**RESEARCH PAPER**

# Physical Activity and Quality of Life in Patients with Neurological Disorders: A Physiotherapy Perspective

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**ABSTRACT**

Neurological disorders are statistically correlated with long-term functional limitation and low quality of life. It includes physical activity, which has been mentioned as a potentially modifiable factor that can improve multidimensional health outcomes of this population. Reviewing the association between physical activity level and quality of life in patients with neurologic diseases from the standpoint of physiotherapy was the aim of the paper. The type of design used was a cross-sectional questionnaire, and 90 adults whose diagnosis was stroke, Parkinson's/Sclerosis or spinal cord injury were used. Physical activity was measured using the International Physical Activity Questionnaire (IPAQ). while WHOQOL-BREF was used to measure quality of life. Pearson correlation, descriptive statistics and one-way ANOVA were performed. The findings showed a somewhat positive and statistically significant connection between total physical activity and overall quality of life ($r = 0.54$, $p < 0.001$). The quality of life of the respondents in the high group of physical activity was significantly better compared to those in the moderate and low groups of physical activity ($p < 0.001$). The analyses performed on the domains of analysis revealed the same favourable relationship in the physical, psychological, social, and environmental domains. According to the findings of these studies, physical activity and the quality of life of people with neurological illnesses are related. Integration of systematic and personalised strategies of physical activity into physiotherapy practice can help to improve patient outcomes and long-term health

**Keywords**: physical activity, quality of life, neurological disorders, physiotherapy, rehabilitation..

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## INTRODUCTION

The neurological conditions of stroke, Parkinson's disease, multiple sclerosis, and spinal cord injury are commonly linked with the chronic effects of impairments that inhibit independence and limit involvement in everyday life. Health-related quality of life in stroke populations is affected by a set of physical constraints and contextual factors that determine the recovery and reintegration into communities (Kariyawasam et al., 2020). Poor functional capacity and autonomy have also been identified as the reasons why stroke survivors suffer reduced performance in their daily activities, thus demonstrating the significance of perceived quality of life (Ellepola et al., 2022). In addition to functional problems, restrictions in participation are a significant issue because reduced physical activity can decrease the involvement in the meaningful daily role and social situations (de Diego-Alonso et al., 2024). Taken together, these results point to the fact that quality of life in neurological conditions is multidimensional and closely related to the movement, functionality, and engagement of patients in the environment. The quality of life, psychological health, and physical condition of people with neurological conditions are all impacted by physical activity, which is widely regarded as a behavioural characteristic that can be changed. Structured exercise has been demonstrated to have beneficial effects on mental health outcomes and has a positive impact on the health-related quality of life in adults with spinal cord injury, which justifies its importance as a vital approach to therapeutic interventions in rehabilitation (Ponzano et al., 2024). Other evidence-based studies have also shown that patients with a spinal cord injury having higher levels of physical activity have a higher quality of

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life, which is why the level of engagement in activities beyond the impairment level is important (Filipcic et al., 2021). In MS, the connection between physical activity and quality of life seems to be explained, in part, by the psychosocial mechanisms, including self-efficacy, which may mean that movement behaviors have an effect on the well-being through both physiological and cognitive channels (Guicciardi et al., 2019). These trends support the clinical justification of physical activity promotion as a component of the overall neurorehabilitation, especially in cases where quality of life is taken into consideration as one of key patient-cantered outcomes. Physical activity and sedentary behaviour are two behavioural targets that are different, but closely related in Parkinson disease, and with consequences on quality of life. Greater sedentary time has been linked to worse quality of life in people with Parkinson disease, meaning that the excessive inactivity can lead to the increased poorness of the perceptions and functioning of victims (Ellingson et al., 2019). On the contrary, neuropsychiatric symptoms like anxiety and apathy in the early stages of the disease have been associated with the positive effects of more physical activity in Parkinsonism, and these effects may not be confined to motor symptoms (Ng et al., 2021). There is also evidence that exercise has a therapeutic effect in the early phase of Parkinsonism, which was shown to have clinically significant positive impacts on patient outcomes by controlled trials (Swarnakar et al., 2023). Combined, these results imply that interventions to improve quality of life curves in Parkinson disease can be achieved through strategies to enhance physical exercise and decrease sedentary behaviour importance of physical activity becomes more and more accepted, the need to attain recommended levels of activity in the community setting has long been overlooked, although there are numerous stroke survivors who fail to do so. Physical activity, fatigue severity, and health-related quality of life have been found to be interconnected in the case of community-dwelling stroke survivors, which implies that fatigue can serve as an important hindrance in the relationships between decreased levels of activity and declined well-being (Odetunde et al., 2025). Patterns of real-world activity among stroke survivors who walk independently also indicate a degree of variability in the accumulation of activity in daily life, which indicates that mobility alone does not have a significant effect on the meaning of engaging in physical activity (Espernberger et al., 2025). The retrospective information also suggests that exercise behavior in the post-stroke period can be variable over time, and different people can show varying patterns of participation based on the personal and environmental circumstances (Arora et al., 2025). These observations lead to a desire to develop physiotherapy-based interventions that consider the lived experience of stroke survivorship as opposed to using indicators based on impairment only. Physiotherapists can be at the centre of helping to prevent unsafe and individualized participation in physical activities by assessing, prescribing, progressing and providing behaviour-change assistance. Nevertheless, it is difficult to continue being active with time, particularly when rehabilitation services are shifted out of the structured programs and into self-managed routines. It is shown that the compliance with exercise rehabilitation programs among stroke survivors is quite different, and several obstacles may disrupt continued attendance, such as motivational, environmental, and health-related limitations (Gwynne-Mayer et al., 2025). These issues reinforce the idea that patient-reported measure of activity behavior and quality of life is necessary because a questionnaire could be able to simulate subjective experiences, participation limitations, and well-being in a convenient and scalable way. The main objectives of study were to analyse interconnection between level of physical activity and the quality of life of patients with the neurological disorders by using the standardized measurements in the form of a questionnaire. The research question was to clarify whether the increased rates of physical activity are linked to improved overall quality of life and the domain-specific results, such as physical, psychological, social, and environmental well-being, through the prism of physiotherapy.

## 2. Methodology

### 2.1 Study Design and Study Setting

The current study examined relationships between the quality of life and physical activity levels of individuals with neurological diseases using a cross-sectional, questionnaire-based observational design. It was a chosen design as it made it possible to consider the patient-reported outcomes at one point in time and investigate relationships between variables through the prism of physiotherapy. The study was conducted in the out-patient departments of physiotherapy and neurorehabilitation tertiary care hospitals and rehabilitation centres. A time span of six months was used to collect data. The participants were recruited when they paid a visit to the physiotherapy centre.

### 2.2 Participants

The study included 90 patients who were diagnosed with neurological disorders. The criteria that eligible the participants included; Participants required to be individuals (18 years of age and older) with a verified diagnosis of a neurological disorder such as multiple sclerosis, stroke, Parkinson's disease, or spinal cord injury. Each of them was in good health and could answer the questionnaires without any or with little support. Severely impaired mentally patients, patients who were acutely medically unstable or had severe communication disorders were excluded in study.

### 2.3 Sample Size and Sampling Technique

It was decided to use a sample of 90 participants. This figure was deemed sufficient to identify a moderate association between scores of physical activity and quality of life with reasonable statistical strength at a 95 percent confidence interval. The sample also provided adequate representation of the patients undergoing the various neurological conditions in the physiotherapy

departments during the research period. The convenience sampling method was used. The patients were recruited in the study in a consecutive manner; as they met the inclusion criteria and were willing to participate, they were recruited until sample size of 90 was attained.

**2.4 Data Collection Instruments**

Structured and validated questionnaires were used in data collection. The data of age, gender, diagnosis, duration of illness, mobility status, and assistive devices utilization was recorded using a demographic and clinical information form. The International Physical Activity Questionnaire (IPAQ), which measures the frequency, duration, and intensity of physical activity completed over the preceding week, was also used to gauge the intensity of physical activity. The WHOQOL-BREF was a quality of life questionnaire that assesses four areas: environmental well-being, social relationships, psychological health, and physical health.

**2.5 Statistical Analysis**

Statistical techniques were used to input and analyse the data. Descriptive statistics were calculated for clinical and demographic factors. Whereas frequencies and percentages were used to characterize categorical variables, mean and SD were used to characterize continuous variables. To determine if the data had a normal distribution, the Shapiro-Wilk test was employed. Either Pearson or Spearman correlation analysis was used to determine the relationship between the level of physical activity and the quality of life scores. A p-value of 0.05 was considered statistically significant.

**3. Results**

**3.1 Participant Characteristics**

There were 90 respondents who filled the questionnaires. The mean age was 55.2 ± 12.6 years, and mean duration of illness was 5.1 ± 3.4 years. There were 50 males (55.6%) and 40 females (44.4%). The most frequent diagnosis was stroke (n = 35, 38.9%), then the Parkinson disease (n = 20, 22.2%), multiple sclerosis (n = 18, 20.0%), and spinal cord injury (n = 17, 18.9%). The study population's clinical and demographic features are detailed in Table

**Table 1. Demographic and Clinical Characteristics (n = 90)**

| Variable | Value |
|---|---|
| Age (years), mean ± SD | 55.2 ± 12.6 |
| Duration of illness (years), mean ± SD | 5.1 ± 3.4 |
| Male, n (%) | 50 (55.6%) |
| Female, n (%) | 40 (44.4%) |
| Stroke, n (%) | 35 (38.9%) |
| Parkinson’s disease, n (%) | 20 (22.2%) |
| Multiple sclerosis, n (%) | 18 (20.0%) |
| Spinal cord injury, n (%) | 17 (18.9%) |
| Ambulatory (independent/assisted), n (%) | 56 (62.2%) |
| Non-ambulatory, n (%) | 34 (37.8%) |

Also, 56 participants (62.2%) were ambulatory (either independently or with assistive devices), and 34 participants (37.8%) were non-ambulatory during the assessment. Table 1 indicates that stroke was the largest diagnostic category with the second group of diagnosis being Parkinson’s disease, multiple sclerosis and spinal cord injury. The gender ratio was quite even, and somewhat there was a majority of male respondents. The relative frequency of the neurological diagnosis of the participants is shown in Figure 1.

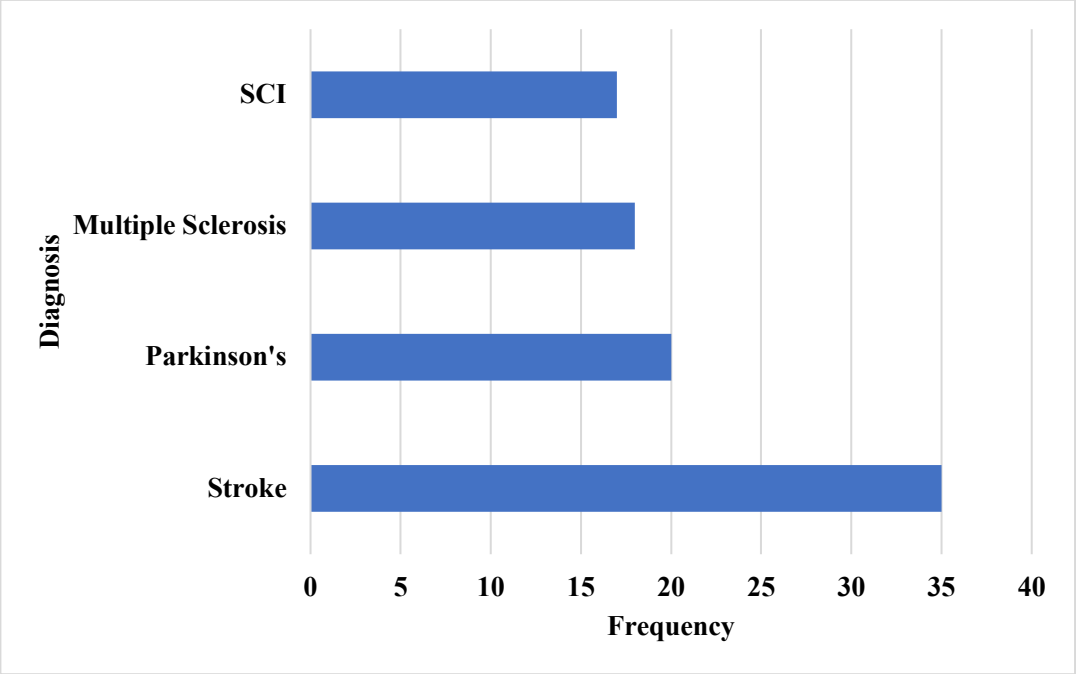


**Figure 1: Distribution of Neurological Diagnoses Among Participants**

Figure 1 graphically illustrates the proportional representation of each of the neurological conditions in the study sample with stroke being the most common diagnosis.

### 3.2 Physical Activity Levels

The mean total physical activity level measured by IPAQ was 1,842 ± 910 MET-minutes/week. According to the IPAQ classification, it was found that 28 (31.1) percent of the participants had low physical activity levels, 37 (41.1) percent had moderate physical activity, and 25 (27.8) percent had high physical activity levels. Table 2 summarizes the categorical distribution of the physical activity levels.

**Table 2. Physical Activity Level Classification (IPAQ)**

| Category | n (%) |
|---|---|
| Low | 28 (31.1%) |
| Moderate | 37 (41.1%) |
| High | 25 (27.8%) |
| Total | 90 (100%) |

According to Table 2, most of the participants fell in the moderate physical activity group, with only a third of them displaying low physical activity. Figure 2 indicates the graphical representation of categories of physical activity.

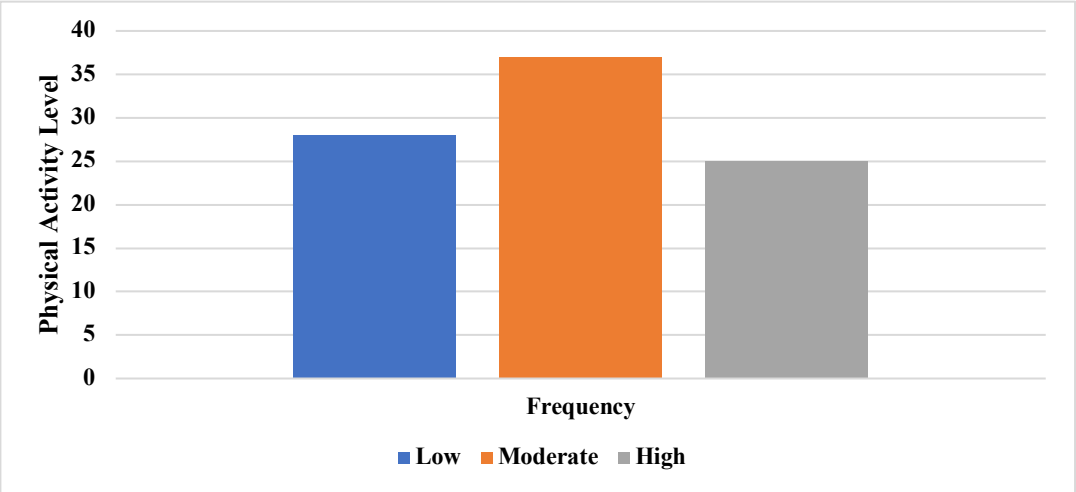


**Figure 2: Distribution of Participants According to Physical Activity Level**

Figure 2 also illustrates the pre-eminence of the moderate level of activity in the participants where the high and the low activity groups have lower proportions.

### 3.3 Quality of Life Scores

The overall WHOQOL-BREF score was 63.7 ± 10.8. Domain-specific scores were as follows: physical health 59.8 ± 11.9, psychological health 62.4 ± 10.5, social relationships 67.1 ± 12.3, and environmental domain 65.3 ± 9.7. Table 3 presents the average scores of each of the quality of life domains.

**Table 3. WHOQOL-BREF Domain Scores (n = 90)**

| Domain | Mean ± SD |
|---|---|
| Physical Health | 59.8 ± 11.9 |
| Psychological Health | 62.4 ± 10.5 |
| Social Relationships | 67.1 ± 12.3 |
| Environmental | 65.3 ± 9.7 |
| Overall QoL | 63.7 ± 10.8 |

Table 3 indicates that the social relationship domain had the highest mean score as compared to the physical health which had relatively low scores as compared to the other three domains. Figure 3 represents the comparative distribution of domain scores.

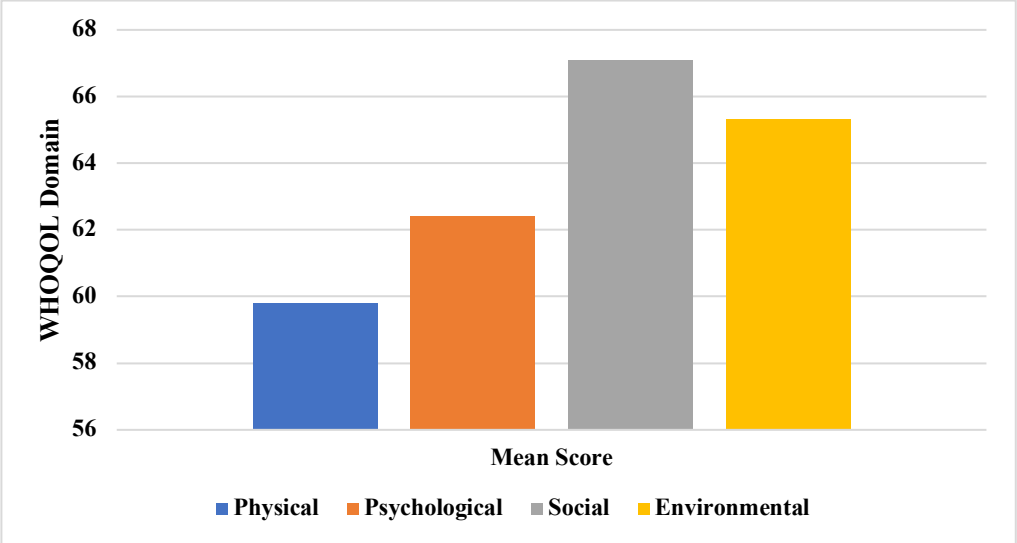


**Figure 3: Mean Scores Across WHOQOL-BREF Domains**

In Figure 3, the relative differences will be shown by domains of quality of life, with the social and environmental domains showing relatively high mean scores than physical health.

### 3.4 Correlation Between Physical Activity and Quality of Life

Shapiro Wilk was done to test continuous variable normality. The data were found to be distributed normally ($p > 0.05$) more or less and thus the Pearson correlation analysis was performed. Pearson correlation analysis indicated that the total physical activity has a statistically significant moderate positive correlation with the total quality of life ($r = 0.54$, $p < 0.001$). The positive correlation also existed between the physical activity and physical health domain ($r = 0.58$, $p < 0.001$), psychological domain ($r = 0.49$, $p = 0.001$), social relationships domain ($r = 0.36$, $p = 0.001$) and environmental domain ($r = 0.33$, $p = 0.002$). Table 4 indicates the correlation coefficients and significant values.

**Table 4. Correlation Between Physical Activity and WHOQOL-BREF Scores**

| Variable | r | p-value |
|---|---|---|
| 'Overall QoL' | 0.54 | <0.001 |
| 'Physical Health' | 0.58 | <0.001 |
| 'Psychological Health' | 0.49 | <0.001 |
| 'Social Relationships' | 0.36 | 0.001 |
| 'Environmental' | 0.33 | 0.002 |

As shown in Table 4, the physical health domain was the strongest followed by overall quality of life score to the physical activity. Figure 4 shows the linear correlation between total physical activity and the overall quality of life.

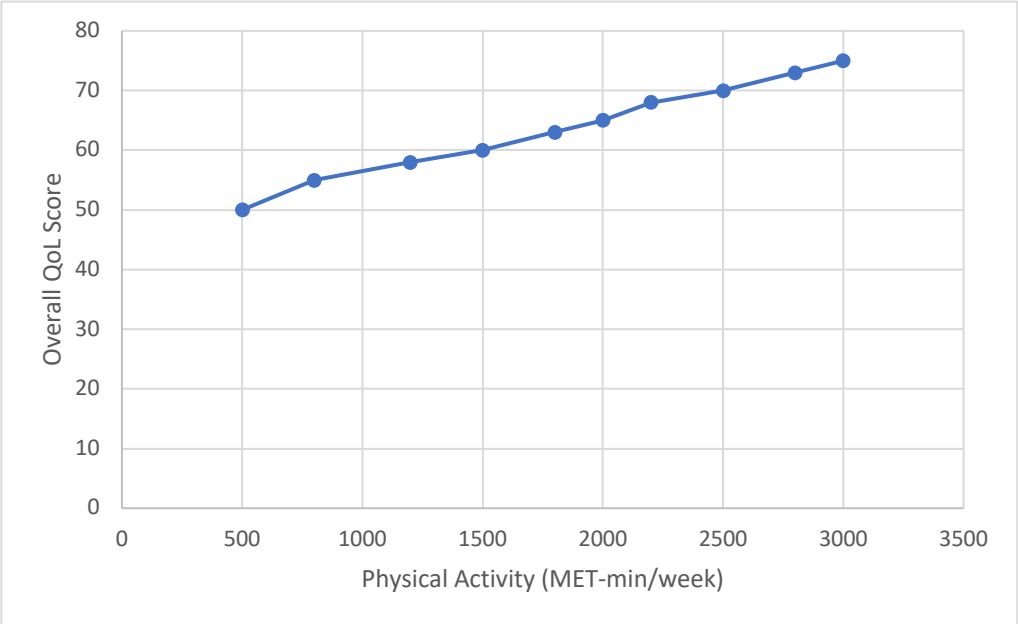


**Figure 4: Scatter Plot Demonstrating the Correlation Between Total Physical Activity and Overall Quality of Life**

Figure 4 indicates that trend is linear and positive, indicating that overall quality of life and levels of physical activity have moderate positive relationship.

### 3.5 Comparison of Quality of Life Across Physical Activity Categories

Before analysis, assumptions of normality and homogeneity of variance were tested. One-way ANOVA was justified by the fact that Levene test showed that the variances were homogenous ($p > 0.05$). This enhances the consistency of the methodology. One-way ANOVA demonstrated that there was a statistically significant difference between the overall quality of life differences in physical activity categories, degrees of freedom (df) $(2,87) = 15.84$, $p < 0.001$). Participants in the high physical activity group demonstrated significantly higher QoL scores ($71.2 \pm 8.6$) compared to the moderate ($63.9 \pm 9.4$) and low activity groups ($55.6 \pm 10.1$). A post hoc Tukey test revealed that all three groups had significant differences ($p < 0.05$). Table 5 gives the mean total quality of life based on the physical activity level.

**Table 5. Overall Quality of Life by Physical Activity Category**

| Physical Activity Level | Mean QoL ± SD |
|---|---|
| Low | 55.6 ± 10.1 |
| Moderate | 63.9 ± 9.4 |
| High | 71.2 ± 8.6 |

Table 5 depicts that the quality-of-life scores have an inverse relationship with the increased physical activity between the low-activity and the high-activity groups in terms of dose-response. The results reveal that, coherent positive association exists between, on the one hand, augmented degree of bodily movement and, on the other hand, quality of existence in a number of realms of a neurological patient.

## 4. Discussion

The current research showed moderate positive relationship between level of physical activities and general quality of life among patients with neurological conditions which is statistically significant. Individuals who indicated more physical activity scored better in physical, psychological, social and environmental areas. These results comply with the data of the populations with PD, where exercise-based interventions have been reported to meaningfully enhance the health related quality of life outcomes (Wang et al., 2025). The domain-specific effects of the present research are consistent with systematic findings that various exercise forms will be sufficient to change motor and non-motor well-being in neurological disorders. The association between levels of activity and quality of life as found to be positive in this study is supported by more extensive behavioural research on the topic of Parkinson disease. Some of the factors that are linked with physical activity and sedentary behavior in Parkinson disease are the severity of symptoms, motivational factors, and environmental support, which indirectly influence perceived well-being (Domingues et al., 2024). Our results help support the expectation that engagement in activities can offset the negative consequences of inactivity on health perceptions. Additionally, a systematic review has noted the beneficial outcomes of physical activity on the quality of life in Parkinson disease regarding the possible positive changes in functional and psychosocial spheres (Bispo et al., 2024). Different patterns in results show gradual rise in the quality of life score among various categories of physical activity, which is indicative of structured exercise programs to this population. It is also shown by meta-analytic evidence that exercise can help in enhancing balance, gait speed,

symptom relief, and quality of life in older patients with Parkinson's disease (Park et al., 2025). These physiological and functional gains are likely to be translated into higher confidence and social engagement, and hence influence multidimensional quality of life outcomes. The current research findings are consistent with this integrative viewpoint, implying that exercise can be used as a baseline ingredient of physiotherapy care interventions in Parkinsonian syndromes. Structured exercise programs have also shown significant changes in health-related quality of life in the population of spinal cord injury. A randomized controlled trial study on home-based exercise identified the quality of life as a significant improvement after intervention, supporting the importance and efficiency of community-based interventions (Nightingale et al., 2018). In the same way, the SCIPA full-on trial showed the advantages of the intensive exercise strategies following the spinal cord injury and corroborates the potential clinical utility of the activity-based strategy (Galea et al., 2018). These controlled findings are reflected in the correlation we found in our study between increased physical activity and greater quality of life, which supports the idea that even naturally occurring evidence of changes in the extent of activity engagement might lead to better patient-reported outcomes. The quality of life outcomes seems to depend on the type of exercise and its structure in multiple sclerosis. Network meta-analytic data indicate that some exercise modalities can be effectively used to enhance the quality of life in such a population (Reina-Gutiérrez et al., 2022). Structured exercise interventions are also able to respond to fatigue, a widespread and disabling symptom of multiple sclerosis, and positive outcomes in the quality of life and fatigue severity are reported in the literature (Yang et al., 2025). The positive outcomes of exercise on the overall well-being of people with multiple sclerosis are also further supported by a broader systematic review (Du et al., 2024). These findings are consistent with domain-specific associations evident in the current study especially in the physical and psychological domain and confirm the significance of the individualized physiotherapy programming. Physical activity among stroke survivors is one of the challenges that is difficult to maintain, but it is one of the most important factors of long-term recovery and quality of life. A structured scoping review of poststroke involvement in physical activity indicated a discrepancy in the degree of participation and found a variety of obstacles to long-term participation (Pasztor et al., 2025). The current research result that showed that more active participants were able to show better quality of life correlates with the rest of the literature that highlights the importance of active involvement in improving poststroke outcomes. These conclusions indicate that physiotherapists must not make use of motor recovery only but also ease the process of long-term behavior change plans that will assist in maintaining regular activity participation in the community setting. The findings of this research are relevant to the practice of physiotherapy. In the neurological contexts, it seems that physical activity is strongly linked with enhanced multidimensional quality of life. The studies of PD support exercise as an important treatment method that determines motor and non-motor outcomes (Wang et al., 2025). There is evidence that structured and home-based exercise models are beneficial to health-related quality of life in spinal cord injury (Nightingale et al., 2018). In MS, specific exercise programs will be able to combat anorexia and improve the general quality of life (Yang et al., 2025). These convergent results highlight the importance of including individual evidence-based physical activity prescriptions in long-term management strategies by physiotherapists.

The strong aspect of this research is the use of questionnaires to conduct its study, which allows the assessment of the quality of life over multidomain and self-reported physical activity using a heterogeneous sample of neurological patients. Although connections were found, one cannot state that increased physical activity directly resulted in the improvement of the quality of life. Stronger causal written by longitudinal and interventional investigations, as in the case of Parkinson disease and spinal cord injury populations, should be included in the direction of future research (Galea et al., 2018). The longitudinal trends of physical activity behavior and quality of life in neurological conditions should be investigated in future research. Physiotherapy recommendations can be further streamlined by comparing studies in various exercise modalities as they have been examined through research in multiple sclerosis and Parkinson's disease (Reina-Gutiérrez et al., 2022). Moreover, combining behavioural and environmental predictors of activity participation can increase the adherence and sustainability of an intervention, which, in the end, will maximize the patient-centered outcomes of neurological rehabilitation settings.

## 5. Conclusion

The close positive relationship between rate of physical activities and the quality of life of the individuals with the neurological issues. The more physically active individuals had a higher total quality of life, a higher benefit on physical, psychological, social and environmental spheres. The results validate the importance of physical activity as a vital component of a multicomponent neurorehabilitation program and its applicability in this situation in terms of motor recovery. Within the scope of physiotherapy, a regular and structured physical exercise may also play a vital role in enhancing functional performance as well as augmenting the quality of life and engagement in daily undertakings. The dose-response relationship, where the quality of life score increased with the ever-increasing physical activity types, highlights the possible clinical benefit of and personalized prescription of exercise and prolonged assistance with activities. The results are consistent with the rising literature that indicates that physical activity is a modifiable factor that can impact multidimensional health outcomes in the nervous system despite the inability to establish causal relationships because of a cross-sectional design. The future studies must look into longitudinal and interventional study to bring out more understanding of the direction and strength of these relationships.

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