

# Biomechanical and organizational risk and prevalence of low back pain in the old adults caregivers of a nursing home in Joao Pessoa/PB

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**Abstract:** The objective present study was to investigate the presence of low back pain in caregivers of a nursing home, related with the labored activities executed by these workers. 16 subjects were investigated, 15 female and one male, with 40,8 age average all being caregivers as their profession. It consisted of three phases, where the first concerns the analysis of the collective work, assessed in a perspective of caregivers, Second, a postural assessment to verify the retractions in such workers and the third stage was used Diagram of Corllet to identify the presence of signs and symptoms in caregivers. The study demonstrated that organizational and biomechanical factors are responsible for the high level of physical fatigue and presence of pain in 93,75% of the caregivers in some region of the body. 50% referred pain in the lumbar region. The results of the postural evaluation confirmed that the caregivers had alterations in the postural alignment, presenting retractions of the anterior and posterior chain. The suggestions are to minimize the risk factors of this productive process and the symptoms and signals presented from these workers by adoption ergonomic measures and the realization of a physical program with stretching and muscular strengthening of the muscles of thee anterior and posterior body chain based on the method of Reorganization Postural Sensoperceptive .

**Keywords:** low back pain, caregivers, elderly, overload work

## 1. Background

The health of caregivers of elderly has been a subject much discussed lately, due to increased population over 65 years, so it is important to correlate this fact the responsibility of teams of health professionals and their [22]. The work of caregivers for the elderly in nursing home and a difficult and demanding activity that requires much physical effort of work and the psycho-emotional disorders, since caregivers often engage elderly, causing physical overload, in

addition to psychological factors activity involving the care, adding to the physical stress that worker, psycho-emotional stress [9, 28].

The work of caregivers for the elderly in nursing home and a difficult and demanding activity that requires much physical effort of work and the psycho-emotional disorders, since caregivers often become involved with the situation of the elderly dependent [25,9,11].

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Thus, these workers are exposed to biomechanical risk, which may contribute to the development of Work-related musculoskeletal disorders (WRMD), especially damage to the spine (especially the lumbar region), by repetition of movement or an overload of work, remaining very time in the position of front tilt (flexion) in handling the care of the elderly [25].

Such action triggers a set of signs and symptoms that reflect changes in postural alignment, and expose you to a state of physical and mental stress that can rule out the professional work or even let it unproductive [21,9,11]. Given the above, this study aims to investigate the biomechanical and organizational risks in caregivers of elderly in a nursing home and its relation to the presence of pain and other symptoms.

**2. Methods**

It is a field study, observational cross-sectional, which were investigated, initially, 15 females and one male, aged 23 to 67 years and have a caregiver activity as an occupation. The methodology used in this study consisted of three

phases, where the first one refers to the collective analysis of the work process, evaluating caregivers' perspective, the activities undertaken by them along the way, its facilities and difficulties, the risks attendant in the workplace and its relationship to the safety and health, thus tracing a profile of activity of the caretaker of the institution under study. To fulfill this first step we used a portable tape recorder to collect information and then transcribe them, analyzing the responses of each caregiver. Secondly, there was a postural physiotherapy assessment to check the retractions present in these workers, as well as the conduct of tests for the previous and posterior according to the method REPOSTURARSE (Sensory-Perception Postural Reeducation) [2]. In the third step we used the diagram Corlett (1976), modified by Cardia (2002) and adapted by Neto (2004) [23] to identify signs and symptoms such as pain, tingling, burning, heaviness, among others, locating them in human body. Corlett's diagram is shown in Figure. 1. Still held the application of semi-structured form, containing questions related to intensity, frequency, type of pain and its relation to activities of daily living and labor.

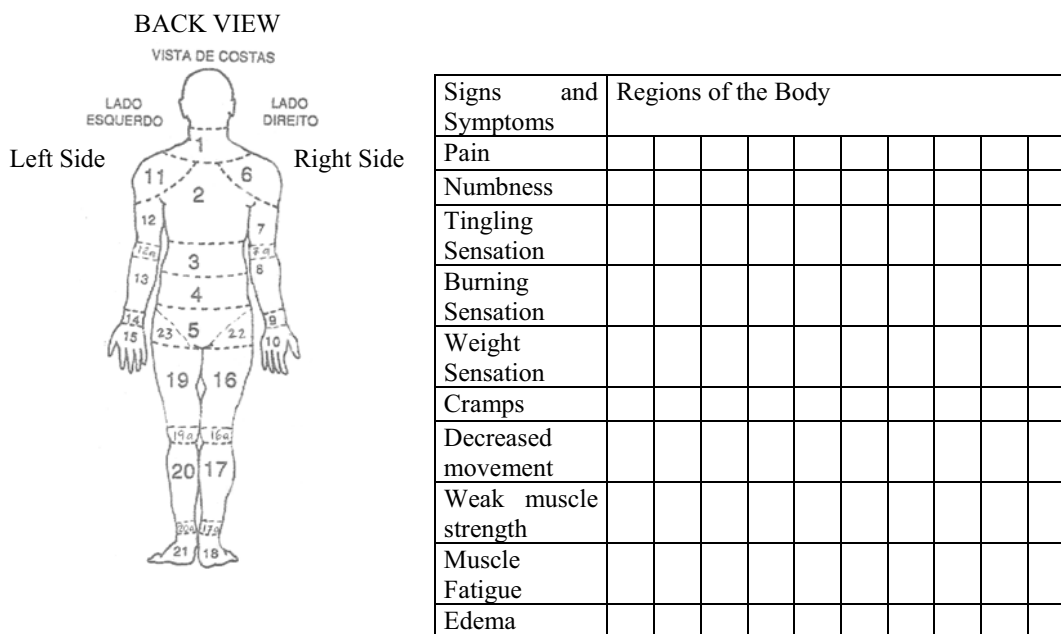


Figure 1: CORLETT'S DIAGRAM: LOCAL SIGNS AND SYMPTOM NEURO-MUSCLE SKELÉTAL. Adapted by NETO (2004), grounded in CORLETT e BISHOP (1976) modified by OSHA(2000) and CARDIA (2002)

### 3. Results

#### 3.1 Profile of caregivers

16 caregivers participated in the study were 15 female and 1 male, mean age of 40.8 years and average length of service of five years. With respect to marital status, 37.5% are married, 18.75% (3) single, 12.5% were widowed and only one caregiver is separate.

Regarding schooling, 25% (4) of the caregivers are illiterate, 25% have finished elementary school, 37.5% (6) the elementary school, 12.5% (2) the school, and 6.5% (1) complete high school. Regarding life habits, 56.25% (9) of caregivers did not smoke, 25% always and only smoke a caregiver sometimes reported smoking and 50% of participants drank. No caregiver practices physical activity and 50% have difficulty sleeping.

The predominance of females, the married state and the mean age less than 50 years among caregivers and corroborated data others studies showing that women have the activity of caring in role of historical roots, cultural, social and affective [11, 21, 25].

A higher level of education may be one factor that contributes to improving the quality of medical care, encouraging the development of these activities [11].

Together with the ease and sedentary habits, stress factors at work that make people's lives become increasingly favorable for the acquisition of psychosomatic illness and physical weakness of immunity [26].

#### 3.2 Description of the caregiver activity

The work of caregivers for the elderly is performed by 17 employees, distributed in two shifts, and one group starts the journey at 7:00 am going until 4:00 pm and another group starts at 9:00 am until 7:00 pm.

They work on a sliding scale system, changed every month, 6 days a week (one week off), including Saturdays, Sundays and holidays. The nursing home is subdivided into two wards, male and female, with most employees working in the female wing, which demands increased workload. All are employed by the system of service, unregistered, receiving a minimum wage at the town hall and a bonus paid by the institution at the time amounted to R\$ 65.00. The institution also offers such benefits, food and transportation vouchers. In addition to the caregivers, the nursing home has three licensed practical nurses, a physiotherapist, a driver and director.

Caregivers are responsible for 86 elderly people

performing the activities of bathing, preparing meals, serve them, cleaning and laundry facilities. The work routine is described in Table 1:

Table 1  
Work routine (caregivers elderly)

<i>Time</i>	<i>Activies</i>
7:00am	Elderly Bath
8:30am	Breakfast (first elderly after caregivers)
9:00am	Cleaning elderly rooms
11:00am	Lunch (almost dependent to the function)
12:00pm	Break to lunch (caregivers)
01:00pm	Cleaning Kitchen, clothes (laundry)
03:00pm	Snack
04:00pm	Bath (elderly)
05:00pm	Elderly Dinner

When asked to define the work of the same caregiver was defined as "nice", "heavy", "repetitive," "tiresome", "boring" "creative" and "painful." They claim to like the work by issuing the relationship with the elderly as being the biggest motivator for implementing the same, which justifies using the words "pleased," "motivated," "joyful," "confident" and "held" to define the sensations present at the end of exhaustive work day. They also reported feelings of anxiety, fatigue and pain as present both before starting the journey and at the end of it. All caregivers reported feeling physically tired at the end of the workday. When asked if the work somehow interfered in his family relationship, 62.5% (10) responded affirmatively, explaining that the fact that they worked on weekends, public holidays, with only a weekly holiday, besides the heavy load of physical work hinders their social relations. All were unanimous in reporting as suggested changes in work organization, work being cited in a single turn, or every other day or even an increase in the number of employees to thus minimize the effects of work overload. The activity of the same caregiver requires a high burden of physical labor, since all caregivers report feeling physically tired at the end of the journey. corroborated others studies [21][9][11]. One study with 20 caregivers, where 75% reported feeling tired physically [11]. The study showed that organizational factors such as workload, work on weekends and holidays was reported by caregivers as responsible for the high level of physical fatigue, and the postures adopted by them along the journey. Others studies [17] [13] [1] showed states that overtime, shift folds, work on Saturdays, Sundays and holidays are work organizational factors that contribute to work

overload and may be accompanied tension overload, according to interfere with aspects of private life of the worker. The maintenance of poor posture in labor activities, produce workers tense and stiff muscles, back pain, constant fatigue and lack of enthusiasm for their activities [7].

3.3 Postural assessment

It was quantified the presence of retractions of previous (front) chain (RCP), back chain (RCB) and decreases in all other caregivers assessed, where 50% of caregivers had more RPC, over 25% and 18.75% RPC (3) showed the same decreases the amount of PC and BC. The shoulder wound was the type of RCP more often with 93.75% (15,) according to Figure 2 shows.

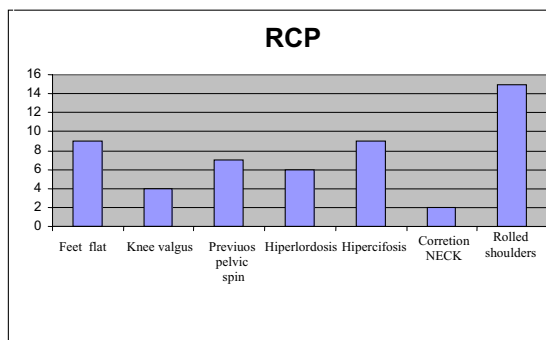


Figure 2: Frequency RCP in caregivers.

With respect to RCB, shoulders raised most often obtained 81.25% (13), as shown in Figure 3.

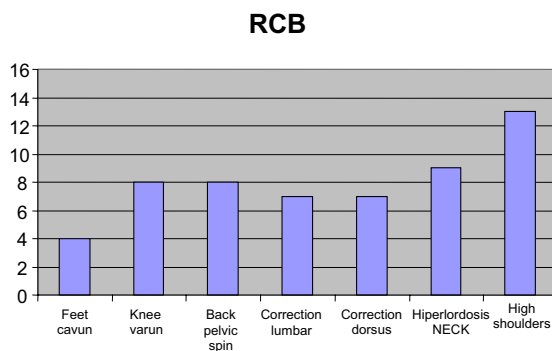


Figura 3: Frequency retraction CB.

Regarding the presence of other decreases lordosis diaphragm was detected by examining posture in 75% (12) of the sample. As for the tests, the tests of CB, standing with abdction (AB) of arms and CB, seated as the arms AB obtained the frequency of 50% of caregivers to offset sharp. The CB test, standing

with adduction (AD) of the arms and the BC, standing, with alignment of three points (occiput, scapula and sacrum) had 56.25% of the caregivers often marked for clearing. The CB test, seated with arms AD presented the results of 37.5% for minimum compensation. As for the trunk flexion test for the CB, the most frequent alterations were the opening angle of the tibial-tarsal, open hip joint angle and the presence of flat areas, with 87.5% of caregivers presenting these changes, as shown Figure. 4:

TEST SPINE FLEXION

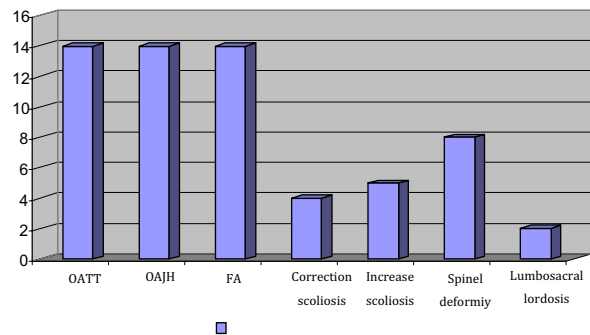


Figure 4: Frequency other problems in caregivers during test to CB

Good posture has an important link in maintaining a healthy spine, since the burden to the spine can cause dysfunction, presenting most often painful symptoms, decreased resistance to fatigue of postural muscles, compromising, consequently, the efficiency of movement which may result in significant changes in body alignment [18].

The normal posture is maintained by strong muscles and flexible joints working properly, a balanced line of gravity and good postural habits. The changes in postural alignment can be secondary to structural malformation muscle even while performing simple tasks [16]. Muscles, ligaments and tendons are particularly vulnerable to the effects of repetitive pressure forces, while the bones and cartilage are susceptible to injury by applying forces compressor [24].

The fact that the activity of caregivers have a high physical demands of the upper limbs and shoulder girdle in the handling of the elderly and other activities of asylum, creating heightened tension of muscles, would justify the higher prevalence of shoulder and rolled high as major downturns.

There was also tests for anterior and posterior chain, which most caregivers showed marked clearing in performing both tests. The opening angle of the tibial-tarsal, opening the hip joint and the flat areas were the most frequent

changes to the trunk flexion test with 87.5%. Such changes are related to retraction of muscles responsible for balancing lumbopelvic (hamstrings, psoas, piriformis, quadratus lumborum) and signs of spinal hypomobility (presence of flat areas) which creates imbalances that can generate static back pain [27] [12] [3] [15].

3.4 Assessment diagram Corllet

Regarding the evaluation of the diagram Corllet adapted the symptom with the highest frequency was fatigue or tiredness regions (17 and 20) that correspond to the legs, with 81% of the results. Pain in region 4 that corresponds to the lumbar spine, was frequent in 50% of caregivers, pain in the upper thoracic region (3) in 18.75% and 25% in the upper thoracic and cervical.

Table 2 shows the frequency of signs and symptoms relating it to the body region most frequently cited by caregivers.

Table 2  
Frequency signs and symptom for body region.

<i>Signs e Symptom</i>	<i>Region</i>	<i>N</i>	<i>%</i>
<b>Pain</b>	4	8	50%
<b>Numbness</b>	10,15	5	31%
<b>Tingling</b>	21	5	31%
<b>Sensation</b>			
<b>Burnings</b>	3,4	3	19%
<b>Sensation</b>			
<b>Weight</b>	2	7	44%
<b>Sensation</b>			
<b>Cramps</b>	15,10	1	6%
<b>Decreased movement</b>	6,7	3	19%
<b>Weak muscle strength</b>	11,12	6	38%
<b>Muscle Fatigue</b>	17,20	13	81%
<b>Edema</b>	18,21	2	13%

The results obtained by applying the diagram adapted Corlett confirmed the exposure of workers to the high physical burden that is consistent with studies of [5] who point out that low back pain affects 60% to 90% of all adults during the time of life, and involvement among the most common degenerative diseases. Moreover, studies corroborate the findings in this study that the activity of high demand caregiver physical and mental work. [9] [11]

3.5 Pain Assessment

In time, 93.75% (15) of caregivers reported feeling pain in any region of the body, more than one year being the same classified as chronic.

With respect to pain in any region of the spine that was cited by all caregivers, referring to the intensity, 13.3% responded that their pain bothers some, that bothers 26.6%, 26.6% very uncomfortable, 6% and 6.66% very uncomfortable that the pain is unbearable. Regarding the type of pain, 73.3% replied that the pain is intermittent and the type that 66.6% (6) to be answered point-and 33.3% (5) burning. As aggravating factors of pain, 53.3% of caregivers responded that the loading weight (handling of the elderly) the most frequent, followed by repetitive movements with 26.6%. Were also cited as walking and stationary position with 6.66% each.

As factors of relief, the rest of the response earned 46.6% of caregivers, medication use 33.3% and 20% exercises. The pain radiated was present in 53.3% of the caregivers and the pain radiated into both arms had the highest percentage with 37.5% of the caregivers. All caregivers had at least one symptom associated with the headache the most frequent with 66.6% (10 caregivers).

When asked if the pain somehow prevented the fulfillment of their daily activities and work 53.3% of caregivers responded affirmatively. As sleep quality 86.6% between 5-8 hours sleep per night, 40% on a soft mattress, 33.3% in hard mattress, 53.3% makes use of a pillow. 53.3% also report that sleep is sometimes hectic, where 13.3% use of medication. Only 20% reported having a peaceful sleep.

All study participants responded to spend most of the day walking which is reflected in the higher frequency of fatigue and tiredness in the lower limbs (LL), Regions 20 and 17 of the diagram Corllet.

Finally when asked about the position they feel more pain 46.6% answered that they change from sitting to standing, standing up 33.3% and 33.3% sat.

The work of caregivers elderly is characterized by heavy lifting and / or handling of excessive loads, occurring on the structure osteomusculoskeletal trauma, especially in the spine.[19] [13] [17]. Several factors have been associated with the presence of chronic low back pain, such as age, sex, smoking, alcohol consumption, body weight, social class, education level, physical activity and work activities [2].

The pain of patients who most frequently seek the position of physiotherapist in pain, still pain, pain, arthritis, aches and pains due to the osteopathic musculoskeletal disorders. Different types of pain and the placement are still related to work activities. [6]

The pain caused by positioning these positions

are maintained for long periods of time and repeated movements. It is known for the pain professional precursor of osteoarthritis and repetitive strain injuries. Occur due to excessive ligament tensions and imbalances of pressure on the joint surfaces. These pains are not present in the acute phase, gradually settle the patient need not know the moment it appeared, is not constant, goes away with rest and relieved by the change of position at work [6]. The home as a factor in relieving low back pain was the most cited presenting a percentage of 43.75% of the sample. This finding demonstrates that, according to the classification of Bienfait<sup>[6]</sup>, the pain is the type of caregivers positional. The fact that 50% of caregivers report that is radiated back pain (18.75% for both the lower extremities, and for both upper limbs) may mean peripheral compression syndromes due to lumbar herniation.[12] [5]

The poor quality of sleep of 75% of caregivers and interference of pain in carrying out their activities of daily living and employment have been reported for 50% of workers demonstrates the degree of discomfort caused by pain and consequently a decrease in productivity which corroborates with others studies [13][14][17] [10].

States that stretches through the different postures practiced the Global Postural Reeducation (GPR) allows the chains lengthen shortened muscle to improve the instrument body morphology correcting, suppressing and releasing the joint stiffness.[29][30]. Method REPOSTURARSE (Postural Reeducation Sensory Perception) is used for technical or felt sense of body awareness, postures Global self postures, analytical work for static balance and postural corrections, among other fundamental techniques to integrate the new experiences gained in the course of work restructuring posture since acquired the corrections are incorporated into the body schema [3]

#### 4. Conclusion

The main objective of this study was to evaluate pain in caregivers of elderly in a nursing home. It was felt that this work activity contributes to the development of back pain in these professionals, confirmed by the analysis of biomechanical and organizational risks are present in the workplace and the diagnosis of postural examination of caregivers who had a positive retraction of both the anterior and chain posterior chain and testing of anterior and posterior chain, significant shortening of both

chains. Therefore, it is suggested to minimize these risk factors present in this production process, adopting some simple ergonomic measures, guiding them in the adoption of appropriate working postures. Moreover, it is recommended exercises in preparation for the workday, as well as restructuring posture, stretching exercises and strengthening analytical and global muscle using the method REPOSTURARSE thus allowing a better body awareness and minimizing the signs and symptoms present in these workers, improving their quality of life and therefore work performance.

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