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ORIGINAL RESEARCH

Sedentary behavior: barriers and facilitators among older adults after hip fracture surgery. A qualitative study

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Abstract
Objectives: Understand the experience of older adults after hip fracture surgery considering barriers and facilitators related to sedentary behavior.
Methods: A qualitative study using a semi-structured interview with three men and eight women aged 60 years or older after hip fracture surgery.
Results: Five barriers emerged: physical complaints, lack of accessibility, fear of falling, demotivation and negative social representation of old age, and two facilitators: overcoming dependency and having a caregiver.
Conclusion: Our results highlight that physical complaints commonly addressed by physical therapists on their interventions are not the only impediments to reduce sedentary behavior. Important individual and social barriers should not be neglected when physical therapists conduct interventions to reduce sedentary behavior to maximize functional recovery in older adults after hip fracture surgery. Future clinical trials are required to investigate the effectiveness of more comprehensive interventions to reduce sedentary behavior in this population.

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Introduction

Worldwide, it is estimated that by 2050 the annual prevalence of hip fracture may exceed five million cases[1] with an estimated expenditure of three billion pounds annually in the United Kingdom alone.[2] After hip fracture surgery, the majority of older adults experience a decrease in their mobility[3] and in their level of physical activity, resulting in disability and in less engagement in social activities.[4]

Recovery of lower limb function and of mobility following hip fracture surgery depends on the previous and ongoing level of physical activity of the individual.[5] However, nearly 70% of the older population engage in sedentary behavior for more than 8.5 h a day.[6] This scenario is even more alarming after hip fracture surgery, considering that survivors sit or lie down for approximately 10 h a day,[7] accumulating only 1.100 steps per day.[8]

The barriers and facilitators that influence how older adults engage in physical exercise programs are complex and multifactorial in nature.[9] However, an investigation that provides a more detailed understanding of the barriers and facilitators to reduce sedentary behavior has yet to be conducted. Decrease in the age-related physiological functional reserve is aggravated by sedentary behavior[10] that can result in the progression of physical frailty,[7] with negative consequences for long-term mobility and for optimizing rehabilitation. Physical therapists play an important role in prescribing structured exercises, but need to understand what prevents older adults from being more active after hip fracture, to maximize physical function and reduce the risk of further falls and fractures.[9] The purpose of this study was to understand the experience of older adults after hip fracture surgery due to a fall regarding barriers and facilitators related to sedentary behavior.

Methods

Design

This research followed a qualitative approach, since comprehension of the sedentary behavior of older adults requires collecting their testimonies, in order to broaden our understanding of what stimulates and inhibits such behavior. Sedentary behavior is any behavior performed while awake and sitting, reclining or lying down, characterized by energy expenditure $\leq$1.5 metabolic equivalents (METs). Common sedentary behaviors include watching TV, using a computer, driving a car, and reading.[11] Data collection, using a phenomenological approach aims to describe the experience instead of interpreting, categorizing or explaining it. The strength of this approach is based on the assumption that reality is constructed and interpreted by the participants, and on the rich interpretation of the thematic texture.[12]

Phenomenology responds better to the research question of this study, since the central concern is with the phenomenon itself and in attempting to understand the object of the individual's lived experience.[13] This approach allows us to shed light on aspects of sedentary behavior in all their complexity. There is a growing interest in this methodological approach to understanding, describing and interpreting behavior and human experience in physical therapy research.[14]

Sample

The participants were men and women aged 60 years old or older, who were eligible for a randomized, 12-month follow-up trial aimed at assessing the effectiveness of a physical exercise program to improve functional mobility post-hip fracture in older adults in the late rehabilitation phase.[15] They were interviewed at baseline between 6 and 24 months after a hip fracture surgery due to a fall and were excluded if they had a cognitive impairment that was evaluated using the Mini-Mental State Examination according to their education level[16] ($\leq$13 points for illiterate individuals, $\leq$18 points for one to eight years of education, and $\leq$26 points for nine or more years of education). For this qualitative study we were interested on those older adults who were experiencing a sedentary behavior (around 8 h)[17] and had decreased physical activity after the hip fracture surgery.

Although there is no consensus, three periods of rehabilitation after hip fracture can be distinguished: acute, subacute and post-acute or late stage.[18] However, much of the research in hip fracture has focused on the perioperative and subacute phase. In the present study we chose to investigate older people in the late phase of rehabilitation. Although in this phase there is an opportunity to optimize functional recovery, the rehabilitation in this period is still not well understood.[19]

The convenience sample was composed of eight women and three men. Ninety-three older adults had been recruited after hip fracture surgery by March 2017. Six were excluded due to cognitive impairment. Of the 87 older adults eligible for the randomized trial, 44 were unavailable for contact, and 14 patients were not interested in participating in the study. The sample thus consisted of 29 eligible older adults who agreed to participate in the randomized clinical trial. In the qualitative study, the participants were interviewed before the randomized trial. Sample size in qualitative research has been broadly discussed, and the consensus is that the homogeneity of discourse in different individuals who share similar situations and characteristics is what guarantees the intensity and depth of the information collected in the discourses.[20] Thus, sample size was determined by the process of theoretical saturation sampling.[14] This process consisted of interrupting the inclusion of new participants when the data obtained began to present redundancy or repetition, according to the assessment of the research team, and further data collection was considered irrelevant. Data saturation was observed in the tenth interview. The eleventh interview was conducted to ensure that no new discourse would emerge.

Data collection

Data were collected over a period of four months, from March to June 2017. Participants were first contacted by phone. The interviews were conducted by the author SAM, who is a female health professional with training in physical therapy with 18 years of clinical experience in rehabilitation. At the time of collection, she was a doctoral student

with expertise in the use of physical therapy in gerontology.

When first contacted by phone, the older adults were asked about their health status after hip fracture surgery, and if they had begun to sit for longer along the day after the hip fracture compared to their usual behavior before fracture. The participants were asked whether they would agree to participate in face-to-face interviews. Following consent, the interview was scheduled and held in the individual's home, in a place of their choice, where he/she felt comfortable. Three pilot interviews were conducted to test the data collection procedure, with individuals who did not participate in the present study.

Participants were characterized regarding sociodemographic factors, functionality and physical activity in the preceding week, using information retrieved from the clinical trial dataset (Falls Efficacy Scale International – FES-I,[21] Short Physical Performance Battery,[22] and Incidental and Planned Exercise Questionnaire Participant – IPEQ-W).[23] Characteristics of the participants are presented in Table 1.

The interviews were recorded to preserve the verbal integrity for further analysis. Initially participants were encouraged to report the circumstances surrounding the hip fracture and their routine after surgery from the time they got up until the time they went to sleep. The background to the trigger question was the changes brought about by the fracture and surgery regarding the adoption of sedentary behavior and less engagement in physical activities. *''What do you think contributed to sitting for longer after fracturing your hip?''*; *''What prevents you from being more active?''*; *''What do you think would make it easier for you to be more active?''*; *''And is your routine different on weekends? Do you spend more time or less time sitting?''*.

It is important to highlight that the transcripts were not returned to the participants for comments and corrections, thus participants did not send any feedback on the interview results. We asked additional information for four participants. A field diary was also kept, in which the observations and impressions of the researcher were recorded during the interview. Participants were given a name of precious stones to preserve their identity.

Ethical requirements

The Research Ethics Committee of the Universidade Cidade de São Paulo, São Paulo, Brazil approved this study, under protocol no. CAAE 27398814.7.0000.0064 and all participants signed a consent agreement.

Rigor

This article report was based on the checklist for consolidated criteria for reporting qualitative research (COREQ).[24]

Data analysis

The interviews were submitted to analysis that defined categories emerged from participants' discourse. To classify the elements into categories, it was necessary to identify what they had in common to form groupings. Two researchers read and reviewed all the transcripts (SAM and MRP), and in an interactive process of successive rounds, they discussed discrepancies in the category codification to reach a consensus. A third researcher (NAR) helped to resolve discrepancies and reviewed the adequacy of categories. The transcripts were imported into the MAXQDA® to help structure the participants discourse into categories.

Results

After analyzing the reports, seven categories emerged, five categories concerning those that the participants perceived as barriers to reduce sedentary behavior and two categories concerning facilitators to overcome it. Representative quotes regarding the thematic categories related to barriers and to facilitators are described in Tables 2 and 3.

Barrier 1: physical complaints

In this category, the participants perceived that physical complaints such as pain, dizziness, imbalance, leg fatigue were impediments to be less inactive, with the presence of leg pain being the most frequent.

Barrier 2: lack of accessibility

Participants reported that the stairs inside their homes, and cracked and uneven sidewalks were key reasons that kept them inside their homes, consequently increasing the period of sedentary behavior.

Barrier 3: fear of falling

The experience of the fracture left some participants afraid of falling and led to a decrease in self-confidence, keeping participants more time seated and less active based on the fact that the primary concern was to avoid a new fall episode.

Barrier 4: demotivation

The participants reported lack of motivation, that was reflected in terms of lack of desire or being less inclined to perform activities post-hip fracture surgery.

Barrier 5: negative social representations of old age

The negative connotations of age such as decline, devaluation and a sense of passivity were experienced by participants leading to immobility, or to a behavior of sitting around and doing nothing.

Only two categories emerged from participant discourses related to facilitators or enablers that might help them to reduce sedentary behavior: overcoming dependency, and having a caregiver.

Table 1 Characteristics of the participants.

White race, *n* (%)	8 (73%)
Marital status (widowers), *n* (%)	7 (63%)
Live alone, *n* (%)	4 (36%)
Full years of schooling, mean ± SD	6.5 ± 5.5
Fear of falling, *n* (%)	8 (73%)
Falls Efficacy Scale-International (16–64), mean ± SD	24.9 ± 15.5
Short Physical Performance Battery (0–12), mean ± SD	3.3 ± 1.9
Incidental and Planned Activity Questionnaire (hours/per week)	9.7 ± 6.9

SD, Standard Deviation.

Table 2 Representative quotes of the thematic categories regarding barriers to reduce sedentary behavior in older people after hip fracture surgery.

Barriers	Representative quotes
Physical complaints	***Sapphire:*** *I got up, but then I felt dizzy, I turned around and sat on a chair that sits almost in front of the stove. My leg was hurting so much [...] there's no way around it, the pain in my leg doesn't help, you know? I'll begin to take a step and it already hurts. The pain stops me from doing so many things.* ***Jade:*** *I'm very unsteady I feel very unbalanced [...] I can't go out by myself.*
Lack of accessibility	***Sapphire:*** *I don't even go to my son's house because there's a step there, the staircase stops me, and so does that step.* ***Jade:*** *And the sidewalks around here are all bad. It's bad to walk on the sidewalks, they're full of holes. All downhill, very uneven, it's awful going to the bakery, even for my husband.*
Fear of falling	***Ruby:*** *I'm afraid, I'm afraid of falling and hurting myself again [...] Because I've had three falls.* ***Angelita:*** *In the street you feel insecure, and a little afraid of falling, because I don't want to fall again, do I? [...] I'm afraid of falling.*
Demotivation	***Jade:*** *I don't go out, I don't feel like it. I stay in and pass the time. I need to go out, but I don't have the courage and I don't go out alone [...] I guess, I've lost the motivation, I used to enjoy walking so much [...] I don't have that desire anymore, after I broke my leg.* ***Beryl:*** *You know what contributes to it (sitting for a long time), it's that I don't feel like doing anything else.*
Negative social representations of old age	***Topaz:*** *Taking care of old folks is a problem. I'm 80 years old, I'm feeling my age. Especially this thing with my leg, I've resigned myself to it. I'm not doing anything else I'm going to have to wait and see what happens.* ***Beryl:*** *You know, I'm at the end of my life, I'm 87, I'm at the end of my life. I keep thinking, thinking, I think about it a lot. Dear God in heaven!! Useful life, a useful life, there's not much left for me now. Especially now with the 'aggravation' of this thing right here. I've got no more to hope for, I've got no more aspirations in life, none [...] I've already made peace with old age and I calmly accept it.*

Facilitator 1: overcoming dependency

In this category, the older adults reported their willingness to be physically independent in basic and instrumental activities of daily living. The greatest expression of this is how important it is for them to be able to survive without needing help to perform these activities and express self-determination to overcome dependency.

Facilitator 2: having a caregiver

For the interviewees, having a support network, whether formal or informal, was indicated as a way of overcoming dependency to move around and, especially, to walk safely, resulting in better mobility and more active behavior.

Participants in this study reported sitting for many hours on the sofa. We observed that it is a place in the home where everything happens mostly of the day, such as watching TV, listening to the radio, knitting, or even just passing the time. As a result, it is place also associated with rest and inactivity.

Discussion

Sedentary behavior was perceived by older adults after hip fracture surgery due to a fall as an almost immutable scenario that is the result of physical complaints, inaccessible and unsafe environments, fear of falling, demotivation, and self-perceived negative social representations of old age (self-ageist stereotypes). One enabler, having a caregiver, emerged in the discourse as a counterpoint to a barrier and

Table 3 Representative quotes of the thematic categories regarding facilitators to reduce sedentary behavior in older people after hip fracture surgery.

Facilitators	Representative quotes
Overcoming dependency	***Hyacinth:*** *I decided one day I'm going to take a shower by myself. I showered in a shower chair. That's when I started showering alone and walking.* ***Agatha:*** *I was doing everything I could around the house. I wasn't doing it and now I am. I'm starting over. I shower by myself. I wasn't taking a shower by myself I depended on her (caregiver) to take a shower. It's been a couple of months since I began showering and dressing myself. Because when I see that I can shower by myself I feel as if I've freed myself from depending on others and it's really good.*
Having a caregiver	***Topaz:*** *I needed company to go out and walk, to walk with me around the corner [...] because I was always going out, I never stayed at home at all. I'd go to the market to buy something for my wife, I'd go to the supermarket to buy things, go to the bank for her.* ***Agatha:*** *Yes, just the fact that I had someone, here with me in the afternoon, meant I already felt better. Having human warmth, having company around, I could do more things outside [...] yes, if I had company I'd go by public transport. For example, I'd go to some park, get some fresh air in the park.*

is dependent on contextual factors, such as social and economic issues. Overcoming dependency was recognized as a facilitator to reduce sedentary behavior that relied on self-determination.

Moreover, the aspirations of modifying life as it stands seem to have been diluted in the face to incapacity, fraught with limitations and difficulties, which in part are credited to old age itself. These perceptions reinforce that being physically active reveals complex social practices, linked to habits, expectations and life trajectories, and the presence or absence of friendly environments.[25] The challenges for recovering mobility and functionality after hip fracture are numerous.[26] Our results indicate that the presence of disabling symptoms, such as complaints of pain, imbalance and dizziness are perceived as a limitation to be more active. Previous studies on engagement in exercise programs by older adults living in the community have shown that changes due to age, comorbidities, and pain, discomfort or fear of new injuries, are evoked as significant impediments to exercise.[9] Although, older adults with chronic musculoskeletal problems and those after hip fracture[25] commonly report that pain is a barrier to walking outside the home,[3] we believe that it is also a key factor for prolonged sitting in this population.

The incapacity to move inside and outside the home due to lack of accessibility and safety was perceived by the participants as a barrier, which could substantially threaten the life spaces and functional independence of older adults.[27] The perception of safety offered by the constructed physical environment is influenced by environmental and contextual factors that affect the walking decisions of older adults.[28] Uneven sidewalks with holes and obstacles are commonly highlighted as environmental barriers by older adults with reduced mobility, resulting in a negative impact on utilitarian walking, which involves activities like shopping, going to the pharmacy, and visiting relatives and friends.[29]

The fear of falling reported by participants reinforces the view that a fall involving traumatic injury can be a physically and emotionally debilitating experience. Older adults who perceive at risk of falling outside the home adjust their behavior to reduce their exposure to activities that may lead to further falls[30] and negatively decrease their level of physical activity.[31] This restriction can lead to in-home confinement,[32] increased dependency and increased risk of future falls.[33]

Contradicting a study on barriers to physical exercise in older adults after hip fracture, the participants in this study reported being demotivated, that was expressed either by a lack of life purpose or a lack of personal determination.[25] Although, the desire to return to mobility, being able to do everyday activities and engaging in leisure activities are important motivators for exercise it may be not sufficient to reduce sedentary behavior. The motivation to be more physically active in a daily basis is the result of a complex interaction between various factors: personal disposition, lifestyle, personal and other experiences, condition status, interests and current activities.[34]

Participants reported self-ageist stereotypes, such as a self-image related to loss, decline and devaluation. The perception of a declining old age is usually associated with physical incapacity, inactivity, dependence and a sense of worthlessness.[35] Older adults, who experience diminished physical activity and leisure time, have feelings of low self-esteem, of self-depreciation, with negative self-representation compared to those who practice regular physical activities. A negative view of old age, your own and that of others, reinforces a cycle of helplessness in life.[36]

Although demotivation and negative age-related self-image were viewed by participants as barriers, they also understand that avoiding being compelling dependent on others to accomplish basic activities of daily living may help to overcome sedentary behavior. Another aspect of the process of motivational recovery and negative self-representation was a multi-professional approach, headed by health professionals. Health education can promote motivational changes.[37] Such actions can change the living conditions of older adults, assisting them in making decisions to avoid sedentary behavior.[37] There is evidence that promoting physical activity can be stimulated by

professionals using a cognitive-behavioral approach, which involves motivational aspects.[38]

Older adults in general evaluate the recovery process as a condition of self-determination, resilience and willingness to start over. A previous study on older adults after hip fracture emphasized that exercise is a source of personal determination to optimize functional recovery, enable activities outside the home and to maintain independence.[25] Being optimistic, having a positive attitude and self-confidence, despite the difficulties, are valued behaviors that aid in functional post-fracture recovery.[39] This apparent contradiction may reflect a dualistic feeling related to participants needs and expectations to be move more against the real scenario of not having all the personal, contextual and environmental conditions to overcome being sited for prolonged periods.

A network of formal or informal care can come from various sources, including family, friends or health professionals. Previous research suggests that having a supportive network is decisive for more active behavior in older adults post-hip fracture.[40] In addition to the presence of family caregivers, the positive influence of health professionals provides a significant increase in the social support perceived by older adults after hip fracture,[41] which reinforces the need to create integrated health care in a network that can promote interventions in all spheres of care.

Our study was composed mostly by women. The incidence and prevalence of hip fracture is greater in women.[42] Women are generally engaged in domestic activities in the home and, for this reason, may experience less sedentary behavior in relation to men.[5] In this study, however, this was not was observed, considering that one of the criteria for participation was remaining seated or lying down during the day for a long period.

Clinical implications

The decision to sit less and move more is complex in nature. Among older people, social influences, access to facilities and declining physical function may help to explain how they value sitting and non-sitting activities. Particularly, older people tend to value the restorative function of sitting, but also acknowledge the negative consequence of doing sitting activities as a way of simply filling time.[43] Barriers to reduce sedentary behavior should be discussed with older adults after hip fracture surgery and their families. Not only strategies to alleviate physical complaints and to address fear of falling and functional limitation are important. The pathway of care of older adults after hip fracture should include strategies to foster social connections and facilitate the accessibility to outdoor activities. Encouragement to overcome dependency in activities of daily living may be a way of breaking up long periods of passive sitting by spreading household chores throughout the day.

Interviews involving comprehensive questions, such as those used in the phenomenological approach, can help physical therapists to remove barriers and emphasize facilitators that decrease sedentary behavior and to devise a more comprehensive plan that is less focused on physical complaints alone. A patient-centered approach, based on their needs and life context, has been increasingly recommended as an intervention strategy to promote physical activity in frail older adults.[18]

There are some limitations: first, we did not use an instrument to measure the level of sedentary behavior. Second, we are not able to generalize our study for older people in an acute or post-acute phase after hip fracture surgery, since participants in this study were included if they were in a late stage of rehabilitation (between 6 months and 24 months. The perception of barriers and facilitators to reduce sedentary behavior might be influenced by cultural, social and environmental factors and the generalization of our results should be done cautiously. Future exploratory analysis using a semi-structured questionnaire with a larger sample is required to confirm the data reported in this study.

Conclusion

This study sheds light on important individual and social barriers to reduce sedentary behavior and consequently maximize functional recovery in older adults after hip fracture. Physical therapists play an important role in encouraging older people to break up long periods of sitting, but should use a comprehensive approach to understand what prevent them of doing activities in standing and implement personalized interventions. Furthermore, our results highlight that physical complaints commonly targeted by physical therapists are not the only impediments related to sedentary behavior. Future clinical trials are required to investigate the effectiveness of more comprehensive intervention to reduce sedentary behavior in this population.

Conflicts of interest

The authors declare no conflicts of interest.

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References

1. Cooper C, Cole ZA, Holroyd CR, et al. Secular trends in the incidence of hip and other osteoporotic fractures. *Osteoporos Int*. 2011;22(5):1277–1288, http://dx.doi.org/10.1007/s00198-011-1601-6.
2. Hernlund E, Svedbom A, Ivergard M, et al. Osteoporosis in the European Union: medical management, epidemiology and economic burden. A report prepared in collaboration with the International Osteoporosis Foundation (IOF) and the European Federation of Pharmaceutical Industry Associations (EFPIA). *Arch Osteoporos*. 2013;8:136, http://dx.doi.org/10.1007/s11657-013-0136-1.
3. Salpakoski A, Tormakangas T, Edgren J, et al. Walking recovery after a hip fracture: a prospective follow-up study among community-dwelling over 60-year old men and women. *Biomed Res Int*. 2014;2014:289549, http://dx.doi.org/10.1155/2014/289549.
4. Ishidou Y, Koriyama C, Kakoi H, et al. Predictive factors of mortality and deterioration in performance of activities of daily living after hip fracture surgery in

Kagoshima, Japan. *Geriatr Gerontol Int*. 2017;17(3):391–401, http://dx.doi.org/10.1111/ggi.12718.
5. Fleig L, McAllister MM, Brasher P, et al. Sedentary behavior and physical activity patterns in older adults after hip fracture: a call to action. *J Aging Phys Act*. 2016;24(1):79–84, http://dx.doi.org/10.1123/japa.2015-0013.
6. Harvey JA, Chastin SF, Skelton DA. Prevalence of sedentary behavior in older adults: a systematic review. *Int J Environ Res Public Health*. 2013;10(12):6645–6661, http://dx.doi.org/10.3390/ijerph10126645.
7. Zusman EZ, Dawes MG, Edwards N, Ashe MC. A systematic review of evidence for older adults' sedentary behavior and physical activity after hip fracture. *Clin Rehabil*. 2017, http://dx.doi.org/10.1177/0269215517741665, 269215517741665.
8. Resnick B, Galik E, Boltz M, et al. Physical activity in the post-hip-fracture period. *J Aging Phys Act*. 2011;19(4):373–387, http://dx.doi.org/10.1123/japa.19.4.373.
9. Perracini MR, Kristensen MT, Cunningham C, Sherrington C. Physiotherapy following fragility fractures. *Injury*. 2018;49(8):1413–1417, http://dx.doi.org/10.1016/j.injury.2018.06.026.
10. Kortebein P, Symons TB, Ferrando A, et al. Functional impact of 10 days of bed rest in healthy older adults. *J Gerontol A: Biol Sci Med Sci*. 2008;63(10):1076–1081, http://dx.doi.org/10.1093/gerona/63.10.1076.
11. Tremblay MS, Aubert S, Barnes JD, et al. Sedentary Behavior Research Network (SBRN) – Terminology Consensus Project process and outcome. *Int J Behav Nutr Phys Act*. 2017;14(1):75, http://dx.doi.org/10.1186/s12966-017-0525-8.
12. Reid K, Flowers P, Larkin M. Exploring lived experience: an introduction to interpretative phenomenological analysis. *Psychologist*. 2005;18(1):20–23, http://dx.doi.org/10.1177/030802260907200107.
13. Crotty M. *Phenomenology and Nursing Research*; 1996:202. South Melbourne, Australia. ISBN 9780443054327.
14. Carpenter Christine MS. *Qualitative Research for Occupational and Physical Therapists: A Practical Guide*; 2008:185. Oxford. ISBN 1405144351.
15. Lima CA, Sherrington C, Guaraldo A, et al. Effectiveness of a physical exercise intervention program in improving functional mobility in older adults after hip fracture in later stage rehabilitation: protocol of a randomized clinical trial (REATIVE Study). *BMC Geriatr*. 2016;16(1):198, http://dx.doi.org/10.1186/s12877-016-0370-7.
16. Bertolucci PHF, Brucki SMD, Campacci SR, Juliano Y. The Mini-Mental State Examination in an outpatient population: influence of literacy. *Arq Neuro-Psiquiatr*. 1994;52:1–7, http://dx.doi.org/10.1590/S0004-282X1994000100001.
17. Visser M, Koster A. Development of a questionnaire to assess sedentary time in older persons a comparative study using accelerometry. *BMC Geriatr*. 2013;13:80, http://dx.doi.org/10.1186/1471-2318-13-80.
18. Perracini MR, Franco MRC, Ricci NA, Blake C. Physical activity in older people – case studies of how to make change happen. *Best Pract Res Clin Rheumatol*. 2017;31(2):260–274, http://dx.doi.org/10.1016/j.berh.2017.08.007.
19. Auais MA, Eilayyan O, Mayo NE. Extended exercise rehabilitation after hip fracture improves patients' physical function: a systematic review and meta-analysis. *Phys Ther*. 2012;92(11):1437–1451, http://dx.doi.org/10.2522/ptj.20110274.
20. Cecília M, Minayo M. Amostragem e saturação em pesquisa qualitativa: consensos e controvérsias. *Rev Pesqui Qual*. 2017;5(7):1–12. ISSN 2525-8222.
21. Camargos FFO, Dias RC, Dias JMD, Freire MTF. Cross-cultural adaptation and evaluation of the psychometric properties of the Falls Efficacy Scale – International Among Elderly Brazilians (FES-I-BRAZIL). *Braz J Phys Ther*. 2010;14:237–243, http://dx.doi.org/10.1590/S1413-35552010000300010.
22. Guralnik JM, Simonsick EM, Ferrucci L, et al. A short physical performance battery assessing lower extremity function: association with self-reported disability and prediction of mortality and nursing home admission. *J Gerontol*. 1994;49(2):M85–M94, http://dx.doi.org/10.1093/geronj/49.2.M85.
23. Delbaere K, Hauer K, Lord SR. Evaluation of the incidental and planned activity questionnaire (IPEQ) for older people. *Br J Sports Med*. 2010;44(14):1029–1034, http://dx.doi.org/10.1136/bjsm.2009.060350.
24. Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. *Int J Qual Health Care*. 2007;19(6):349–357, http://dx.doi.org/10.1093/intqhc/mzm042.
25. Gorman E, Chudyk AM, Hoppmann CA, et al. Exploring older adults' patterns and perceptions of exercise after hip fracture. *Physiother Can*. 2013;65(1):86–93, http://dx.doi.org/10.3138/ptc.2012-01BH.
26. Dyer SM, Crotty M, Fairhall N, et al. A critical review of the long-term disability outcomes following hip fracture. *BMC Geriatr*. 2016;16:158, http://dx.doi.org/10.1186/s12877-016-0332-0.
27. Rantakokko M, Iwarsson S, Kauppinen M, Leinonen R, Heikkinen E, Rantanen T. Quality of life and barriers in the urban outdoor environment in old age. *J Am Geriatr Soc*. 2010;58(11):2154–2159, http://dx.doi.org/10.1111/j.1532-5415.2010.03143.x.
28. Yen IH, Fandel Flood J, Thompson H, Anderson LA, Wong G. How design of places promotes or inhibits mobility of older adults: realist synthesis of 20 years of research. *J Aging Health*. 2014;26(8):1340–1372, http://dx.doi.org/10.1177/0898264314527610.
29. Rosenberg DE, Huang DL, Simonovich SD, Belza B. Outdoor built environment barriers and facilitators to activity among midlife and older adults with mobility disabilities. *Gerontologist*. 2013;53(2):268–279, http://dx.doi.org/10.1093/geront/gns119.
30. Wijlhuizen GJ, de Jong R, Hopman-Rock M. Older persons afraid of falling reduce physical activity to prevent outdoor falls. *Prev Med*. 2007;44(3):260–264, http://dx.doi.org/10.1016/j.ypmed.2006.11.003.
31. Wijlhuizen GJ, Chorus AM, Hopman-Rock M. Fragility, fear of falling, physical activity and falls among older persons: some theoretical considerations to interpret mediation. *Prev Med*. 2008;46(6):612–614, http://dx.doi.org/10.1016/j.ypmed.2008.01.016.
32. Berlin Hallrup L, Albertsson D, Bengtsson Tops A, Dahlberg K, Grahn B. Elderly women's experiences of living with fall risk in a fragile body: a reflective lifeworld approach. *Health Soc Care Community*. 2009;17(4):379–387, http://dx.doi.org/10.1111/j.1365-2524.2008.00836.x.
33. Delbaere K, Crombez G, Vanderstraeten G, Willems T, Cambier D. Fear-related avoidance of activities, falls and physical frailty. A prospective community-based cohort study. *Age Ageing*. 2004;33(4):368–373, http://dx.doi.org/10.1093/ageing/afh106.
34. Guell C, Shefer G, Griffin S, Ogilvie D. 'Keeping your body and mind active': an ethnographic study of aspirations for healthy ageing. *BMJ Open*. 2016;6(1):e009973, http://dx.doi.org/10.1136/bmjopen-2015-009973.
35. Guerra ACLC, Caldas CP. Difficulties and rewards on aging: the elderly's self perception. *Ciênc Saúde Colet*. 2010;15:2931–2940, http://dx.doi.org/10.1590/S1413-81232010000600031.

36. Santana MdS, Chaves Maia EM. Senior citizen's physical activity and welfare. *Rev Salud Pública*. 2009;11:225–236, http://dx.doi.org/10.1590/S0124-00642009000200007.
37. Melo MCd, Souza AL, Leandro EL, Mauricio HdA, Silva ID, Oliveira JMOd. Education in health as a life quality promoter for elderly people. *Ciênc Saúde Colet*. 2009;14:1579–1586, http://dx.doi.org/10.1590/S1413-81232009000800031.
38. Verena Klusmann NN. *Motivational Barriers and Resources for Physical Activity Among Older People*. *The Palgrave Handbook of Ageing and Physical Activity Promotion*. Cham: Palgrave Macmillan; 2018, ISBN 978-3-319-71291-8:251–269, http://dx.doi.org/10.1007/978-3-319-71291-8.
39. Sims-Gould J, Stott-Eveneshen S, Fleig L, McAllister M, Ashe MC. Patient perspectives on engagement in recovery after hip fracture: a qualitative study. *J Aging Res*. 2017;2017, http://dx.doi.org/10.1155/2017/2171865, 2171865.
40. Resnick B, Orwig D, Magaziner J, Wynne C. The effect of social support on exercise behavior in older adults. *Clin Nurs Res*. 2002;11(1):52–70, http://dx.doi.org/10.1177/105477380201100105.
41. Casado BL, Resnick B, Zimmerman S, et al. Social support for exercise by experts in older women post-hip fracture. *J Women Aging*. 2009;21(1):48–62, http://dx.doi.org/10.1080/08952840802633719.
42. Kanis JA, Oden A, McCloskey EV, et al. A systematic review of hip fracture incidence and probability of fracture worldwide. *Osteoporos Int*. 2012;23(9):2239–2256, http://dx.doi.org/10.1007/s00198-012-1964-3.
43. Palmer VJ, Gray CM, Fitzsimons CF, et al. What do older people do when sitting and why? Implications for decreasing sedentary behavior. *Gerontologist*. 2018, http://dx.doi.org/10.1093/geront/gny020.