IMPACTO DOS DESVIOS POSTURAIS NA QUALIDADE DE VIDA DE INDIVÍDUOS COM PET/MAH

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Abstract
Background and Purpose. HTLV-1 associated myelopathy or Tropical Spastic Paraparesis (HAM/TSP) causes,beyond other disturbances,postural alterations.It is necessary to evaluate the impact of postural misalignment on quality of life. **Subjects and Methods**. In this cross-sectional study the 38 selected individuals underwent a postural evaluation using Software for Postural Assessment(SAPO®) with their functional level established by the SF-36. **Results**. The postural pattern of this type of patient is characterized by adopting the anteriorized position of head and trunk, hip and knee flexion, and reduced ankle angle.The more pronounced the deviation,the larger the impact in quality of life,in terms of Functional Capacity and Physical Appearance.The postural impairments that most influenced the functional capacity were the anteriorization of trunk (Pearson Linear Correlation;r=-0.63,p=0.04) and hip flexion(Pearson Linear Correlation;r=- 0.60,p=0.03).Weaker correlations were found with the knee flexion (Spearman Linear Correlation;r=- 0.41,p=0.04),anteriorization of head (Pearson Linear Correlation;r=- 0.42,p=0.02), and reduced ankle angle(Pearson Linear Correlation;r=0.30,p=0.03).Concerning the physical aspect,correlation reverse have been identified on the

anteriorization of trunk(Pearson Linear Correlation;r=- 0.59,p=0.03).These features denote an anteriorized position in relation to vertical alignment. **Discussion and Conclusion**. This study demonstrates that there is a typical pattern of posture of the patient with HAM/TSP,which is characterized by an anterior shift of the center of mass, with a flexor pattern of hip and knee.These changes affect the functional capacity of patients,leading to a decreased quality of life.It is suggested the inclusion of a rehabilitation program involving postural approaches for these patients,in order to improve their activities of daily living.

Keywords: HTLV-1; Tropical Spastic Paraparesis; Posture; Quality of Life. Rating.

IMPACT OF POSTURAL DEVIATION ON QUALITY OF LIFE AMONG PATIENTS WITH HAM/TSP

Resumo

Objetivo. A mielopatia associada ao HTLV-1 ou paraparesia espástica tropical (HAM/TSP) causa, além de outros distúrbios, alterações posturais. Faz-se necessário avaliar o impacto dos desalinhamentos posturais na qualidade de vida. **Metodologia**. Nesse estudo transversal os 38 indivíduos selecionados foram submetidos a uma avaliação postural através do Software para Avaliação Postural (SAPO®) e seu nível funcional estabelecido através do questionário de qualidade de vida – SF-36. **Resultados**. O padrão postural desse tipo de paciente caracteriza-se por adotar posição de cabeça e tronco anteriorizados, quadril e joelho em flexão e redução do ângulo do tornozelo. Quanto mais acentuados os desvios maior o comprometimento da qualidade de vida no que diz respeito a Capacidade Funcional e Aspecto Físico. Os comprometimentos posturais que mais afetaram a capacidade funcional foram a anteriorização do tronco (r=- 0.63, p= 0.04) e a flexão do quadril (r=- 0.60, p= 0.03). Correlações mais fracas foram encontradas com a flexão do joelho (r=- 0.41, p= 0.04), anteriorização da cabeça (r=- 0.423,p= 0.02) e redução do ângulo do tornozelo (r=0.30, p= 0.03). Estas características denotam uma postura anteriorizada em relação ao alinhamento vertical. **Discussão e Conclusão**. Este estudo demonstra que existe um padrão postural típico do paciente portador de HAM/TSP, caracterizado por uma anteriorização do centro de massa, com padrão flexor de quadril e joelho. Estas alterações influenciam a capacidade funcional dos pacientes, levando a uma diminuição na qualidade de vida. Sugere-se a inclusão de um programa de reabilitação que envolva abordagens posturais desses pacientes, no intuito de melhorar suas atividades de vida diária.

Palavras-chave: HTLV-1; Paraparesia Espástica Tropical; Postura; Qualidade de Vida; Avaliação.

1 INTRODUCTION

The human T-cell lymphotropic virus (HTLV-1) is endemic in many regions of the world.[1,2] HTLV-1 also has high incidence and prevalence in Brazil, especially in the city of Salvador.[3] In a study made in Salvador-Bahia, it has been found a prevalence of 1,76%.[4] About 95% of the persons infected by this virus remain asymptomatic.[5]

HTLV-1 is a retrovirus associated to a myelopathy known as tropical spastic paraparesis (HAM/TSP), which is characterized by a chronic and progressive demyelinating lesion,[6] associated to paraparesis, sphincteric dysfunction, and sensitive impairment.[7,8]

Patients with HAM/TSP present biomechanical, sensitive, and functional alterations, which are similar to each other. Beyond hypertonia, the clinical picture is made of pelvic girdle and lower limb paresis. This weakness, along with spasticity, muscle shortening, and joint hypomobility cause, probably, abnormal posture in sedestation and orthostasis, and the inadequacy of movement during transfers and gait.[9]

Facing these problems, patients with HAM/TSP may face difficulties in carrying out their social, professional, and home activities, thereby reducing their quality of life. Thus, it is necessary to evaluate the impact of postural misalignment on quality of life of these patients.

2 **METHODS**

This is a cross-sectional research conducted at the HTLV Center of Escola Bahiana de Medicina e Saúde Pública. The sampling was of convenience, 38 subjects were consecutively enrolled in the study, who agreed to signing the informed consent, were diagnosed with HTLV-1 by ELISA and confirmed by Western blot test, and had clinical signs compatible with definite HAM / TSP, following diagnostic criteria for HAM/TSP proposed by WHO.[10] Patients suffering from other disorders that compromised the definition of postural profile, such as rheumatic diseases, other neurological disorders, patients unable to remain in orthostasis without assistance and those who had cognitive impairment that could compromise the postural assessment and quality of life were excluded from study, as well as those who had cognitive impairment and who were undergoing physiotherapy.

The study was approved by the Ethical Committee of the Escola Bahiana de Medicinal e Saúde Pública, under protocol number 84/2007. Sample calculation was made using the program PEPI,[11] based on parameters of a previous pilot study, adopting a confidence interval of 95%, correlation coefficient of 0.5, considering standard deviation (SD) of 6.58 of the variable ‘angle of the ankle’, and SD of 37.15 of the variable physical aspect. A sample of 36 patients was estimated using these parameters.

Height and weight were measured using a mechanical anthropometric scale of the brand Welmy (Santa Barbara D'Oeste), properly calibrated, followed by calculation of the body mass index (BMI). Selected subjects underwent an orthostatic postural evaluation by two-dimensional image using a digital camera, with resolution of 3.2 megapixels (Olympus Imaging Corporation D-535, China), perpendicular to three meters away from the individual and a height of half their height, using a tripod.

Plot points for postural assessment were preselected by the protocol of the Postural Assessment Software, SAPO ® version 0.67 (USP, Brazil). To highlight those anatomical points, semi-polystyrene spheres (25 mm) were used, and their core diameters were outlined by red tape. A strip of 10 cm was affixed in the patient's arm for subsequent image calibration.[12]

A photo record of the entire body was kept, in a position that the patient considered comfortable, in the usual four views: anterior, posterior, and right and left sides. Study volunteers were instructed to remain barefoot. Female patients used shorts and bra, and male patients, only shorts, for visualization of body segments.[13] The privacy of the volunteers was protected, since the assessment was conducted in a closed room, allowing access only to the investigators.

Photographs were taken during a short apnea after inspiration. To ensure the same base of support in the whole views, it was designed the contour of the foot using chalk on a black rubber mat, with elbows flexed to 90 degrees, feet slightly abducted, and Frankfurt plan parallel to the ground.[12] The procedure was performed after an interval of five seconds of proper positioning of the individual.

Pictures were transferred to the computer and calibrated regarding vertical limits. Through the selected plots, joint angles were analyzed.[12] Once the study sample was made of patients with paraparesis, there were selected measures focused on possible postural deviations in lower limbs, not excluding the possibility of interference of these deviations on the other body segments: 1) angle formed between the acromial and the two anterosuperior iliac spines (ASIS), featuring a lateral inclination of the trunk; 2) the angle formed by the greater trochanter, the knee joint line and lateral malleolus, which is called frontal angle, with possible tendency to valgus knee and varus knee; 3) angle between the tragus-acromion and the vertical axis, which checks the vertical alignment of the head and a tendency to anterior or posterior shift; 4) angle between the acromion, the greater trochanter and vertical axis, which checks the vertical alignment of the trunk and a tendency to anterior or posterior trunk shift; 5) angle formed by the acromion, greater trochanter and lateral malleolus, which is called the hip angle, and registers a possible pattern of flexion or extension of this joint; 6) the angle formed between the acromion, lateral malleolus and vertical, which checks the vertical alignment of the body and a possible tendency to anterior or posterior shift; 7) angle between the posterior iliac spines and anterior-superior (ASIS-PSIS) and the horizontal axis on both sides, which verifies the horizontal alignment of the pelvis and a possible tendency to anteversion or retroversion; 8) angle formed by the greater trochanter, the knee joint line and lateral malleolus (posterior angle) of both sides, which is called the angle of the knee and checks a possible trend in flexion or extension, and; 9) the angle formed by the knee joint line, malleolus lateral and the horizontal (ankle angle).[12]

The functional level of patients was established through the short version in Portuguese of the SF-36, consisting of 36 items included in eight components: functional capacity, physical aspects, pain, general health status, social aspect, emotional aspect and vitality and mental health. The questionnaire presents a final score ranging from zero to 100, in which zero corresponds to the worst overall health status and 100 the best of health status.[14]

The independent variable of the study was the posture, and the dependent variables were the domains physical aspect, functional capacity and pain, according to the SF-36. Data were analyzed using measures of correlation (Pearson or Spearman, as applicable), using the Statistical Package for Social Sciences (SPSS) version 14.0 (USA), being accepted as significant an alpha value less than 5%.

3 **RESULTS**

Of the 38 individuals included in the study, 23 were female. The mean age was 52 (10.1) years, BMI of 24.45 (5.3). The sample comprised 89.5% of nonwhites and 60.5% with low education, which ranged from illiterate to the fourth grade (Table 1).

Table 1 - Sample Characteristics of 38 HAM/TSP individuals in a Reference Center for HTLV in Salvador/Bahia

Variable		N=38	%
Gender	Female	23	60.5
	Male	15	39.5
Age (years)	Median (SD)	52.0 (10.1)	
BMI	Median (SD)	24.45 (5.3)	
Skin color	Caucasian	4	10.5
	Black	20	52.6
	Brown	10	26.3
	Índian	4	10.5
School level	Illiterate	11	28.9
	≤ 4th grade	12	31.6
	< 5th≥ 8th grade	7	18.4
	High school	7	18.4
	College	1	2.6

Considering the postural changes that were associated with the level of quality of life, the standing posture of patients was characterized by an anteriorized position of head and trunk, hip flexion, knee flexion, and reduced ankle angle. These features denote an anteriorized position in relation to vertical alignment. The postural impairments that influenced the functional capacity were the anteriorized position of the trunk in left lateral view (Pearson Linear Correlation; r =- 0.63, p = 0.04), and left hip flexion (Pearson Linear Correlation; r =- 0.60, p = 0.03). Weaker correlations were found with the right knee flexion (Spearman Linear Correlation; r =- 0.41, p = 0.04), anteriorized head position on the left side view (Pearson Linear Correlation; r =- 0.42, p = 0.02), and a reduced right ankle angle (Pearson Linear Correlation; r = 0.30, p = 0.03) (Tables 2 and 3).

When analyzing the physical aspect, it was observed a significant inverse correlation with the anterior deviation of the trunk in left lateral view (Pearson Linear Correlation; r = -0.59, p = 0.03) (Table 2).

Table 2 - Pearson Linear Correlation between Functional Capacity and Postural Deviations

	r	**p-value**
Anteriorization of Head RLD	-0.18	0.32
Anteriorization of Head LLV	-0.42	**0.02**
Anteriorization of Trunk LLV	-0.63	**0.04**
Posteriorization of Trunk RLV	0.04	0.91
Lateral Bound of the Trunk to the Right	-0.29	0.18
Anteriorization of the Body RLV	0.09	0.61
Anteriorization of the Body LLV	-0.14	0.46
Pelvic Anteversion RLV	-0.00	0.95
Pelvic Anteversion LLV	-0.00	0.98
Right Hip Flexion	-0.42	0.11
Left Hip Flexion	-0.60	**0.03**
Right Hip Extension	-0.26	0.13
Left Hip Extension	-0.53	0.09
Left Knee Flexion	-0.27	0.15
Reduction of Right Ankle Angle	0.30	**0.03**
Reduction of Left Ankle Angle	0.16	0.24
Right Valgus Knee	0.09	0.63
Rigth Varus Knee	-0.27	0.24
Left Varus Knee	-0.29	0.25

Pearson Linear Correlation, $p < 0.05$

RLV – Right Lateral View

LLV – Left Lateral View

Table 3 - Spearman Linear Correlation between Functional Capacity and Postural Deviations

	r	**p-value**
Anteriorization of Trunk RLV	-0.28	0.36
Posteriorization of Trunk LLV	0.12	0.57
Lateral Bound of the Trunk to the Left	0.12	0.53
Right Knee Flexion	-0.41	**0.04**
Left Valgus Knee	0.08	0.63

Spearman Linear Correlation, $p < 0.05$

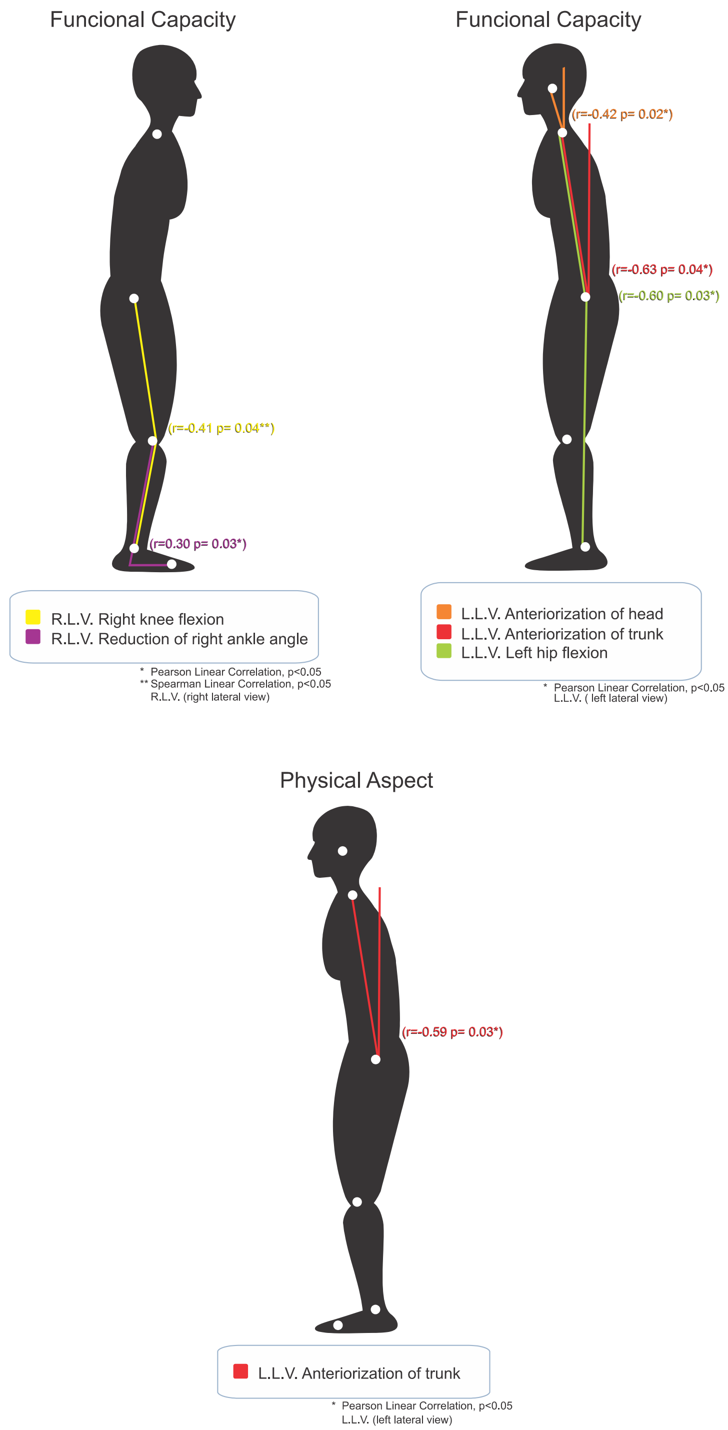
RLV – Right Lateral View

LLV – Left Lateral View

Pain did not have a statistically significant correlation with the selected postural deviations.

The more pronounced the deviation, the greater the impairment of quality of life in relation to Functional Capacity and Physical Appearance (Figure 1).

Figure 1 - Postural Deviations associated with Quality of life



4 DISCUSSION

This study aimed to evaluate the impact of postural misalignment in the quality of life, with a typical postural tendency in individuals of the sample, as reflected by the anteriorized position of head and trunk, hip flexion, knee flexion, and reduced ankle angle (Figure 1) which is associated with a negative influence on quality of life of participants. Such misalignments can characterize the posture of patients with HAM/TSP, in the same way that other typical postures may be triggered by distinct neurological disorders such as Parkinson's disease, Hemiplegia, spastic diplegia type of cerebral palsy and spastic paraparesis.[15,16]

Because it is a neurological disease, the causal factors of postural deviations should be considered. They include spasticity, muscle weakness, abnormal joint mobility and proprioception, and muscle shortening.[9,17,18]

The degree of fatigue is probably increased in subjects who remain in flexed posture, as patients with HAM/TSP. This hypothesis justifies the decreasing level of functional capacity and physical appearance as the degree of postural deviation increases. Coincidental findings were observed regarding fatigue in people with other types of spinal cord damage, traumatic and nontraumatic. Using the Fatigue Severity Scale, the mean score reflected a severe fatigue, which could generate negative implications for quality of life and daily activities.[19,20] Among other contributing factors of fatigue, it was considered the postural imbalance.[19] The impaired postural control takes place by increasing the oscillation of the center of gravity.[21]

The postures and movements are driven by a combination of motor programs and sensory feedback.[22,23] Any interruption in the cyclic events of neural activity will affect the outcome. If there is an abnormal postural tone as a result of a neurological injury, there may be a disordered movement or a limited repertoire of movement, producing an abnormal sensory input to the CNS. This can lead to a response that is produced by stress and / or compensation, which in turn produces an abnormal movement and abnormal posture adjustment.[22] Thus, it can be seen the constant interaction between posture and movement, considering that the impairment in one will produce an impact on the other. Therefore, it is appropriate to make a linear association between the static misalignment of the patients, the domains functional ability and physical appearance, once the proper positioning is very important to enable effective movement,[15] especially stability in orthostasis, which is considered the cornerstone for the determination of ambulation.[24,25] In this sense, the study revealed a postural change that may cause balance disorders that impact adversely on ambulation and therefore reduce the level of functional ability and physical appearance, as well as the findings of a research that showed deficits in postural control in orthostasis, suggesting that it is the main component of gait disorders in spastic diplegic type of cerebral palsy.[26]

As the effect of HAM/TSP becomes more serious in terms of postural misalignment, the damage becomes greater in the patient's quality of life. Franzoi et al (2005) observed reduction in the functional level in patients with HAM/TSP. In this study, it has been applied the Functional Independence Measure (FMI), and it has been observed the lowest levels related to locomotion (deambulation and stairs) and vesical management.[27] Yet because it is quality of life in patients with a neurological disease with spinal involvement, studies that evaluate the quality of life in chronic and degenerative disease through the SF-36, the multiple sclerosis, suggest that the symptoms that accompany the disease and that lead to disability have a major impact on quality of life of patients.[28,29]

These results indicate the loss of functional capacity and physical appearance due to postural abnormalities. Using the same instrument for assessing quality of life, the study by Coutinho (2008) showed that patients with HAM/TSP have difficulties in activities of daily living (ADLs) and a negative impact on quality of life. Furthermore, it was applied the Health Assessment Questionnaire (HAQ), which revealed the impairment of quality of life particularly in the physical domain.[18]. This trend was also found in studies which applied the SF-36 in people with spinal cord injury. They showed a reduction in the level of quality of life.[30-32] Applying the Functional Independence Measure (FIM), Riberto et al (2004) found that individuals with thoracic spinal cord injury had a low score on the motor domain (51.6%).[33] Other research that also indicated changes in functional status was developed by Shublaq (2009). A percentage of 70% of survey participants suffering from HAM/TSP were classified according to the FIM scale as modified independence, or independent with the use of assistive devices and without the help of another person. In the same study, it was applied the Osame’s Scale and result obtained was a percentage of 67% of patients considered dependent, emphasizing that this scale assesses particularly gait. The findings from the application of Kurtzke’s Expanded Scale of Disability Status were losses suffered in gait and functional systems. Regarding gait, 67% of the sample was classified as dependent. The application of SF-36 identified poor quality of life according to domains Physical Appearance and Functional Capacity.[34]

The limitations of this study are related to mode of postural examination. Postural assessment was performed using a software for bi-dimensional postural evaluation, not adjusted for fluctuations in the center of mass. However, it is considered effective, objective and detailed.[35] Moreover, the photographs were taken during apnea after inspiration, reducing the influence of oscillations of the center of mass.

Future studies, in particular assessing the muscle electrophysiology and dynamic postural behavior, can be developed to seek the causes of misalignment of posture, assess the results of postural approaches focused on deviations and the effects of such therapy on functional status of individuals.

5 **CONCLUSION**

Postural abnormalities impair quality of life of patients with HAM/TSP. As the posture changes a condition that influences the quality of life, the findings encourage the inclusion of a rehabilitation program involving postural approaches in this kind of patient, in order to improve their activities of daily living, since the positioning and appropriate movements to maintain and restore muscle and joint range of motion are essential to ensure optimal level of function of each individual.

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