Physiotherapy in Human T-Lymphotropic Virus 1 Infection

Subjects: Rehabilitation

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The human T-lymphotropic virus 1 (HTLV-1) is a retrovirus in the Retroviridae family that affects human blood T lymphocytes and can cause neurological disorders. This infection is characterized by silent, long-term persistence in the host. Physical therapy has been prescribed for neurological complications associated with HTLV-1 because it improves functional status, reduces symptoms, and positively impacts patients' quality of life

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1. Introduction

The human T-lymphotropic virus 1 (HTLV-1) is a retrovirus in the Retroviridae family that affects human blood T lymphocytes and can cause neurological disorders. This infection is characterized by silent, long-term persistence in the host. Despite its irregular distribution, estimates suggest that at least 20 million people are infected with HTLV-1 worldwide [1][2][3][4][5], whereas, in Brazil, about two million people live with the infection, but its distribution is heterogeneous and varies geographically [3][6].

The development of serious diseases has been pointed out in association with the virus, such as adult T-cell leukemia/lymphoma (ATL) and tropical spastic paraparesis or HTLV-1-associated myelopathy/tropical spastic paraparesis (HAM/TSP). The latter is characterized by the installation of classic motor disabilities in patients and the slow, progressive, and non-remitting inflammation of the spinal cord, which affects 4 to 5% of infected subjects, causing more proximal motor weakness, spasticity of the lower limbs (LLLL), pain and bladder, intestinal and sexual dysfunctions, and, consequently, functional limitations such as impaired walking, ascending and descending stairs, washing, dressing, and urinary continence [7].

Faced with these significant motor disabilities, physical therapy has been prescribed for neurological complications associated with HTLV-1 because it improves functional status, reduces symptoms, and positively impacts patients' quality of life [8][9][10]. Considering the importance of implementing physical exercise programs, the development of protocols that can be performed at home provides an alternative for treatment and continued care to resolve health conditions. Professionals must constitute methodologies that successively stimulate patients, as well as the teaching–learning process. Strategies to encourage adherence and motivation are fundamental for the success of treatment performed at home without the direct guidance of a health professional [11].

Such protocols are envisaged as auxiliary strategies for patients with difficulties attending rehabilitation centers as they propose to enable their performance with the use of low-cost materials, promote autonomy and confidence, resume social roles, and seek to provide general data of health conditions associated with HTLV-1 in this population since the levels of evidence and the strength of recommendation for these protocols are yet to be well-established.

Observing the presence of neurological signs and symptoms in HTLV-1 carriers living in the municipality of Belém (PA) [12] in unfavorable socioeconomic conditions, alongside the greater involvement of older women in relation to their presence, their prevalence among the Brown/Black population [13][14][15][16][17][18], as well as the limitations of access to vacancies in therapeutic programs regulated by the Unified Health System [19], the use of new interventions (such as the home exercise program) to strengthen patients' muscles, improve their flexibility and joint mobility, adjust their postural disorders, and enable economic and cognitive access to other platforms would positively impact these individuals' quality of life.

2. Physiotherapy in Human T-Lymphotropic Virus 1 Infection

Although Brazil has a prominent place in scientific production in physical therapy for people with HTLV-1, this production is still in its infancy, mainly testing therapeutic procedures.

A scientometric study on the subject only found 68 studies involving physical therapists, 21 of which were interventional [20]. The most tested therapeutic resources were individual and group functional exercises, including Pilates, home exercise booklets, virtual therapy, and proprioceptive neuromuscular facilitation.

Therapeutic exercise protocols must be improved, especially regarding dosage and progression. On the one hand, individualized exercises, as in PNF, positively reduce spasticity and improve movement control and functionality levels, but they are isolated cases, as in Costa et al. (2018)'s work [9], which reported five cases of patients with HAM/TSP which, thus, may have a higher cost. Group exercises are more accessible, may include a professional assisting a group (which reduces costs), and include the aspect of sharing experiences among peers, as in Klautau (2020)'s work [21], which carried out a pilot study with eight patients divided into two groups, one of wheelchair users and the other with gait impairment. As in Mota (2017) [19] and Facchinetti (2013) [22], home exercises stimulate autonomy for self-care and generate access opportunities for those who are unable to participate in outpatient services.

In view of this, the three modalities of therapeutic exercises should be tested in randomized clinical trials with a larger sample size and more detailed protocols, considering a reasonable follow-up time to enable the measurement of a larger effect size, produce better levels of recommendation, and provide greater security in its reproducibility.

Home care has become one of the main pillars of providing services at different levels of health as it meets the needs of patients with chronic health conditions, improves quality of life by controlling signs and symptoms, and

decreases the risk of complications. Thus, the effectiveness of the practice of home exercises after an injury demands that patients, family members, and caregivers understand the importance of therapy, thus reaching an adequate process with greater possibilities of good results [23].

Studies have been using the home approach for physical exercise, considering feasibility and long-term maintenance [24][25][26][27][28], with a more accessible approach to exercise plans that can be performed at home and without the use of special equipment. Home exercise programs are widely used as an alternative strategy for patients with different conditions, such as Parkinson's disease [29], traumatic spinal cord injury [30][31][32], multiple sclerosis [33][34], Huntington's disease [35], strokes [36][37], post-polio syndrome [38], cardiovascular diseases [39], etc.

Home exercises remove the need for accessibility to training facilities [40], is cost-effective [41][42][43], and reduces barriers to commuting time [41]. Moreover, standardized home exercise protocols guided by socio-educational materials such as booklets have been found as effective treatments of chronic degenerative diseases, stimulating individuals' autonomy to manage their condition [44][45][46][47][48].

Thus, gathering evidence with a broad review should precede actions that help prevent functional declines associated with HTLV-1, such as the implementation of public health programs aimed at HTLV-1 carriers without defined HAM/TSP.

3. Conclusions

More studies on physical therapy modalities aimed at people affected by HTLV-1 must be developed and tested in randomized clinical trials with a larger sample size and more detailed protocols. This entry can contribute to a safe and evidence-based home clinical practice and point out new paths in the production of health education technologies that are sensitive to the reality of this population.

References

1. González-Alcaide, G.; Ramos, J.M.; Huamaní, C.; de Mendoza, C.; Soriano, V. Human t-lymphotropic virus 1 (htlv-1) and human t-lymphotropic virus 2 (htlv-2): Geographical research trends and collaboration networks (1989–2012). Rev. Inst. Med. Trop. São Paulo 2016, 58, 11.
2. Roucoux, D.F.; Murphy, E.L. The epidemiology and disease outcomes of human T-lymphotropic virus type II. Aids Rev. 2004, 6, 144–154.
3. Gessain, A.; Cassar, O. Epidemiological Aspects and World Distribution of HTLV-1 Infection. Front. Microbiol. 2012, 3, 388.
4. Poiesz, B.J.; Ruscetti, F.W.; Gazdar, A.F.; Bunn, P.A.; Minna, J.D.; Gallo, R.C. Detection and isolation of type C retrovirus particles from fresh and cultured lymphocytes of a patient with

cutaneous T-cell lymphoma. Proc. Natl. Acad. Sci. USA 1980, 77, 7415–7419.

5. Araujo, A.Q.-C. Neurologic complications of HTLV-1: A review. Rev. Bras. Neurol. 2019, 55, 5–10.
6. Proietti, F.A.; Carneiro-Proietti, A.B.F.; Catalan-Soares, B.C.; Murphy, E.L. Global epidemiology of HTLV-I infection and associated diseases. Oncogene 2005, 24, 6058–6068.
7. Franzoi, A.C.; Araújo, A.Q.C. Disability profile of patients with HTLV-I-associated myelopathy/tropical spastic paraparesis using the Functional Independence Measure (FIM™). Spinal Cord 2004, 43, 236–240.
8. Sá, K.N.; Macêdo, M.C.; Andrade, R.P.; Mendes, S.D.; Martins, J.V.; Baptista, A.F. Physiotherapy for human T-lymphotropic virus 1-associated myelopathy: Review of the literature and future perspectives. J. Multidiscip. Health 2015, 8, 117–125.
9. Costa, K.H.A.; Silva, T.B.D.V.; Souza, G.; Barbosa, R.D.F.D.M. Influence of proprioceptive neuromuscular facilitation on the muscle tonus and amplitude of movement in HTLV-1-infected patients with HAM/TSP. Rev. Soc. Bras. Med. Trop. 2018, 51, 550–553.
10. Mota, R.D.S.; Macêdo, M.C.; Corradini, S.; Patrício, N.A.; Baptista, A.F.; Sá, K.N. The effect of home exercise on the posture and mobility of people with HAM/TSP: A randomized clinical trial. Arq. Neuro-Psiquiatr. 2020, 78, 149–157.
11. Oliveira, M.M.; Berlezi, E.M. Implementation of an Individualized Physical Therapy Exercise Program to Re-educate the Urinary Continence Mechanism in Women at Home. Rev. Interdiscip. Study Health 2018, 7, 24–38.
12. Assis, I.M. Analysis of Neurological Disabilities and Vcam-1 as an Early Serological Biomarker of Ham/Tsp in Htlv-1 Carriers. 2018. Available online: https://sigaa.ufpa.br/sigaa/public/programa/defesas.jsf?lc=pt_BR&id=487 (accessed on 3 June 2023).
13. Carneiro-Proietti, A.B.F.; Catalan-Soares, B.C.; Castro-Costa, C.M.; Murphy, E.L.; Sabino, E.C.; Hisada, M.; Galvão-Castro, B.; Alcantara, L.; Remondegui, C.; Verdonck, K.; et al. HTLV in the Americas: Challenges and perspectives. Rev. Panam. Salud. Publica 2006, 19, 44–53.
14. Moxoto, I.; Boa-Sorte, N.; Nunes, C.; Mota, A.; Dumas, A.; Dourado, I.; Galvão-Castro, B. Perfil Sociodemographic, epidemiological and behavioral profile of women infected with HTLV-1 in Salvador, Bahia, an endemic area for HTLV. Rev. Soc. Bras. Med. Trop. 2007, 40, 37–41.
15. Almeida, B.N.; de Santos, R.B.; Quintanilha, L.F. Level of knowledge of the population of Salvador—Ba about the human t-lymphotropic virus. Semin. Study Acad. Prod. 2020, 88–96. Available online: https://revistas.unifacs.br/index.php/sepa/article/view/6580 (accessed on 3 June 2023).
16. Arruda, A.B.D.L.; Queiroz, H.A.; Gomes, F.V.B.A.F.; Arruda, A.A.D.L. Lifting positive or undermined HTLV cases in blood donation candidates. Braz. J. Health Rev. 2019, 2, 3881–3895.

17. Silva, I.C.; Pinheiro, B.T.; Nobre, A.F.S.; Coelho, J.L.; Pereira, C.C.C.; Ferreira, L.D.S.C.; De Almeida, C.P.S.; Viana, M.D.N.D.S.D.A.; De Almeida, D.S.; Falcão, J.R.; et al. Moderate endemicity of human T-lymphotropic virus infection in the metropolitan region of Belém, Pará, Brazil. Rev. Bras. Epidemiol. 2018, 21, e180018.
18. Morais, M.T.M.; Caires, S.S. Perfil socioepidemiológico dos portadores do htlv em um município do sudoeste baiano. Rev. Collect. Health UEFS 2017, 7, 18–21.
19. de Mota, R.S. Impact of a Home Exercise Program on Functional Mobility and Pain in People with PET/HAM: A Randomized Clinical Trial. 2017. Available online: https://repositorio.bahiana.edu.br:8443/jspui/handle/bahiana/775 (accessed on 3 June 2023).
20. Tambon, L.G.L.; Quixadá, A.P.; Sá, K.N. Research scenario in physiotherapy for people with human t-cell lymphotropic virus (HTLV): Scientometric study/Cenário das pesquisas em Fisioterapia para pessoas com Human T-Cell Lymphotropic Virus (HTLV): Estudo cientométrico. Braz. J. Dev. 2022, 8, 12025–12042.
21. Klautau, A.V.; Pinto, D.D.S.; Santana, B.B.; Queiroz, M.A.F.; da Silva, A.N.M.R.; Cayres-Vallinoto, I.M.V.; Ishak, R.; Vallinoto, A.C.R. Pilates exercise improves the clinical and immunological profiles of patients with human T-cell lymphotropic virus 1 associated myelopathy: A pilot study. J. Bodyw. Mov. Ther. 2020, 24, 1–8.
22. Facchinetti, L.D. The Effects of a Home Exercise Program in Patients with Tropical Spastic Paraparesis/HTLV-1 Associated Myelopathy (PET/HAM). 2013. Available online: https://www.arca.fiocruz.br/handle/icict/14380 (accessed on 3 June 2023).
23. Damasceno, S.D.O.; Costa, T.A.M.; Caiares, V.C.; Pereira, A.S.; Guerrero, K.M.; Gonzaga, C.N.; Moliterno, A.H.; Frasson, I.B.; Tacao, G.Y.; Barbatto, L.M.; et al. Relationship of home guidance associated with group physiotherapy on the motor performance of chronic hemiparetic patients. Fisioter. Bras. 2019, 20, 468–475.
24. Santos, A.M.B.; Oliveira, T.d.P.; Piemonte, M.E.P. Elaboration of an illustrated manual of home exercises for patients with hemiparesis secondary to cerebrovascular accident (CVA). Fisioter. E Pesqui. 2012, 19, 2–7.
25. Esbenshade, A.J.; Friedman, D.L.; Smith, W.A.; Jeha, S.; Pui, C.-H.; Robison, L.L.; Ness, K.K. Feasibility and Initial Effectiveness of Home Exercise During Maintenance Therapy for Childhood Acute Lymphoblastic Leukemia. Pediatr. Phys. Ther. 2014, 26, 301–307.
26. Tanir, M.K.; Kuguoglu, S. Impact of Exercise on Lower Activity Levels in Children with Acute Lymphoblastic Leukemia: A Randomized Controlled Trial from Turkey. Rehabil. Nurs. 2013, 38, 48–59.
27. Marchese, V.G.; Chiarello, L.A.; Lange, B.J. Effects of physical therapy intervention for children with acute lymphoblastic leukemia. Pediatr. Blood Cancer 2003, 42, 127–133.

28. Takken, T.; van der Torre, P.; Zwerink, M.; Hulzebos, E.H.; Bierings, M.; Helders, P.J.M.; van der Net, J. Development, feasibility and efficacy of a community-based exercise training program in pediatric cancer survivors. Psycho-Oncology 2009, 18, 440–448.
29. Caglar, A.T.; Gurses, H.N.; Mutluay, F.K.; Kiziltan, G. Effects of home exercises on motor performance in patients with Parkinson’s disease. Clin. Rehabil. 2005, 19, 870–877.
30. Mulroy, S.J.; Thompson, L.; Kemp, B.; Hatchett, P.P.; Newsam, C.J.; Lupold, D.G.; Haubert, L.L.; Eberly, V.; Ge, T.-T.; Azen, S.P.; et al. Strengthening and Optimal Movements for Painful Shoulders (STOMPS) in Chronic Spinal Cord Injury: A Randomized Controlled Trial. Phys. Ther. 2011, 91, 305–324.
31. Dolbow, D.R.; Gorgey, A.S.P.; Ketchum, J.M.; Moore, J.R.R.; Hackett, L.A.; Gater, D.R. Exercise Adherence During Home-Based Functional Electrical Stimulation Cycling by Individuals with Spinal Cord Injury. Am. J. Phys. Med. Rehabil. 2012, 91, 922–930.
32. Sasso, E.; Backus, D. Home-Based Circuit Resistance Training to Overcome Barriers to Exercise for People With Spinal Cord Injury. J. Neurol. Phys. Ther. 2013, 37, 65–71.
33. DeBolt, L.S.; McCubbin, J.A. The effects of home-based resistance exercise on balance, power, and mobility in adults with multiple sclerosis. Arch. Phys. Med. Rehabil. 2004, 85, 290–297.
34. Carter, A.M.; Daley, A.J.; Kesterton, S.W.; Woodroofe, N.M.; Saxton, J.M.; Sharrack, B. Pragmatic exercise intervention in people with mild to moderate multiple sclerosis: A randomised controlled feasibility study. Contemp. Clin. Trials 2013, 35, 40–47.
35. Khalil, H.; Quinn, L.; van Deursen, R.; Dawes, H.; Playle, R.; Rosser, A.; Busse, M. What effect does a structured home-based exercise programme have on people with Huntington?s disease? A randomized, controlled pilot study. Clin. Rehabil. 2013, 27, 646–658.
36. Hui-Chan, C.W.; Ng, S.S.; Mak, M.K. Effectiveness of a Home-Based Rehabilitation Program on Lower Limb Functions after Stroke|HKMJ. Available online: https://www.hkmj.org/abstracts/v15n3Suppl4/42.htm (accessed on 3 June 2023).
37. Mayo, E.N.; MacKay-Lyons, M.J.; Scott, S.C.; Moriello, C.; Brophy, J. A randomized trial of two home-based exercise programmes to improve functional walking post-stroke. Clin. Rehabil. 2013, 27, 659–671.
38. Oncu, J.; Durmaz, B.; Karapolat, H. Short-term effects of aerobic exercise on functional capacity, fatigue, and quality of life in patients with post-polio syndrome. Clin Rehabil. 2009, 23, 155–163.
39. Jolly, K.; Taylor, R.; Lip, G.; Greenfield, S.; Raftery, J.; Mant, J.; Lane, D.; Jones, M.; Lee, K.; Stevens, A. The Birmingham Rehabilitation Uptake Maximisation Study (BRUM). Home-based compared with hospital-based cardiac rehabilitation in a multi-ethnic population: Cost-effectiveness and patient adherence. Health Technol. Assess. 2007, 11, 1–118.

40. Petursdottir, U.; Arnadottir, S.A.; Halldorsdottir, S. Facilitators and Barriers to Exercising Among People With Osteoarthritis: A Phenomenological Study. Phys. Ther. 2010, 90, 1014–1025.
41. Hinrichs, T.; Bucchi, C.; Brach, M.; Wilm, S.; Endres, H.G.; Burghaus, I.; Trampisch, H.-J.; Platen, P. Feasibility of a multidimensional home-based exercise programme for the elderly with structured support given by the general practitioner's surgery: Study protocol of a single arm trial preparing an RCT . BMC Geriatr. 2009, 9, 37.
42. Leijon, M.E.; Faskunger, J.; Bendtsen, P.; Festin, K.; Nilsen, P. Who is not adhering to physical activity referrals, and why? Scand. J. Prim. Health Care 2011, 29, 234–240.
43. Kegler, M.C.; Alcantara, I.; Veluswamy, J.K.; Haardörfer, R.; Hotz, J.A.; Glanz, K. Results From an Intervention to Improve Rural Home Food and Physical Activity Environments. Prog. Community Health Partnersh. Res. Educ. Action 2012, 6, 265–277.
44. Alves, V.S. A health education model for the Family Health Program: For comprehensive care and reorientation of the care model. Interface-Comun. Health Educa. 2005, 9, 39–52.
45. Hill, K.D.; LoGiudice, D.; Lautenschlager, N.T.; Said, C.M.; Dodd, K.J.; Suttanon, P. Effectiveness of balance training exercise in people with mild to moderate severity Alzheimer's disease: Protocol for a randomised trial. BMC Geriatr. 2009, 9, 29.
46. Olney, S.J.; Nymark, J.; Brouwer, B.; Culham, E.; Day, A.; Heard, J.; Henderson, M.; Parvataneni, K. A Randomized Controlled Trial of Supervised Versus Unsupervised Exercise Programs for Ambulatory Stroke Survivors. Stroke 2006, 37, 476–481.
47. Gondim, I.T.G.D.O.; Lins, C.C.D.S.A.; Coriolano, M.D.G.W.D.S. Exercícios terapêuticos domiciliares na doença de Parkinson: Uma revisão integrativa. Rev. Bras. Geriatr. Gerontol. 2016, 19, 349–364.
48. Tanaka, E.H.; dos Santos, P.F.; Silva, M.F.; Botelho, P.F.F.B.; Silva, P.; Rodrigues, N.C.; Gomes, M.M.; Moraes, R.; de Abreu, D.C.C. The effect of supervised and home based exercises on balance in elderly subjects: A randomized controlled trial to prevent falls. Rev. Bras. Geriatr. Gerontol. 2016, 19, 383–397.

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