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Sedentary Behavior Is Related to Clinical Profile, Disability and Quality of Life in Community-Acquired Pneumonia Patients at Hospitalization and Follow-Up

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Abstract: Community-acquired pneumonia (CAP) causes symptoms that disturb the clinical profile, functionality and quality of life of infected patients. Many CAP patients are hospitalized as a result of these conditions. A sedentary lifestyle is a risk factor for symptoms and functional decline in hospitalized patients; for this reason, it could be a key factor before a CAP infection. This study aimed to describe the symptoms, functionality and quality of life of CAP patients during and after hospitalization by comparing their sedentary behavior. A prospective observational study of CAP hospitalized patients was carried out. Participants were divided into two groups according to the daily sedentary time before hospitalization (420 minutes > sedentary). Dyspnea, fatigue, functionality and quality of life were collected upon admission, discharge, and 3 months after hospitalization. Ninety CAP patients were included in this study. At hospital admission, the sedentary patients presented lower functionality and quality of life ($p = 0.002$). At discharge, there were significant differences in quality of life in favor of the active group ($p < 0.05$). In addition, sedentary patients showed higher dyspnea ($p = 0.04$) and poorer functionality and quality of life ($p < 0.001$) 3 months after discharge.

Keywords: CAP; pneumonia; physical activity; sedentary behavior; disability; quality of life

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1. Introduction

Community-acquired pneumonia (CAP) is a major reason for hospitalizations, with nearly 20% of patients returning to the hospital within 30 days post-discharge [1]. During hospitalization, reduced physical activity and bed rest are frequently observed. In patients with CAP, activity is restricted due to external factors like intravenous antibiotic therapy and oxygen support, as well as internal factors such as hypoxemia and fatigue [2].

Physical activity plays a fundamental and essential role as a cornerstone in the comprehensive treatment of patients who suffer from respiratory diseases, including those diagnosed with community-acquired pneumonia (CAP) [3]. Engaging in physical exercise has been shown to improve overall health outcomes, promote better respiratory function, and enhance recovery in individuals affected by such conditions. According to a study conducted by Ryrsø et al., a significant association was found between a sedentary lifestyle and increased risks of mortality and hospital readmission in patients who had

been hospitalized due to CAP. The researchers observed that individuals who remained physically inactive during their hospitalization or after discharge exhibited higher chances of experiencing negative health events, underscoring the critical importance of minimizing sedentary behavior. These findings highlight the need for targeted interventions aimed at promoting physical activity during and following hospitalization for respiratory infections, such as CAP [4].

Sedentary behavior is defined as any form of activity that requires very low levels of energy expenditure and is typically characterized by prolonged periods of sitting or lying down, during which there is minimal or negligible physical movement. This type of behavior encompasses a wide range of daily activities, such as watching television for extended hours, working on a computer, reading books or magazines, or spending long periods seated while commuting in a car or public transportation. Although sedentary behavior is frequently associated with leisure-related pastimes that involve little physical engagement, it is equally common in professional settings, where tasks often necessitate extended periods of sitting, such as those performed by office workers or individuals in administrative roles [5]. Research has consistently shown that prolonged sedentary behavior, when maintained over time, can have significant detrimental effects on health. Specifically, it has been linked to an increased risk of developing chronic illnesses, including type 2 diabetes, obesity, and various forms of cardiovascular disease. Furthermore, excessive sedentary habits have been associated with a higher likelihood of experiencing reduced life expectancy, as they can elevate the overall risk of all-cause mortality. These findings underscore the urgent need for public health initiatives aimed at reducing sedentary time and encouraging more active lifestyles, both in the workplace and during leisure hours [6,7].

In addition, there is substantial evidence indicating that sedentary behavior serves as an important risk factor for the progressive functional decline observed in individuals suffering from respiratory diseases. Extended periods of physical inactivity can lead to a host of adverse effects, including weakened skeletal muscles, decreased lung capacity, and a compromised immune system. These negative outcomes collectively contribute to poorer health status and a higher likelihood of complications in patients with respiratory illnesses. Prolonged sedentarism makes individuals more vulnerable to reduced physical performance and can further exacerbate disease progression [8]. Studies conducted on other respiratory conditions, such as Chronic Obstructive Pulmonary Disease (COPD), have shown that sedentary lifestyles are closely linked to worsening symptoms, decreased functional ability, and reduced exercise tolerance at the time of hospital admission, regardless of the underlying severity of the disease itself. These findings suggest that maintaining physical activity levels may play a critical role in managing respiratory disorders. However, despite the growing body of evidence regarding the impact of inactivity on respiratory health, our understanding of how sedentary behavior specifically influences clinical outcomes in cases of community-acquired pneumonia (CAP) remains relatively limited [9]. Further research is necessary to clarify the extent to which prolonged sedentarism may affect the symptomatology, recovery process, and long-term prognosis in patients diagnosed with CAP.

We hypothesized that sedentary behavior prior to hospitalization should be associated with symptomatology, functionality and quality of life in patients with CAP. Therefore, the objective of this study was to determine whether sedentary behavior is related to symptomatology, functionality and quality of life in patients with CAP during hospitalization and after hospital discharge.

2. Materials and Methods

2.1. Study Design

We conducted a longitudinal observational prospective cohort study from September 2022 to August 2024. This study adhered to the recommended guidelines for designing observational studies and applied the criteria and checklist from the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) [10]. This study was also carried out following the Declaration of Helsinki 1975, revised in 2013 [11]. The Biomedical Research Ethics Committee of Granada (Granada, Spain) reviewed and approved the study protocol.

2.2. Participants

Participants were recruited from the Pneumology Service of the "Hospital Universitario San Cecilio" (Granada, Spain). The inclusion criteria were: (1) Patients hospitalized by a CAP infection, (2) whose age is over 16 years, and (3) signed the informed consent. Patients were excluded if they had cognitive impairments that prevented them from understanding and answering, if they were not hospitalized, did not sign the informed consent, or they presented any comorbidity that might disturb the patient's assessment.

2.3. Group Assignment

Admitted participants were divided into two groups according to their daily sedentary time. Participants were asked how much time they had spent sitting in the seven days before hospital admission. The cutoff point reported by Ku PW et al. [12] was used to identify sedentary participants (>420 min/day). Patients who remained inactive for more than 420 min per day were included in the sedentary group, and those who spent less than 420 min per day inactive were included in the active group.

2.4. Data Collection

Data collection was performed at admission, discharge and 3 months after hospital stay by the same investigators previously trained. Patients completed an initial assessment that included anthropometric and sociodemographic data (age, sex, body mass index, and comorbidity index (Charlson index) [13]). Data collected from the medical history included the length of hospital stay and the CAP severity, which was evaluated with the CURB-65 score [14] and FINE scale [15].

The primary study outcomes included respiratory symptoms (dyspnea and fatigue), disability levels, and health-related quality of life.

Dyspnea was measured by the Borg modified scale 0–10 (no dyspnea–maximum dyspnea) [16]. This scale has been used in previous studies to evaluate dyspnea in hospitalized patients with respiratory diseases [17,18]. Fatigue was assessed by a Numeric Rating Scale (NRS) from 0 (no fatigue) to 10 (maximum fatigue) [19].

World Health Organization Disability Assessment Schedule 2.0 (WHODAS 2.0) was used to assess the functionality of CAP patients. This tool measures the health and functionality of patients, with the levels of difficulties that present for performing different activities. It consists of 36 items, collected in 6 domains, which are scored from 1 (slight) to 5 (unable to do). The total score ranges from 36 to 180, where greater values represent greater disability [20].

Health-related quality of life was evaluated using the Euroqol 5Dimension-5Levels (Eq-5D5L). This scale presents two sections. The first measure of 5 dimensions (mobility, self-care, usual activities, pain/discomfort, anxiety/depression) scored as no, slight, moderate, severe problems, or unable to perform it. The second section presents a Visual Analogue Scale where patient evaluated their health status from 0 (the worst imaginable health) to

100 (the best imaginable health). The Spanish version of Eq-5D has established reliability and was validated [21]. This scale has been used in previous studies that have evaluated respiratory pathologies [22,23].

2.5. Statistical Analysis

Statistical Package SPSS version 25.0 (International Business Machines, Armonk, USA) was used to analyze the data. Before statistical analysis, the Kolmogorov-Smirnov test was used to confirm the normality of the variables. For each outcome measure, a two (sedentary vs. active) × three (admission, discharge, and 3-month follow-up) two-way mixed analysis of variance was performed. When the two-by-three analysis of variance showed a significant interaction for each variable, Bonferroni's post hoc test was used to identify the specific mean differences. A 95% confidence interval was used for statistical analysis. All numerical variables were expressed as mean ± SD. A p-value less than 0.05 was considered statistically significant.

3. Results

A total of 130 patients who were hospitalized with community-acquired pneumonia (CAP) were initially assessed for eligibility to participate in this study. Out of the 130 patients, 40 were excluded from the analysis for various reasons. Specifically, 13 patients declined to participate in the study, and 27 others did not meet the inclusion criteria due to certain factors, such as having cognitive impairments or presenting comorbidities that could potentially interfere with the accuracy or reliability of the patient's assessment and evaluation. After applying these exclusion criteria, a final total of 90 patients were included in the study and were subsequently divided into two distinct groups based on their level of physical activity. Among the 90 included participants, 44 CAP patients were categorized into the active group, while the remaining 46 patients were assigned to the sedentary group. Notably, there were no drop-outs or withdrawals from the study at either the time of hospital discharge or during the follow-up period. The distribution of participants between the two groups is clearly illustrated in Figure 1, which provides a visual representation of how the patients were allocated to each group and the overall flow of participants throughout the study. This breakdown allows for a comprehensive understanding of the sample population and the methodology used to categorize and analyze the data.

The baseline characteristics, symptoms, functionality, and health-related quality of life of the participants in both groups are summarized and presented in Table 1. Upon reviewing the data, it became evident that both groups—active and sedentary—shared similar demographic characteristics, such as age, gender, and other sociodemographic factors, as well as comparable scores on Charlson's comorbidity index, which is a measure of the burden of comorbid conditions. However, one notable difference was that the sedentary group was significantly older than the active group, with a p-value of 0.001, indicating that age was a distinguishing factor between the two groups. Despite this difference in age, no significant differences were observed between the two groups concerning the duration of their hospital stay or the severity of their CAP, as indicated by the p-value greater than 0.05. This suggests that the severity of the pneumonia and the length of hospitalization were comparable across both groups, regardless of their activity levels. Furthermore, no significant differences were found in the symptomatic outcomes of the patients, meaning that both the active and sedentary groups reported similar levels of symptoms during the course of their illness. Additionally, it is worth noting that none of the patients included in the study required admission to the intensive care unit, invasive mechanical ventilation, or treatment outside of the pulmonary ward, which indicates that all participants had a

relatively stable clinical course and did not experience complications that would require more intensive medical interventions.

Table 1. Baseline characteristics of CAP patients.

	Sedentary Group (n = 46)	**Active Group (n = 44)**	***p***
Sex. n Male (%)	27 (66.6)	18 (46.1)	0.13
Age (years)	62.8 ± 17.5	56.1 ± 15.5	0.001 *
BMI	27.3 ± 6.3	26.1 ± 5.3	0.125
Charlson Index	3.6 ± 2.7	3.4 ± 2.5	0.428
Hospital stay (days)	6.7 ± 3.4	7.5 ± 4.2	0.063
ICU n (%)	0 (0)	0 (0)	1
Pulmonary Ward n (%)	46 (100)	44 (100)	1
CURB-65	1.7 ± 2.7	1.8 ± 2.3	0.812
FINE	88.8 ± 32.3	87.8 ± 39.8	0.823
Borg Dyspnea	3.2 ± 2.8	2.6 ± 2.2	0.079
NRS Fatigue	4.8 ± 3.2	4.5 ± 2.9	0.495
EUROQOL 5D-5L			
Mobility	1.9 ± 0.6	1.6 ± 1.2	0.001 *
Activity Daily Living	2.4 ± 1.1	1.7 ± 1.3	<0.001 **
Self-Care	1.4 ± 0.6	1.2 ± 0.4	0.002 *
Pain	2.8 ± 1.2	2.2 ± 1.1	0.391
Anxiety/depression	2.1 ± 0.9	1.8 ± 0.8	0.055
VAS score	47.2 ± 19.6	58.2 ± 24.6	0.002 *
WHODAS 2.0			
Cognition	9.6 ± 4.1	9.5 ± 5.2	0.78
Mobility	9.9 ± 5.9	7.9 ± 3.9	0.003 *
Self-care	6.1 ± 3.5	5.4 ± 2.7	0.092
Relations	7.4 ± 3.7	6.8 ± 3.4	0.141
Activity Daily Living	9.0 ± 5.7	7.4 ± 4.7	0.011 *
Participation	16.5 ± 7.9	12.9 ± 5.1	<0.001 **
Total	62.5 ± 26.6	53.4 ± 17.6	0.002 *

BMI: Body Mass Index; NRS: Numeric Rating Scale; Euroqol 5D-5L: Euroqol 5Dimension-5Levels; ICU: Intensive Care Unit; VAS: Visual Analogue Scale; WHODAS 2.0: World Health Organization Disability Assessment Schedule 2.0. Data expressed as mean ± Standard Difference or frequency (%); * $p < 0.05$; ** $p \leq 0.001$ s.

Concerning quality of life, significant differences were found in the mobility, activities of daily living and self-care subscores ($p < 0.05$), with poorer values in the sedentary group. The active group showed significantly higher VAS score than the sedentary group ($p = 0.02$). Additionally, the sedentary group reported significantly poorer results in the functional evaluation for mobility ($p = 0.003$), activities of daily living ($p = 0.011$), participation ($p < 0.001$) and total ($p = 0.002$) WHODAS 2.0 score.

Table 2 shows symptomatic and health-related quality of life differences among and between groups at hospital discharge. Both groups had significant differences between admission and discharge in fatigue with a significant improvement. Dyspnea scores also showed an improvement in both groups; however, only the sedentary group presented significant results ($p = 0.008$). No significant differences between groups were observed at discharge.

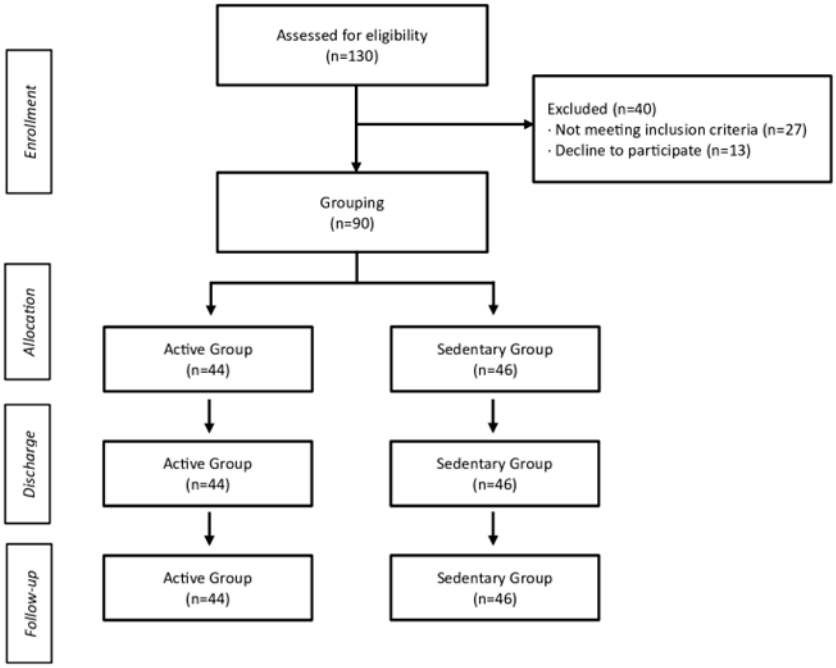

Figure 1. Flow diagram of the included participants.

Table 2. Symptomatology and quality of life changes, among and between groups, at hospital discharge.

	Sedentary Group (n = 46)	**Active Group (n = 44)**	***p***
Borg Dyspnea	1.0 (0.2–1.7) *	0.02 (−0.6–0.6)	0.695
NRS Fatigue	1.2 (0.4–2.0) *	1.9 (1.1–2.8) **	0.165
EUROQOL 5D-5L			
Mobility	0.4 (0.2–0.5) **	−0.3 (−0.6–0.0)	0.01 *
Activity Daily Living	0.3 (0.3–0.5) *	−0.5 (−0.9–−0.1) *	0.335
Self-Care	0.2 (0.5–0.4) *	−0.2 (−0.5–0.1)	0.095
Pain	0.9 (0.6–1.2) **	0.4 (0.1–0.7) *	0.692
Anxiety/depression	0.7 (0.4–0.9) **	0.0 (−0.2–0.2)	0.043 *
VAS score	−15.8 (−20.6–−11.0) **	−15.0 (−19.9–−10.2) **	0.037 *

NRS: Numeric Rating Scale; Euroqol 5D-5L: Euroqol 5Dimension-5Levels; VAS: Visual Analogue Scale; * $p < 0.05$; ** $p \leq 0.001$. Data expressed as Mean Difference (95% Confidence Interval).

The sedentary group presented significant differences between admission and discharge in all subscales of the EuroQol5D-5L ($p < 0.05$). The active group only showed significant differences in activities of daily living ($p = 0.009$), pain ($p = 0.004$) and VAS Euroqol score ($p < 0.001$). Significant differences between groups were observed at discharge for mobility ($p = 0.01$), anxiety and depression ($p = 0.043$) and global quality of life ($p = 0.037$) scores, with better punctuations for the active group.

Symptoms, functionality and quality of life differences among and between groups, 3 months after discharge, are presented in Table 3.

Significant differences between groups at 3 months follow-up were observed for dyspnea levels ($p = 0.04$). The active group decreased and the sedentary group increased dyspnea levels, but no significant results among groups were presented. Both groups showed significantly lower fatigue levels at 3-month follow-up compared to hospital discharge ($p < 0.05$). However, no significant differences between groups were observed.

Table 3. Symptomatology, functionality and quality of life changes, among and between groups, at 3 month follow-up.

	Sedentary Group (n = 46)	Active Group (n = 44)	*p*
Borg Dyspnea	−0.4 (−2.0–1.1)	0.1 (−0.1–0.3)	0.04 *
NRS Fatigue	2.2 (0.7–3.7)	3.0 (6.0–0.0) *	0.393
EUROQOL 5D-5L			
Mobility	−0.3 (−0.8–0.2)	0.2 (−0.3–0.8)	<0.001 **
Activity Daily Living	−0.5 (−1.4–0.3)	1.1 (0.6–1.7) **	<0.001 **
Self-Care	−1.0 (−1.6–−0.4) *	0.3 (−0.1–0.7)	<0.001 **
Pain	−0.1 (−0.7–0.5)	0.1 (−0.3–0.6)	<0.001 **
Anxiety/depression	0.0 (−0.2–0.2)	−0.4 (−0.8–−0.05) *	0.456
VAS score	−3.9 (−21.4–13.5)	−8.5 (−16.6–−0.4) *	<0.001 **
WHODAS 2.0			
Cognition	3.4 (2.4–4.3) **	−1.5 (−8.0–4.9)	<0.001 **
Mobility	−2.2 (−4.4–−0.02) *	2.5 (1.8–3.2) **	<0.001 **
Self-care	−3.0 (−4.4–−1.5) **	1.1 (0.4–1.8) *	<0.001 **
Relations	−0.5 (−1.2–0.1)	0.6 (−0.7–1.8)	<0.001 **
Activity Daily Living	6.2 (8.8–3.5) **	−2.8 (−1.2–−4.4) **	<0.001 **
Participation	1.2 (−1.7–4.2)	3.3 (1.5–5.1) **	<0.001 **
Total	−9.9 (−19.9–−0.0) *	9.3 (3.5–15.1) *	<0.001 **

NRS: Numeric Rating Scale; WHODAS: World Health Organization Disability Assessment Schedule 2.0; EuroQoL: European Quality of Life. Data expressed as mean ± Standard Difference.* $p < 0.05$; ** $p \leq 0.001$. Data expressed as Mean Difference (95% Confidence Interval).

Concerning the health-related quality of life scores, the active group showed significant among-group improvement in activity of daily living ($p < 0.001$) and VAS ($p = 0.039$) scores. The sedentary group showed a significant among-group decline in the self-care subscale ($p = 0.002$). Significant differences between groups at 3 months follow-up were observed for mobility, activities of daily living, self-care, pain, and global scores ($p < 0.001$), with better results in the active group.

Significant differences between groups were observed, with higher functional levels in the active group for all WHODAS 2.0 scores ($p < 0.001$). The sedentary group had significant differences between discharge and 3-month follow-up, with a significant improvement in cognition ($p < 0.001$) and activity of daily living ($p < 0.001$), and a significant worsening in mobility ($p = 0.048$), self-care ($p < 0.001$) and total score ($p = 0.049$). The active group significantly improved mobility ($p < 0.001$), self-care ($p = 0.002$), participation ($p < 0.001$) and total score ($p = 0.002$), but significantly worsened activity of daily living score ($p < 0.001$).

4. Discussion

This study was designed with the objective of thoroughly describing the association between sedentary behavior and various clinical aspects, including symptoms, physical functionality, and overall quality of life, in patients diagnosed with community-acquired pneumonia (CAP). The analysis was conducted during three critical time points: the period of hospitalization, the moment of hospital discharge, and a follow-up conducted three months after discharge. Our findings indicated that at the time of hospital admission, those patients who exhibited sedentary behavior had significantly lower levels of physical functionality and reported a poorer quality of life compared to their more physically active counterparts. Furthermore, at the point of discharge from the hospital, there were notable and significant differences in favor of the active group, particularly with respect to their quality of life, suggesting that physical activity may have played a role in promoting better outcomes during their recovery process. By the time of the three-month follow-

up assessment, it became evident that sedentary patients continued to experience worse clinical outcomes, including higher levels of dyspnea, greater physical limitations, and a lower overall quality of life compared to those who had maintained a more active lifestyle throughout the recovery period. These results highlight the potential importance of addressing sedentary behavior as a modifiable risk factor during and after hospitalization for CAP, as it may influence long-term recovery and overall well-being.

The clinical characteristics of the individuals who participated in this study are consistent with the demographic and clinical profiles reported in the samples of previous research conducted on patients hospitalized with community-acquired pneumonia (CAP). Specifically, the age, comorbid conditions, severity of illness at admission, and general health status of the participants closely resemble those described in earlier studies focusing on similar patient populations. This alignment suggests that the findings of our study are applicable and comparable to the existing literature, reinforcing the validity and relevance of our results within the broader context of CAP research [24].

In addition, it has been observed that participants belonging to the sedentary group are significantly older compared to those in the active group. Sedentary behavior has long been associated with advancing age, as it is well-documented that as individuals grow older, they tend to engage more frequently in low-energy activities that involve sitting or lying down. This increase in sedentary behavior can be attributed to a variety of contributing factors. One primary reason is a natural reduction in physical capacity, which may include diminished muscle strength, lower endurance levels, and reduced flexibility. Furthermore, psychosocial factors also play a crucial role in this trend [25–27]. As people age, changes in their daily routines, such as retirement or limited social interaction, often result in fewer opportunities for physical activity. In particular, older adults who experience difficulty leaving their homes or moving from one place to another due to physical limitations are more prone to sedentary lifestyles. Additionally, a decline in overall physical health, marked by conditions such as decreased muscle mass, chronic joint pain, and long-term diseases like arthritis, osteoporosis, and cardiovascular conditions, can further restrict their ability to remain active. Social isolation, the onset of depression, and a general lack of motivation are other critical factors that can contribute to prolonged periods of inactivity. Together, these elements collectively influence the activity levels of older individuals, resulting in a lifestyle characterized by significantly higher sedentary behavior and lower levels of physical engagement [28].

Our results have demonstrated that, regarding reported symptoms, significant differences between the sedentary and active groups were observed during the 3-month follow-up period, with the active group showing more favorable outcomes. Specifically, patients who engaged in higher levels of physical activity reported fewer and less severe symptoms, particularly concerning dyspnea, or difficulty breathing. These findings are consistent with the conclusions of previous studies, such as the research conducted by Torres-Castro R, et al. [29], which similarly identified a clear association between reduced physical activity levels and increased severity of dyspnea in patients. The observed variations in dyspnea between the sedentary and active groups were anticipated, given that the underlying mechanisms contributing to the development and persistence of dyspnea are multifactorial. These mechanisms appear to involve a combination of structural changes in lung parenchyma, which may result from inflammation or fibrosis, generalized physical deconditioning due to prolonged inactivity, cardiovascular dysfunction leading to impaired oxygen transport, and altered or dysfunctional breathing patterns. Together, these physiological factors contribute to the increased sensation of breathlessness in individuals with lower physical activity levels. Consequently, promoting physical activity during recov-

ery could play a crucial role in reducing the severity of dyspnea and improving overall respiratory function in patients over time [30].

Regarding functionality results, significant and noteworthy differences were identified both at the baseline assessment and during the 3-month follow-up period between the sedentary and active groups, with the active group consistently showing better outcomes. Specifically, patients in the active group demonstrated higher levels of physical functionality, which may have contributed to their improved overall health status compared to their sedentary counterparts. These findings are consistent with those reported in similar studies that have focused on other populations suffering from respiratory conditions, such as individuals recovering from COVID-19 [28], or those dealing with cardiovascular diseases [31]. The observed alignment with previous research highlights the broader applicability of our results across different clinical contexts involving chronic or acute illnesses. This finding holds significant clinical importance, as previous evidence has shown that low levels of physical functionality are closely linked to a higher mortality risk in patients with chronic respiratory or cardiovascular conditions [32]. The relationship between decreased functionality and increased mortality underscores the urgent need for interventions aimed at improving physical capacity in vulnerable patient populations. Ensuring that patients maintain or enhance their functional status during recovery could be a key strategy for reducing long-term complications and mortality rates, further emphasizing the critical role of physical activity in clinical management.

With respect to quality of life, it was observed that active patients consistently exhibited better outcomes compared to their sedentary counterparts at all three assessment points: baseline, hospital discharge, and the 3-month follow-up. Specifically, active patients reported higher levels of well-being and overall satisfaction with their health status across these critical timeframes. Similar patterns have been noted in previous research involving other hospitalized populations [33]. For instance, Munir H. et al. found a clear and significant association between increased sedentary behavior and poorer self-reported post-hospital health-related quality of life in patients who had been treated for acute cardiovascular diseases [34]. These findings align with our expectations, as there is substantial evidence supporting the role of physical activity as a protective factor that positively influences and enhances overall quality of life [35,36]. Engaging in regular physical activity has been shown to improve multiple aspects of physical and mental well-being, leading to better recovery outcomes in hospitalized patients. Additionally, the study conducted by Bleda Andrés J. and Orcajada Pérez J. [37] further supports this notion, suggesting that physical activity, due to its numerous physiological benefits, may serve as a protective factor against secondary pneumonia caused by other infectious agents, such as the COVID-19 virus. This evidence emphasizes the crucial role of maintaining an active lifestyle during and after hospitalization in promoting both recovery and long-term quality of life.

These results represent a crucial consideration for improving the overall quality of hospital care, particularly in patients with community-acquired pneumonia (CAP). Sedentary behavior often does not receive sufficient attention within the hospital setting, largely due to the complex interplay of various clinical priorities and the interdisciplinary nature of inpatient care. Hospitals are traditionally perceived as places where patients go to rest and recover from acute illnesses, which leads to a general lack of emphasis on promoting physical activity during hospitalization. Moreover, there are typically insufficient resources, such as dedicated staff or structured programs, to actively encourage movement or reduce sedentary time among patients [38]. However, understanding the potential risks associated with prolonged sedentary behavior in patients with CAP provides clinicians with valuable and actionable insights. Specifically, it underscores the importance of considering sedentarism as a significant prognostic factor that may negatively influence key clinical outcomes,

such as the rate of recovery and overall mortality. Raising awareness about the impact of physical inactivity in this patient population could lead to the development of new hospital protocols aimed at minimizing sedentary behavior. By prioritizing strategies that promote safe and appropriate physical activity, healthcare providers may be able to improve both short-term recovery and long-term health outcomes in patients hospitalized with CAP [8]. Consequently, addressing sedentary behavior during inpatient care could become a vital component of a comprehensive approach to patient management in hospitals.

Limitations

This study has limitations to disclose. The use of self-reported measures may affect the results, as they may not be as accurate as objective variables. Nevertheless, the cutoff point used to divide patients in both groups takes into account that the measurement is self-reported. Ku et al. [12] proposed two cutoff points depending if the measure was self-reported or an objective measure. Therefore, the potential bias that could arise from a self-reported variable has already been accounted for when dividing the patients. Future studies could be complemented with accurate variables. Additionally, to evaluate the clinical status in the long term could provide more information about the recovery of the CAP hospitalized patients. However, our study design has been based on previous studies where physical activity levels were only evaluated once [39].

5. Conclusions

This study concludes that sedentary behavior is strongly associated with a higher number of symptoms, as well as poorer functionality and health-related quality of life, in patients diagnosed with community-acquired pneumonia (CAP) both during their hospital stay and after discharge. The findings from this study underline the critical importance of maintaining an active lifestyle to prevent complications and improve recovery outcomes following a CAP infection. The results suggest that physical inactivity not only exacerbates symptoms but also impairs patients' ability to regain functional capacity and enhances the risk of experiencing long-term health challenges. As such, promoting physical activity among CAP patients could serve as a key strategy for improving their overall health and reducing the burden of disease in the recovery phase. Future research should focus on identifying the specific barriers that prevent patients from engaging in physical activity, as well as their preferences for different types of exercise and movement. This would help to tailor interventions more effectively and increase patient adherence. Furthermore, it is essential to develop comprehensive approaches that take into account the multifactorial nature of CAP and its associated risk factors, such as age, comorbidities, and cognitive impairments, which may all influence the extent to which patients can engage in physical activity. Clinicians, including doctors, nurses, physiotherapists, and other healthcare professionals, have frequent and consistent contact with CAP patients throughout their hospital stay, which positions them uniquely to encourage and support lifestyle changes. Given their close interaction with patients, these healthcare providers are in an ideal position to not only educate patients about the benefits of physical activity but also to suggest practical ways to incorporate exercise into their daily routines, helping to improve both short-term and long-term outcomes for patients.

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