SRMS IMS

10.21761/jms.v11i1.01

ORIGINAL RESEARCH ARTICLE

Long-Term Physical Well-Being Among Cancer Survivors: A Retrospective Study in District Bareilly

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ABSTRACT

Introduction: Cancer survivorship is increasingly recognized as a critical phase of the cancer care continuum. Although advancements in diagnosis and treatment have improved survival rates, many survivors experience persistent physical symptoms such as fatigue, pain, appetite changes, and sleep disturbances. These long-term effects significantly impact quality of life (QoL), especially in low-resource settings where follow-up care is limited.

Objective: To assess the long-term physical well-being of cancer survivors five years post-treatment and examine its association with socio-demographic factors in District Bareilly, Uttar Pradesh.

Material and Methods: A retrospective cohort study was conducted among cancer survivors who completed treatment in 2018 at a tertiary care hospital. Of 144 identified individuals, 90 survivors participated. Physical well-being was assessed using a pretested interview schedule adapted from the quality of life-cancer survivor version (QoL-CSV), focusing only on the physical domain. Data were analyzed using SPSS version 25 with descriptive statistics and non-parametric tests (Mann-Whitney U and Kruskal-Wallis).

Result: The mean total physical well-being score was 26.8 ± 10.7 out of 80. Fatigue and appetite changes were the most prevalent symptoms. Socioeconomic status was significantly associated with physical well-being scores ($p < 0.05$), with higher scores among the upper class. No significant associations were found with age, gender, or occupation.

Conclusion: Five years post-treatment, cancer survivors face notable physical challenges. Socioeconomic disparities influence physical recovery, underscoring the need for targeted survivorship interventions in resource-limited settings.

Keywords: Cancer survivors, Physical well-being, Quality of life, Long-term effects, Socioeconomic status.

Submission: 02/01/2026; **Acceptance:** 04/02/2026; **Published:** 30/06/2026

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How to cite this article: Zia MA, Khan H, Singh RP, Kumar P, Kumar P, Pandey A, Kumar R. Long-Term Physical Well-Being Among Cancer Survivors: A Retrospective Study in District Bareilly. SRMS J Med Sci. 2026;11(1):1-6.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Cancer continues to represent a major global health burden, responsible for millions of deaths each year. According to estimates from GLOBOCAN 2012, there were 14.1 million new cases of cancer and 8.2 million deaths worldwide, with projections suggesting these numbers will increase by 70% by 2030.[1] While improvements in early diagnosis and cancer therapy have increased overall survival, this has brought forth a growing focus on the physical and psychosocial consequences of cancer survivorship. Survivors frequently report long-lasting symptoms that affect their physical well-being and, subsequently, their overall quality of life (QoL).[2]

The transition from patient to survivor is accompanied by a complex set of challenges. Survivors may struggle with the late and long-term effects of treatment, which include fatigue, pain, reduced physical function, sleep disturbances, appetite loss, and impaired mobility. These challenges may persist for years and can compromise independence, productivity, and overall life satisfaction.[3] For example, findings from a study in India demonstrated that among 768 cancer patients, 91.8% reported persistent fatigue, 73% suffered from chronic pain, and over 71% had disrupted sleep patterns clearly illustrating the magnitude of the physical toll that cancer and its treatment can exact on patients.[1]

Despite high survival rates in some cancer types, physical well-being often remains compromised for years following treatment. For instance, a large-scale review of breast cancer survivors in China showed that those undergoing chemotherapy had significantly lower physical QoL scores compared to those who were treated with traditional Chinese medicine or surgery alone. Furthermore, survivors with stronger social support networks and higher socioeconomic status exhibited better physical functioning, reinforcing the interaction

between clinical, psychosocial, and demographic determinants of health outcomes.[4]

Physical symptoms in survivorship can be categorized as either long-term—those that begin during treatment and persist or late effects, which emerge months or years after treatment ends.[2] The distinction is significant for clinicians and patients alike, as it informs the development of appropriate monitoring and intervention strategies. In either case, the symptoms may substantially impair QOL, particularly in individuals with advanced-stage disease or multiple comorbidities. For example, in the study by Nayak and colleagues, 85.8% of patients reported limitations in physical performance, while 85.5% were dissatisfied with their working capacity, metrics that reflect considerable disruption to physical autonomy.[5]

Multiple factors contribute to the physical outcomes observed in survivors. Treatment type plays a critical role: for instance, chemotherapy has been associated with sustained fatigue, peripheral neuropathy, and cardiotoxicity. Radiotherapy may lead to fibrosis and tissue damage, whereas surgery, especially in breast and head-and-neck cancers, can cause muscular impairment or disfigurement.[2,4] Additionally, age at diagnosis, stage of disease, and pre-existing health conditions further modulate survivors' capacity to regain pre-cancer levels of physical functioning.[6]

Research from Western countries aligns with these findings. For instance, population-based studies in the United States revealed that long-term cancer survivors were significantly more likely to report physical limitations compared to non-cancer controls 53 *vs.* 21%, respectively.[2,7] These limitations affected activities requiring sustained muscle activity, such as walking, climbing stairs, or engaging in sports. Similarly, breast cancer survivors in longitudinal studies have demonstrated continued deficits in physical function and vitality even 5 to 10 years post-treatment.

Moreover, the physical effects of cancer may vary by geography and healthcare infrastructure. In low- and middle-income countries, limitations in access to rehabilitation services, pain management, and follow-up care exacerbate survivorship challenges. In India, only 12.5% of cancer patients present for treatment in the early stages of disease, and in many cases, patients lack access to physiotherapy, nutritional support, or psychosocial counseling.[1] These limitations further increase the likelihood of unaddressed physical symptoms and chronic disability.

Efforts to improve the physical well-being of survivors must be multidimensional. The development of personalized survivorship care plans, including physical rehabilitation, pain management, nutritional support, and psychosocial interventions, is essential.[8] Tools, such as the quality of life (QoL) questionnaire validated by Vidhubala *et al*., used in Indian studies, provide a standardized means to assess patient needs and inform targeted interventions.[1] Similarly, in the Chinese context, the functional assessment of cancer therapy-breast (FACT-B) tool has been successfully applied to capture multi-domain QoL outcomes and to correlate them with treatment type, social support, and economic conditions.[4]

In summary, while improved survival rates are a major success in oncology, they come with the responsibility to manage the residual physical burden that survivors carry. Fatigue, pain, loss of function, and disrupted sleep are not just clinical symptoms; they represent barriers to autonomy, productivity, and dignity. A comprehensive approach that includes clinical management, social support, and policy reform is essential to address these challenges and promote physical well-being in cancer survivorship.

This study aimed to assess the long-term psychological well-being of cancer survivors five years post-treatment and examine its association with socio-demographic factors.

MATERIAL AND METHODS

This retrospective cohort study was conducted to assess the long-term psychological well-being of cancer survivors residing in district Bareilly, Uttar Pradesh. The study population included individuals who had completed their definitive cancer treatment in the year 2018 at a tertiary care hospital. Data collection took place over an 18-month period, from May 1, 2023, to October 2024. The study aimed to evaluate persistent physical challenges among survivors, such as fatigue, pain, appetite, and sleep changes, which often remain under-recognized in survivorship care.

A complete enumeration sampling technique was used to include all eligible survivors identified from hospital records. Initially, 144 individuals met the inclusion criteria. However, due to deaths, changes of residence, or refusal to participate, only 100 participants were available for data collection. A pilot study was conducted among 10 individuals to validate the tool and test feasibility; these participants were excluded from the main analysis. Thus, the final study sample consisted of 90 cancer survivors.

The primary instrument for data collection was a predesigned, pretested, and semi-structured interview schedule developed using the Quality of Life-Cancer Survivor Version (QoL-CSV). For the purpose of this study, only the physical well-being domain was analyzed. This segment captured data on various physical parameters such as fatigue, appetite changes, aches or pain, sleep changes, constipation, nausea, and overall

physical health. These indicators were selected to provide a comprehensive understanding of the physical state of long-term cancer survivors.

To ensure the reliability of the tool, internal consistency was assessed during the pilot phase using Cronbach's alpha. The physical domain yielded an alpha coefficient of 0.86, indicating excellent reliability in measuring emotional and mental well-being. Trained interviewers conducted face-to-face interviews with participants at their residences. Prior appointments were scheduled according to the participants' convenience, and privacy and confidentiality were strictly maintained. Written informed consent was obtained from all participants before commencing the interviews.

The study received ethical approval from the Institutional Ethics Committee (IEC) of the tertiary care center under reference number SRMS IMS/ECC/2023/59. Participation was voluntary, and no incentives were provided. Data entry was performed using Microsoft Excel 2021, and statistical analysis was conducted using SPSS Trial Version 25. Descriptive statistics such as mean, median, and standard deviation were used to summarize the physical well-being scores. Since the data did not follow a normal distribution, non-parametric tests were applied for inferential analysis. The Mann-Whitney U test was used to compare physical well-being scores between two groups (e.g., male vs. female), and the Kruskal-Wallis test was employed for comparisons across more than two groups (e.g., education levels, caste categories). A *p-value* of less than 0.05 was considered statistically significant in all analyses.

Association with various socio-demographic determinants.

RESULTS

The study included 90 cancer survivors who completed treatment in 2018 and were assessed for long-term physical well-being. The majority of participants belonged to the age group of 50 to 69 years, accounting for 52.23% (n = 47), followed by 37.77% (n = 34) in the 30 to 49 years group. Participants aged 70 to 89 years constituted 6.67% (n = 6), while the 10 to 29 age group represented the smallest proportion at 3.33% (n = 3), as shown in Figure 1. In terms of gender distribution, 55.56% (n = 50) were male, and 44.44% (n = 40) were female, as shown in Figure 2. Socioeconomic status revealed that the largest proportion of participants came from the upper middle class (38.90%, n = 35), followed by the middle class (36.70%, n = 33), and the lower middle class (18.90%, n = 17). A small percentage (5.60%, n = 5) belonged to the upper class, and none were classified as lower class, as shown in Figure 3.

Table 1 shows the score of the domain of physical well-being among study participants (N = 90). The mean fatigue score was 4.93 ± 2.10. Appetite changes had a mean score of 5.20 ± 3.13. Aches or pain had a mean score of 1.64 ± 3.20. Sleep changes had a mean score of 2.00 ± 2.75. Constipation and nausea showed moderate severity, with mean scores of 2.73 ± 3.34 and 3.11 ± 3.63, respectively. Menstrual changes or fertility-related concerns had the lowest mean score of 1.14 ± 2.43. Overall physical health had a mean score of 6.02 ± 2.09. The total physical well-being score was 26.8 ± 10.7 out of a maximum score of 80. Table 2 shows the comparison of the median score of the domain of physical well-being with socio-demographic variables. There was a statistically significant difference

Table 1: Score of domain of physical well-being among study participants (N=90)

Parameter	*Mean ± SD*	*Median (Min – Max)*
Fatigue	*4.93 ± 2.10*	*5 (0–8)*
Appetite changes	*5.2 ± 3.13*	*7 (0–9)*
Aches or pain	*1.64 ± 3.20*	*0 (0–8)*
Sleep changes	*2.00 ± 2.75*	*0 (0–7)*
Constipation	*2.73 ± 3.34*	*0 (0–8)*
Nausea	*3.11 ± 3.63*	*0 (0–9)*
Overall physical health	*6.02 ± 2.09*	*6 (2–9)*
Total physical well-being score	*26.8 ± 10.7*	*26 (7–46)*

NOTE: Total physical well-being score =80 (each subparts total score=10)

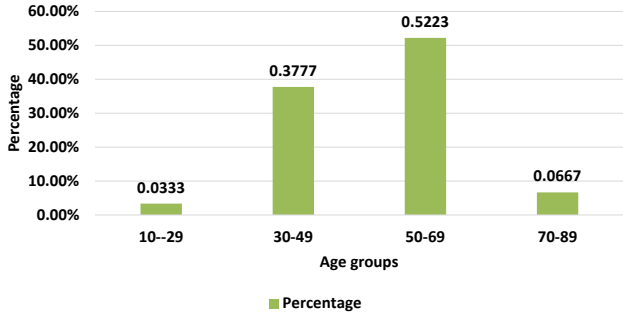

Figure 1: Distribution of study participants based on age groups (N = 90)

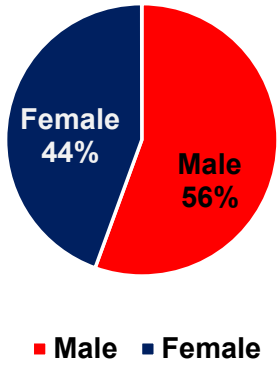

Figure 2: Distribution of study participants based on gender (N=90)

Table 2: Comparison of median score of domains of physical well-being with socio-demographic variables (N=90)

Socio-demographic variables		*Physical well-being domain score median (IQR)*	*p-value*
Age[$]	10-29	16.0 (16.0 – 30.0)	0.101
	30-49	37.0 (23.0 – 37.0)	
	50-69	24.0 (16.0 – 30.5)	
	70-89	23.0 (23.0 – 23.8)	
Sex[@]	Female	26.0 (16.0 – 37.0)	0.89
	Male	25.5 (17.8 – 37.0)	
Socioeconomic status[$]	Upper class	41.0 (36.2 – 44.0)	0.04**
	Upper middle class	33.0 (22.0 – 39.5)	
	Middle class	24.0(16.0 – 37.0)	
	Lower middle class	25.0 (16.0 – 37.5)	

*[@]Mann whitney U test, [$]Kruskal-wallis Test. ** p-value < 0.05 – statistically significant*

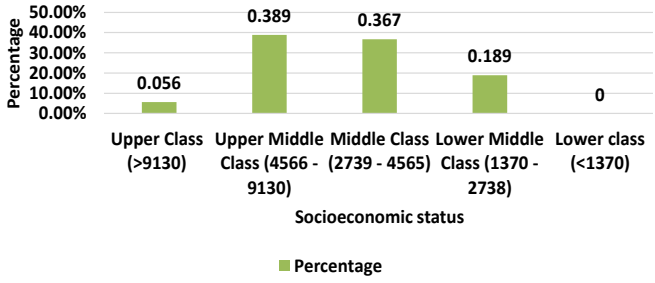

Figure 3: Distribution of study participants based on their socioeconomic status (N=90)

with p <0.05 between the median score of physical well-being and socioeconomic status. The highest median score of 41 (IQR - 36.2–44.0) was for the upper class, while the lowest was 25 (16.0–37.5) for the lower middle class. There was no statistically significant difference between the median scores of physical well-being within variables such as age, sex, and occupation.

DISCUSSION

The present study highlights a predominant age distribution of participants within the 50 to 69 age group, 47 (52.23%), followed by the 30 to 49 age group, 34 (37.77%). The gender distribution shows a slight male predominance of 50 (55.56%) over females 40 (44.44%). These findings align with global cancer epidemiology trends as per a study done by Kaur N. *et al.*[9] and Patra A. *et al.*[10], where older age groups often represent the majority of cancer survivors due to the association of cancer risk with age. A similar study was done by Neethu AP. *et al.*[11] on breast cancer survivors found a comparable age distribution, with a mean age of 55.45 years among participants, emphasizing the representation of older individuals in survivorship studies. Contrasting findings emerge from a 30-year retrospective cohort of childhood cancer survivors in India done by Prasad M. *et al.*[12] where the median age was 18 years, reflecting the study's focus on a younger demographic.

The present study indicates that the majority of participants belonged to the upper-middle class 35 (38.90%) and middle class, 33 (36.70%), followed by the lower-middle class 17 (18.90%) and a small proportion in the upper class 5 (5.60%). However, no participants were from the lower class (<₹1370). These findings align with a study done by Kaur N. *et al.*[9] which highlighted that survivors from middle and upper-middle socioeconomic strata are more likely to access survivorship programs due to better financial resources and awareness. In contrast, a study done by Prasad M. *et al.*[12] which included survivors from diverse economic backgrounds, reported a higher representation of lower socioeconomic groups, reflecting broader regional sampling. The absence of participants in the lower class in the current study might indicate limitations in access to healthcare and follow-up among economically disadvantaged groups, as seen in a study done by Patra A. *et al.*[10] That study emphasized the financial barriers faced by lower-class individuals, including challenges in treatment affordability and survivorship care.

Quality of Life

Physical well-being

The mean fatigue score in the present study was 4.93 ± 2.10, with a median of 5, indicating moderate fatigue among participants. This aligns with findings by Kaur N. *et al.*[9] which reported moderate-to-high fatigue levels among cancer survivors, especially during long-term follow-up, due to lingering effects of treatment. In contrast, Neethu AP. *et al.*[11] observed slightly lower fatigue levels in breast cancer survivors. Participants reported a mean appetite change score of 5.2 ± 3.13, reflecting moderate issues. This is consistent with findings by Prasad M. *et al.*[12] who identified appetite changes as a common concern among survivors undergoing chemotherapy or radiation therapy. Conversely, Patra A. *et al.*[10] noted a lower prevalence of

appetite-related issues, suggesting better management of side effects through nutritional counseling in their cohort. The mean score for aches or pain was 1.64 ± 3.20, showing low pain levels in most participants. This contrasts with findings by Kaur N. *et al*.[9] which reported higher pain scores, particularly among survivors with advanced-stage disease. However, similar to the present study, Neethu AP. *et al*.[11] found low pain levels in early-stage survivors. A mean score of 2.00 ± 2.75 for sleep changes indicates that most participants experienced minimal sleep disturbances. This aligns with findings by Patra A. *et al*.[10] which reported improved sleep quality due to supportive care programs. However, Prasad M. *et al*.[12] observed higher sleep disturbances, particularly in rural survivors with limited access to psycho-oncology services.

The mean constipation score was 2.73 ± 3.34, indicating mild issues for most participants. This finding is consistent with Kaur N. *et al*.[9] which highlighted mild-to-moderate constipation among survivors, often linked to chemotherapy-induced side effects. In contrast, Neethu AP. *et al*.[11] reported fewer cases of constipation, likely due to proactive dietary interventions. Participants reported a mean nausea score of 3.11 ± 3.63, reflecting mild-to-moderate symptoms. This aligns with Prasad M. *et al*.[12] who identified nausea as a common side effect of treatment. However, Patra A. *et al*.[10] noted lower nausea scores in their cohort, attributing this to advancements in antiemetic therapies. The mean score for menstrual changes or fertility issues was 1.14 ± 2.43, indicating minimal concerns among participants. This finding aligns with Neethu AP. *et al*.[11] who reported similar results in postmenopausal survivors. Conversely, Kaur N. *et al*.[9] found higher scores in younger survivors, reflecting greater fertility-related concerns. The mean overall physical health score was 6.02 ± 2.09, showing a positive perception of physical well-being. This finding is consistent with Prasad M. *et al*.[12] who reported moderate-to-high overall health satisfaction among survivors. However, Patra A. *et al*.[10] observed slightly higher scores, possibly reflecting differences in supportive care access. The total physical well-being score was 26.8 ± 10.7, reflecting moderate physical health. This aligns with Neethu AP. *et al*.[11], who reported similar total scores, indicating the lasting impact of treatment on physical domains. In contrast, Kaur N. *et al*.[9] reported lower scores, particularly in survivors with advanced-stage disease or comorbidities.

A statistically significant difference was observed between the median scores of physical well-being and socioeconomic status (p = 0.041). Participants from the upper class reported higher median scores (41.0) compared to those in lower socioeconomic groups. This finding aligns with Prasad M. *et al*.[12] which emphasized the critical role of economic resources in accessing quality post-treatment care, nutrition, and rehabilitation services. Similarly, Kaur N. *et al*.[9] reported that higher socioeconomic status was associated with better physical recovery, as survivors had greater access to healthcare and supportive services. However, Neethu AP. *et al*.[11] reported no significant differences in physical well-being across socioeconomic groups, suggesting that government-funded healthcare systems in certain regions can mitigate economic disparities. These contrasting findings indicate that the impact of socioeconomic status on physical well-being is highly context-dependent, influenced by healthcare infrastructure and policy interventions.

The present study found no statistically significant differences between the median scores of physical well-being and variables such as age (p = 0.101) and sex (p = 0.892). These findings align with results from a study by Kaur N. *et al*.[9] which reported that physical well-being scores were largely unaffected by age and sex. This consistency suggests that physical challenges, such as fatigue and pain, are common across diverse demographic groups and are more directly influenced by treatment-related factors rather than socio-demographic characteristics. These discrepancies highlight the potential influence of regional and healthcare accessibility differences.

CONCLUSION

This study reveals the ongoing physical challenges faced by cancer survivors five years after treatment in a semi-urban Indian setting. While many reported moderate physical well-being, a substantial number experienced persistent fatigue, pain, and sleep changes. Variations in physical outcomes were noted across age and socioeconomic groups, with lower-income survivors faring worse. The findings call for structured physical assessment and tailored interventions within follow-up care, including counselling and support services. A holistic, patient-centered survivorship approach, integrating long-term mental health care, is essential to address the enduring emotional needs of survivors, especially in resource-constrained settings.

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