer, emphasizing the need for an active lifestyle throughout the cancer journey

### 1. Introduction

Cancer, a non-communicable disease, is rapidly becoming the leading cause of death, accounting for at least one out of every six deaths [1]. According to the Global Cancer Statistics 2022 report, an estimated 20 million new cases of cancer and 9.7 million cancer-related deaths occurred worldwide in 2022 [1]. Lung cancer leads as the most commonly diagnosed cancer globally, making up 12.4% of all cases. It is followed by breast cancer in females (11.6%), colorectal cancer (9.6%), prostate cancer (7.3%), and stomach cancer (4.9%)[1]. Cancer is categorized into different stages based on the extent of tumor growth, lymph node involvement, and metastasis [2]. Cancer and its treatments have side effects leading to patients

experiencing fatigue, depression, anxiety, reduced quality of life, and sleep problems.

Since cancer is a chronic condition, it necessitates continuous management to maintain a sustained quality of life for patients. Breakthroughs in cancer detection, medical management strategies, and other innovations in cancer care have significantly impacted patients' lives. It is essential to address various domains of quality of life in cancer survivors to improve their physical, emotional, and social well-being [3].

While the major focus in cancer treatment and care has been on clinical interventions, only in the past few decades has the role of lifestyle factors, including dietary intake and physical activity, been considered for cancer control. Physical inactivity has led to a global increase in



the risk of non-communicable diseases, cognitive decline, poor physical health, weight gain, and mental health issues. From 2000 to 2022, physical inactivity rose globally from 23.4% to 31.3%<sup>4</sup>. Leisure-time physical activity within the recommended level (7.5–15 MET hours/week) was associated with 6–29% risk reduction among several cancers, including colon, breast, endometrial, kidney, myeloma, liver, and non-Hodgkin lymphoma (in women). Physical activity may enhance treatment effectiveness and coping by directly affecting tumour growth and metastasis, improving treatment completion rates and efficacy, managing treatment-induced toxicities, and enhancing physical, psychosocial outcomes, and overall quality of life [5]. In this current study we have analysed the physical activity and quality of life of patients in different stages of cancer.

## 2. Methodology

An observational study was conducted to examine the effect of physical activity levels on the quality of life across various stages of cancer. The study took place at Sri Ramachandra Medical Centre and Hospital, Department of Oncology. Convenient sampling was employed to recruit patients based on specific inclusion and exclusion criteria. Participants diagnosed with different stages of breast, stomach, rectum, colon, prostate, liver, lung cancers, and Hodgkin's lymphoma were included, from both outpatient and inpatient departments. Patients with evidence of physical health impairments or neurological problems were excluded from the study.

A total of 100 patients who signed informed consent after being explained about the study were recruited. The EORTC QLQ-C30 questionnaire was used to assess the patients' quality of life, and the Godin Leisure-Time Physical Activity Questionnaire was used to evaluate their physical activity levels. Subjects were divided into three groups based on their stages of cancer. Basic

demographic data was collected, and then the questionnaires were provided for the patients to fill in the details.

Scoring were done according to the guidelines provided by the EORTC QLQ-C30 questionnaire [6] and Godin Leisure-Time Physical Activity Questionnaire [7].

## 3. Statistical Analysis

In this study data were collected from study subjects in three groups. The collected data were tabulated and taken up for data analysis using SPSS for Windows version 15.0

Variables such as age, gender, physical activity and quality of life were calculated and compared individually, and their mean, standard deviation data were computed

Physical activity and quality of life with in the groups was compared with ANOVA, multiple comparisons using Tukey HSD test (honestly significant difference). Physical activity level on quality of life in different stages was correlated using Kendall Nonparametric test. Statistical analysis was tabulated and results were shown, as follows.

## 4. Results

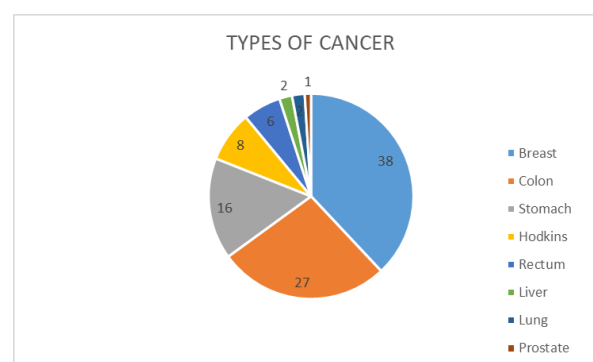


Figure 1. Distribution Of Cancers Among Study Subjects

Table 1: Demographic data

| Characteristics | Number (n) |                |
|-----------------|------------|----------------|
| TUMOR           | N=35       | M= 14<br>F= 21 |
| LYMPH NODE      | N= 30      | M=10           |



| Characteristics | Number (n)    |      |
|-----------------|---------------|------|
|                 |               | F=20 |
|                 |               | M=14 |
| METASTASIS      | N=35          | F=21 |
| Stage           | Mean± SD      |      |
| TUMOR           | 51.2± 9.94    |      |
| LYMPH NODE      | 49.33 ± 12.79 |      |
| METASTASIS      | 51 ± 11       |      |

M= male, F= Female, SD= Standard deviations

**Table 2: Comparison of Physical Activity in Different Stages of Cancer**

| Stage      | Mean± SD*     | F              | Level of significance |
|------------|---------------|----------------|-----------------------|
| TUMOR      | 71.20 ± 11.63 |                |                       |
| LYMPH NODE | 48.7 ± 5.607  | <b>210.186</b> | <b>.000</b>           |
| METASTASIS | 33 ± 3.58     |                |                       |

\*SD- standard deviation, F- f-test

**Table 3: Comparison of Quality of Life Components in Different Stages of Cancer**

| Global health status  |                |                |                       |
|-----------------------|----------------|----------------|-----------------------|
| STAGE                 | MEAN± SD       | F              | Level of significance |
| TUMOR                 | 90.20 ± 7.26   |                |                       |
| LYMPH NODE            | 60.27 ± 5.78   | <b>728.58</b>  | <b>0.00</b>           |
| METASTASIS            | 27.63 ± 7.27   |                |                       |
| Physical functional   |                |                |                       |
| TUMOR                 | 87.17 ± 8.04   |                |                       |
| LYMPH NODE            | 59.13 ± 7.52   | <b>436.047</b> | <b>0.00</b>           |
| METASTASIS            | 28.24 ± 9.00   |                |                       |
| Role functional       |                |                |                       |
| TUMOR                 | 94.03 ± 7.683  |                |                       |
| LYMPH NODE            | 61.40 ± 6.032  | <b>635.949</b> | <b>0.00</b>           |
| METASTASIS            | 27.23 ± 9.233  |                |                       |
| Emotional functioning |                |                |                       |
| TUMOR                 | 87.66 ± 6.58   |                |                       |
| LYMPH NODE            | 59.80 ± 12.767 | <b>352.858</b> | <b>0.00</b>           |



|                              |                |                |             |
|------------------------------|----------------|----------------|-------------|
| METASTASIS                   | 27.4 ± 8.073   |                |             |
| <b>Cognitive functioning</b> |                |                |             |
| TUMOR                        | 94.14 ± 7.83   |                |             |
| LYMPH NODE                   | 61.27 ± 5.72   | <b>783.255</b> | <b>0.00</b> |
| METASTASIS                   | 26.60 ± 7.425  |                |             |
| <b>Social functioning</b>    |                |                |             |
| TUMOR                        | 91.46 ± 12.862 |                |             |
| LYMPH NODE                   | 62.27 ± 6.695  | <b>405.848</b> | <b>0.00</b> |
| METASTASIS                   | 23.51 ± 9.053  |                |             |

\*SD- standard deviation, F- f-test

**Table 3: Comparison of Quality of Life – Symptom Scale in Different Stages of Cancer**

| Symptoms               | Stage      | MEAN± SD     | F        | Level of significance |
|------------------------|------------|--------------|----------|-----------------------|
| Insomnia               | TUMOR      | 4.77±3.631   |          |                       |
|                        | LYMPH NODE | 62.97±4.993  | 1265.282 | <b>0.000</b>          |
|                        | METASTASIS | 86.31±10.194 |          |                       |
| Appetite loss          | TUMOR      | 2.46±6.065   |          |                       |
|                        | LYMPH NODE | 61.57±9.261  | 881.992  | <b>0.000</b>          |
|                        | METASTASIS | 86.11±9.914  |          |                       |
| Constipation           | TUMOR      | 1.2±3.121    |          |                       |
|                        | LYMPH NODE | 61.7±5.879   | 1462.253 | <b>0.000</b>          |
|                        | METASTASIS | 86.66±9.573  |          |                       |
| Diahorrea              | TUMOR      | 1.74±6.133   |          |                       |
|                        | LYMPH NODE | 61.4±6.441   | 1331.83  | <b>0.000</b>          |
|                        | METASTASIS | 89.54±8.799  |          |                       |
| Financial difficulties | TUMOR      | 7.71±11.24   |          |                       |
|                        | LYMPH NODE | 55.83±42.973 | 107.964  | <b>0.000</b>          |
|                        | METASTASIS | 95.14±8.44   |          |                       |

## 5. Discussion

This study on cancer patients was undertaken to compare its findings with various reference studies, allowing for contextualization within the broader literature and shedding light on the state of cancer patients in India. The knowledge gained has highlighted the comparison

between the quality of life and physical activity of patients at different stages of cancer. Among the study subjects, the majority of the data pooled comes from breast cancer, colon cancer, stomach cancer, and other types.



Physical activity of cancer patients measured using the Godin leisure- time exercise questionnaire gives an insight into how the physical activity of cancer patients in different stages keeps declining. This decline can be seen irrespective of the type of cancer they were diagnosed with. The systemic review conducted by sarah 2021 has collectively said this decline in physical activity can be influenced by sociodemographic variables like age, gender, race, etc., Psychosocial variables like family, group pressure, lifestyle, culture, etc. There are numerous physical activity barriers due to cancer treatments side effects such as fatigue have been major problems to combat to become physically active [8]. Physical activity performed a minimum of two weeks to a maximum of twenty-four weeks has shown promising effects in reducing perceived fatigue experienced by patients with chronic conditions [9]. Along with these other parameters like the patients' weight management, fat composition, insulin levels, and inflammatory parameters can also be managed with a planned structured and individualized physical activity protocol alongside proper diet [10]. Though there are numerous of literature highlighting the benefits of regular physical activity the transmission of knowledge to patients through Oncologists, physiotherapists, and nurses will exhibit a positive impact and motivation for the patients to perform physical activity [8].

Quality of life declines as the stage of cancer progresses which was measured using EORTC QLQ-C30 questionnaire. Constant development and revolutionary interventions in the field of Oncology have added years to patient's life but having it added life to those years is still quarry and a concern to address. According to the results from the above questionnaire the global health component of QOL is declined significantly in different stages of life. This depicts that the patients themselves have an insight into their health status as the cancer progresses. The functional component of EORTC QLQ-C30 which assesses physical, role, emotional, cognitive, and social functioning and symptoms scales/items such as fatigue, Nausea, pain, dyspnoea, insomnia, appetite loss, constipation, Diarrhoea, and financial difficulties. Muhandiramge, in a study have discussed in detail the factors that lead to functional decline in older patients with cancer giving us a perception that has to be addressed to improve the quality of life. Functional decline leads to poor quality of life of patient, mortality,

care given burden, and suitability of other treatments. Early detection is necessary to prevent and to manage better [11]

For each stage of cancer namely tumor, lymph node, and metastasis, physical activity and quality of life were correlated. This correlation helped us understand how symptoms were improved when physical activity was performed. In our study physical activity and domains of quality of life in different stages of cancer have not reflected significance because of the heterogeneous group of patients. Takumura have summed up that physical activity has benefits and improve the symptoms and the overall quality of life [12]. Tracking the physical activity of patients will help in improving the quality of life. This will also alleviate various symptoms experienced by them during the course of the treatment.

## 6. Conclusion

The findings of this study provide valuable insight into how physical activity and quality of life are impacted at various stages of cancer. It highlights the importance of maintaining an active lifestyle throughout the cancer journey. Understanding that encouraging physical activity can significantly enhance the quality of life and alleviate symptoms, it becomes imperative for healthcare personnel, caregivers, and peers to work together in supporting patients. This collective effort involves motivating patients to engage in regular exercise routines, fostering an active lifestyle, and ensuring they adhere to a balanced diet. By doing so, patients can better manage their symptoms, improve their overall well-being, and enhance their quality of life, even during the challenges of cancer treatment and recovery

## 7. Limitation of the Study

The current study relatively small sample size of 100 participants, which may not be representative of the larger cancer population. The reliance on self-reported questionnaires may also introduce bias or inaccuracies in the data.

## 8. Acknowledgement

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## 9. Conflict of Interest

There was no conflict of interest associated with this study and no author has any financial interest or received any financial benefit from this research.

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