**Article Title: The Influence of Presurgical Factors on the Rehabilitation Outcome of Patients Following Hip Arthroplasty.**

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**Abstract**

**Purpose:** To predict which factors can delay the start of the rehabilitation program and increase the correspondent Length of Stay (LOS) in older adult patients following Total Hip Arthroplasty (THA).

**Methods:** A prospective cohort study conducted in an orthopaedic inpatient unit with 40 patients undergoing THA.

**Findings:** The Morse Fall Scale (MFS) scores and pain intensity scores delayed the commencement of rehabilitation program. Gender and social support were important determinants of LOS and rehabilitation outcome following THA. LOS was also influenced by the weight of the lower limb without OA, followed by pain intensity and overweight patients.

**Conclusions/Clinical Relevance:** Functional outcomes after Total Hip Arthroplasty are variable and the rehabilitation process is an important factor to regain their normal level of physical functioning. This factor can have an impact in the discharge of the patients, in resource allocation and in healthcare of older adult patients.

**Keywords**

Osteoarthritis/Hip arthroplasty/Rehabilitation/Length of stay/Nurses.

**Key Practice Points**

* Osteoarthritis (OA) is one of the most important causes of disability in older adults, affecting ability to perform daily activities, increasing the risk of depressive symptoms and interfering with quality of life.
* Lengthy inpatient rehabilitation is associated with an increased risk of infection and excessive costs. Whilst inpatient rehabilitation that is too short might be associated with preventable disability, avoidable pain or discomfort, and greater costs in the long run.
* The implications for clinical practice of identifying the factors that can impact on the rehabilitation program and length of stay (LOS) will allow better prediction of the discharge of the patients, support resource allocation and can contribute to the overall improvement in the healthcare of older adult patients requiring a Total Hip Arthroplasty (THA).
* Nursing professionals should understand the factors that can influence the rehabilitation process, since they play a vital role in helping patients regain health, improve quality of life, and reduce the social costs incurred.

**Introduction**

Osteoarthritis (OA) is one of the most important causes of disability in older adults, being the fourth in females and the eighth in males (Marx, Oliveira, Bellini, & Ribeiro, 2006). Total Hip Arthroplasty (THA) in patients suffering with OA is one of the most successful and cost effective interventions, offering reliable relief from pain, as well as improvement in physical function and quality of life (Nilsdotter, 2002). Pain is the principal indication for hip replacement and significant relief may be seen as early as one week after surgery (Crawford & Murray, 1997). Quality of life after surgery approximates to that of a healthy reference population, with improvements in energy levels, sleep, social and sexual function also being observed (Crawford & Murray, 1997). Overall oxygen demand during activity is decreased and walking ability improves, with most of these improvements being seen within three months of surgery. These gains in quality of life allow large numbers of patients to retain their independence and function more actively in society.

The demographic shift towards an aging population and the high prevalence of OA in older adults will lead to an increased demand for THA in the future. The projections for 2030, based on these demographic changes, predict an increase of 80% in total hip replacements (Adunsky, Fleissig, Levenkrohn, Arad, & Noy, 2002). Therefore, to inform future health policy and the development of effective patient rehabilitation programs, the factors that might impede rehabilitation should be assessed. For example, according to Sadr Azodi, Bellocco, Eriksson, & Adami (2006) patients undergoing THA with a high Body Mass Index (BMI) spent up to 7% longer in hospital. This study also showed that, smoking and obesity substantially increased the risk of systemic complications after THA, therefore increasing length of stay (LOS) and consequent costs to the health care system. The authors further suggest that greater attention should be paid to these factors when preparing patients for surgery.

Surgical technique is extremely important in determining implant performance and consequently in rehabilitation and LOS (Crawford & Murray, 1997). Two of the most commonly used approaches are the anterolateral (modified Watson-Jones) and the posterior (Southern, Moore, Gibson, or posterolateral) approaches (Palan, Beard, Murray, Andrew, & Nolan, 2009). Surgical approach, preparation of the implant bed, and cementing techniques all reflect on implant survival (Crawford & Murray, 1997).

Complications following hip replacement surgery are uncommon, and can usually be prevented with careful postoperative management. Complications can occur during surgery (fractures [typically of the femur], aseptic loosening, injury to the surrounding nerves or blood vessels [i.e. sciatic nerve palsy] and change in leg length), in the immediate postoperative period (blood clots, infection, dislocation of the artificial hip joint) (Williams et al., 2002).

With respect to the anaesthetic technique used, Total hip arthroplasty (THA) is amenable to a variety of regional anaesthesia (RA) techniques and general anaesthesia (GA). A systematic review by Macfarlane, Prasad, Chan, & Brull (Macfarlane, Prasad, Chan, & Brull, 2009) does suggest that regional anaesthesia reduces postoperative pain and also nausea and vomiting. Therefore, knowledge of the type of anaesthetic technique used becomes important because it may allow the early start of the rehabilitation program and reduce LOS.

According to Shabat, Mann, Nyska, & Maffulli (Shabat, Mann, Nyska, & Maffulli, 2009) most studies on hip replacement have concentrated on the indications for surgery or related factors; implant survival/surgical procedures, and health related quality of life. However, there are studies that have focused on understanding the factors that impact on length of stay (LOS) and rehabilitation potential. From these studies numerous factors emerge, which may be grouped into the following categories: *sociodemographic factors* [age (Arinzon, Fidelman, Zuta, Peisakh, & Berner, 2005), gender (Rolland et al., 2004), marital status (Lin & Kaplan, 2004), presence of social support (Beaupre et al., 2005) and living condition (i.e., alone or with others) (Fortin et al., 1999)], p*hysical functionality factors* [sensory impairment [hearing and vision](Arinzon et al., 2005), preoperative weakness (Arinzon et al., 2005), preoperative functional status (Moncada, Andersen, Franckowiak, & Christmas, 2006), risk of fall (Moncada et al., 2006) and history of joint overuse (Botha-Scheepers et al., 2006)], p*sychological factors* [preoperative cognitive function (Moncada et al., 2006), depression status (Fredman, Hawkes, Black, Bertrand, & Magaziner, 2006) and delirium or incident cognitive injury (Bitsch, Foss, Kristensen, & Kehlet, 2006)], *anthropometric factors* [obesity (Botha-Scheepers et al., 2006), nutritional status (Lieberman, Friger, & Lieberman, 2006) and decrease in muscle mass(Graf, 2006)], *pre-surgical clinical factors* [medical comorbidities (Patrick, Knoefel, Gaskowski, & Rexroth, 2001), admission albumin levels (Mizrahi, Fleissig, Arad, Blumstein, & Adunsky, 2007), risk of developing pressure ulcers (Lindholm et al., 2008), repeated trauma and hormone disorders (“Recommendations for the medical management of osteoarthritis of the hip and knee: 2000 update. American College of Rheumatology Subcommittee on Osteoarthritis Guidelines.,” 2000), history of joint injury (Botha-Scheepers et al., 2006) and susceptibility genetics (Botha-Scheepers et al., 2006)], *rehabilitation factors* [time between surgery and the start of the rehabilitation program (“A Historic Look at Functional Outcome Following Total Hip and Knee Art...,” n.d.), measures to prevent pressure ulcers (Lindholm et al., 2008) and previous physical exercise program (Justo et al., 2011)], *surgical factors* [type of hip surgery [elective or urgent](Haentjens, Autier, Barette, & Boonen, 2005), surgical technique (Palan et al., 2009) [anterolateral and the posterior approaches], surgical approach, preparation of the implant bed, cementing techniques (Crawford & Murray, 1997), and anaesthetic technique used (Macfarlane et al., 2009)].

According to Barrera-Cadenas & Hernández-Vaquero (Barrera-Cadenas & Hernández-Vaquero, 2011) in the study of the outcomes of arthroplasties, it is advisable to consider the possible influence that the prior history of the patient may have on the results. Currently there are several studies that have focused on the study of the factors that impact inpatient rehabilitation and LOS after THA (Arinzon et al., 2005; Beaupre et al., 2005; Botha-Scheepers et al., 2006; Caracciolo & Giaquinto, 2005; Fortin et al., 1999; Fredman et al., 2006; Haentjens et al., 2005; Harada, Chun, Chiu, & Pakalniskis, 2000; Kennedy, Hanna, Stratford, Wessel, & Gollish, 2006; Lieberman et al., 2006; Lin & Kaplan, 2004; Saleh et al., 2002; Yeung, Davis, & Soric, 2010). However, these studies did not address, in a combined way, all the factors (internal and external) that may influence the time to the beginning of the rehabilitation process and the LOS.

Several models of inpatient rehabilitation after THA exist, and vary according to the health care system in operation, but include rehabilitation beds in acute-care hospitals or specialized geriatric units and convalescent care beds. Rehabilitation is designed to facilitate the return of elderly patients to their premorbid status to the greatest possible extent. That patients can benefit from rehabilitation programs (McGilton, Mahomed, Davis, Flannery, & Calabrese, 2009) and that post-operative rehabilitation is integral to the successful outcome of THA (Crawford & Murray, 1997).

**Methods**

**Aims**

The aims of the study are: (1) to evaluate, the relationship between socio-demographic and anthropometric information and LOS of inpatients following primary THA; (2) to evaluate, the relationship between clinical and pre-surgery factors and LOS in patients undergoing THA; (3) to predict which factors can delay the start of the rehabilitation program. Identifying these predictors of rehabilitation beginning and LOS will facilitate improvements in care processes by informing care planning and more effective resource allocation. These changes may ultimately translate into improved system efficiencies and patient outcomes.

**Design**

This was a prospective cohort study of patients who underwent THA and were admitted to the postoperative rehabilitation program instituted in the orthopaedic inpatient unit of a public hospital in Aveiro (Centro Hospitalar do Baixo Vouga, E.P.E. – Unidade de Aveiro), Portugal.

**Participants**

All older adult patients admitted for an elective THA due to OA and/or prosthesis revision in the period between April 1, and September 30, 2014 were eligible to be recruited into the study and identified from an administrative database. Inclusion criteria consisted of: patients aged 60 years or older, THA planned for OA, admitted to the postoperative rehabilitation program instituted in the orthopaedic inpatient unit, ability to ambulate independently (with or without mobility aids), and to be able to fully or partially weight bare prior to surgery. Patients that developed disorientation and/or confusion or that developed severe systemic complications following surgery were excluded from the study. Forty-six patients over 60 years old were hospitalized in the orthopaedic inpatient unit for an elective THA during the study period and eligible for recruitment. Of these, three patients declined to take part in the study and three others were withdrawn after developing disorientation, leaving a total sample group of 40.

*Description of the standard patient-centred rehabilitation model of care*

Staff of the orthopaedic inpatient unit involved in this study developed an integrated practice-based model of care (Figure 1). This is based on a modification of the McGilton et al. framework (McGilton et al., 2009), where patients begin a standard patient-centred rehabilitation model of care during their hospital stay. This model aims to provide an optimal rehabilitation setting at the appropriate time for patients following THA. The innovative aspects of this model include the following: (1) early commencement of rehabilitation; (2) individualized assessments and interventions focused on the patients’ remaining abilities; (3) assessments for dementia, delirium, and depression within the first 3 days of admission to rehabilitation; (4) patient-centred goals that involve input from patients and their families; (5) individualized rehabilitation care at the bedside if necessary; (6) a focus on care strategies that minimize behavioural and cognitive symptoms related to cognitive impairment; and (7) education and support to health care providers and facilities to implement the model of care (McGilton et al., 2009).

In our model, the primary goal of nursing care in patients following a THA is to maximize their functioning, (Shabat et al., 2009) with a secondary goal of discharging patients back to their previous environment. Outcomes related to patients’ functioning include improvement in patient’s mobility level during inpatient rehabilitation and a return to pre-OA functional ability.

All patients were assessed and treated within 48-72 post-surgery and medically stable patients were assisted to move around as per their activity tolerance. Following the admission assessments, the team and the patient established mutually agreeable rehabilitation goals and the treatment plan for his/her inpatient stay. Patients were also instructed to perform exercises independently as appropriate for their conditions. Mobility training was incorporated into the nursing care plan and integrated into patients’ activities of daily living. This process is guided by the patient-centered rehabilitation model of care, which includes four stages, namely: context, THA, in-patient process and intermediate outcomes (Figure 1 and Table 1).

**Data collection**

Data collection for each patient was undertaken at the time of hospital admission and at the time of hospital discharge. Before the participants’ assessment permission to collect data was requested. Three nurses with relevant clinical experience (rehabilitation nurses with a minimum of 5 years’ experience) were assigned to perform the assessments of systemic and contextual data of the patients included in the study. They were trained on how to score patients with the scales of the data collection instrument and the data recording process before commencing the study. Data from each patient for the various stages of evaluation were not collected by the same nurse. The time of day assessments were conducted by random, according to the availability of the patient, the nurses, the ward organization and surgery time.

The data collection instrument and variables recorded that might influence LOS were based on those most frequently described in the literature, already addressed.

Patient sociodemographic characteristics included in the data collection instrument were age, gender, marital status, education level, number of household members and residence area. Clinical data included comorbidities, vital signs (heart rate, respiratory rate, blood pressure, body temperature and pain) and clinical chemistry data (haemoglobin, haematocrit, platelets, prothrombin time, fasting glucose, creatinine and urea). Anthropometric parameters included body mass index and body composition analysis. The data obtained through the application of the selected scales included mental status (Mini-Mental State Examination [MMSE] and Geriatric Depression Scale [GDS]) and functional status (Functional Independence Measure [FIM] scale, Morse Fall Scale [MFS] and Braden Scale). Also, the time interval from surgery to beginning of the rehabilitation program and LOS was obtained from patient records.

**Ethical considerations**

The Hospital’s Ethics Committee gave full ethical approval and the study was registered with the Hospital’s Research Office, thus fulfilling local research governance requirements (process number 040954). All participants gave informed written consent before inclusion into the study. They were assured that there was no obligation to take part and that their care would not be affected if they declined to participate. All data was confidential and kept securely in locked filing cabinets and password protected computers.

**Data analysis**

The data were analysed using the Statistical Package for Social Science (SPSS) 21.0 for Windows and the level of significance used was 0.05. Summary statistics are reported as mean and standard deviation values for continuous variables; or as counts and percentages for categorical variables. Considering the body composition variables as dependent variables (BMI, fat mass, skeletal muscle mass, lower limb with OA and lower limb without OA), differences among levels of sociodemographic and clinical characteristics (listed in Tables 2 and 3) were assessed using an independent t-test or analysis of variance (ANOVA), if the assumptions of normality and/or homogeneity of variance were verified. If these assumptions could not be met or the presence of small sample sizes, the corresponding non-parametric test was used (Mann-Whitney test). Multivariate Cox’s regression, hazard ratios (HR), adjusted for gender (Rolland et al., 2004) and age (Arinzon et al., 2005), and their correspondent 95% confidence intervals (95% CI) were used to measure the effect of selected outcome time variables (LOS and time period between surgery and beginning of rehabilitation program) in the binary variable “patient discharge (yes/no)”. Spearman’s rank correlation coefficient was used to measure the correlation between the LOS and time period between surgery and beginning of the rehabilitation program.

**Results**

**Participants’ sociodemographic and clinical characteristics**

Table 2 presents the sociodemographic characteristics of patients included in the study. From the total group of 40 patients, 58% were male and 42% female, with a group mean age of 67 ±9 years, the majority being under 75 years old (75%). A high proportion (79%) was classified as being overweight. Regarding body composition the mean values of fat mass were 37%, fat-free mass 63% and skeletal muscle mass 22.3%.

Table 3 shows the clinical characteristics of patients included in the study at admission.All vital signs, except for pain and systolic blood pressure, were within the normal range: heart rate (72.2 ± 12.1 bmp); respiratory rate (17.4 ± 1.6 cpm); systolic blood pressure (140.5 ± 20.2 mmHg); diastolic blood pressure (75.9 ± 10.1 mmHg); tympanic body temperature (36.5 ± 0.4 ºC). Generally, patients had 2.18± 1.47 comorbidities diagnosed, the most common being hypertension (as evidenced by the blood pressure values), type2 diabetes mellitus, dyslipidaemia, and hypercholesterolemia, affecting 67.5% (N=27), 30.0% (N=12), 25.0% (N=10), and 20% (N=8) of the studied patients, respectively. With respect to fasting blood glucose levels, 60.0% (N=24) of the studied patients had higher ranges, which relates to the prevalence of type2 diabetes mellitus in the study group and 30% (N=12) of the patients had undergone hip surgery previously. Clinical laboratory data results showed that most of the patients were within normal range, with the exception of haemoglobin. Low haemoglobin levels were present in 22.7% (N=5) of males (<13.5 g/dl) and 25.0% (N=4) of females (<12.0 g/dl). The assessment results for the GDS, MMSE, BS, MFS, motor and cognitive FIM scores are presented in Table 3.

**Comparison of body composition and rehabilitation variables with sociodemographic and clinical characteristics**

With regards to body composition variables, group differences between the levels of the sociodemographic and clinical characteristics (Table 4) were non-significant with the exception of gender and number of household members.

For gender, females had a significantly higher fat mass than males, while males had significantly higher skeletal muscle mass, fat-free mass, lower limb with OA weight, and lower limb without OA weight. In the case of number of household members variable, significant differences between patients that lived alone and those who lived with their families were found for the following variables: fat mass and lower limb with OA, respectively.

**Predictions for the LOS and the time between the surgery and beginning of rehabilitation program**

Patients were hospitalized (N=37) for a mean of 191.0 hours (±63.9) and started the rehabilitation program (N=36) at a mean of 80.3 hours (±31.5) post-surgery and were uncorrelated (r=0.022). The sample size reduction is related to the closure of the study. At the end, three to four patients were still involved at different recovery stages and therefore no data was available for these two variables. Table 5 presents the model predictions for the LOS and the time period between surgery and the beginning of the rehabilitation program, respectively, adjusted for gender and age.

The LOS endpoint was only predicted by lower limb without OA weight (HR=1.42; IC95%=[1.02;1.97], p<0.05). Also, overweighed patients (HR=2.15; IC95%=[0.88;5.24], p<0.1) and pain intensity (HR=1.16; IC95%=[0.99;1.35], p<0.1) were related to LOS. The other variables evaluated were not statistically significant.

For the time period between surgery and commencement of the rehabilitation program, only the MFS was significant (HR=1.03; IC95%=[1.01;1.05], p<0.05), showing an increased risk of 3% for each additional unit in the MFS scale. Pain intensity (HR=1.16; IC95%=[0.99;1.40], p<0.1) was also related to this endpoint, and the other variables evaluated were not statistically significant.

**Discussion**

The demographic shift towards an increasingly older population, coupled with a predicted increase in patients requiring THA for OA, will increase demands for access to effective inpatient rehabilitation (Sadr Azodi et al., 2006). Thus identification of factors that might be used to predict readiness for rehabilitation, likelihood of rehabilitation success and length of stay would be useful to guide effective resource allocation and competing demands. On one hand, too-long a rehabilitation process might be associated with increased risk for infections and excessive costs (Justo et al., 2011). On the other hand, too-short a rehabilitation might be associated with preventable disability, avoidable pain and poor outcome and greater costs in the long run (Justo et al., 2011). Although several studies have been performed addressing these questions, it is believed that this study is the first to be conducted in Portugal aiming to identify the pre-surgical predictors of rehabilitation commencement and LOS specific to inpatients following hip replacement.

Previous studies suggest that the length of rehabilitation and final outcome in older adult patients are associated with a large number of pre-surgical factors, such as number of co-morbidities, marital status, advanced age, admission albumin levels, and cognitive function. Average LOS following THA has been found to be higher in patients over 65 years old (Graf, 2006), in those with depression (Fredman et al., 2006), those with a high risk of falling (Yamada et al., 2010) and in those with referred pain at admission (Hoogeboom et al., 2009). Based on the literature it was expected that the results of this study would be similar. In terms of comorbidities hypertension, type 2 diabetes mellitus, dyslipidaemia and hypercholesterolemia were the most common, as might be expected in a cohort of older adult patients (Patrick et al., 2001). However, unlike previous studies only lower limb without OA weight was significant (p<0.05), while pain intensity and high BMI (p<0.1) were associated with an increase in LOS. Whilst for the time period between surgery and beginning of the rehabilitation program, only MFS was significant (p<0.05) while pain intensity was also related (p<0.1).

Previous studies have shown that older patients have significant alterations in muscle composition, especially in skeletal muscle mass and adipose tissue accumulation (Caracciolo & Giaquinto, 2005). This muscle atrophy and increase in adipose tissue accumulation with aging (sarcopenia) is linked to the fact that older patients often have a longer overall LOS and delayed entry into rehabilitation than the younger ones following THA (Graf, 2006; Hoogeboom et al., 2009; Janssen, Heymsfield, & Ross, 2002). The maintenance of muscle volume, therefore, seems to be critical in maintaining the activities of daily living in the elderly. Several previous studies have indicated that muscle volume is a strong independent predictor of physical disability or mortality (Bonnefoy, Jauffret, & Jusot; Janssen, 2006; Volpato et al., 2004). Other studies have found significant decreases in muscle density with aging, estimated by Computed Tomography, related to lower extremity function (Sipilä et al., 2004; Visser et al., 2002). According to Janssen et al. (2002) sarcopenia can influence the LOS of patients on a rehabilitation unit ). The loss of muscle mass can be caused by advanced age, as well as muscle disuse, because of certain diseases, including OA (Caracciolo & Giaquinto, 2005). In addition to muscle atrophy, alterations in muscle composition – such as increased adipose tissue accumulation and water contained within the muscle – are related to a decrease in muscle strength and functional limitations (Hoogeboom et al., 2009; Namba, Paxton, Fithian, & Stone, 2005).

In our study this expected result was not observed possibly due to the relative ‘young’ age of patients in the cohort. However we did find significant results for gender. Fat mass was significantly higher in females than in males and skeletal muscle mass in males was higher than in females. With respect to lower limb weight, we found that males had significantly higher values than females in both limbs (lower limb with OA and lower limb without OA). These results are in agreement with those suggested in the literature, where females have been shown to have higher values for adipose tissue accumulation and lower values for lower limb weight compared to males (Graf, 2006; Hoogeboom et al., 2009; Janssen et al., 2002). This suggests that males suffer less sarcopenia than females, and therefore this difference in body mass composition might influence LOS and rehabilitation outcome, although no difference was evident in this study. In general, previous studies (Rolland et al., 2004; Yeung et al., 2010), have also concluded that LOS is influenced by gender. In these studies it was shown that there was a tendency for females to have a longer length of stay when compared to males. Yeung et al. (Yeung et al., 2010), indicated that females stay in hospital 1-2 days longer than males following THA, and suggest that reduced bed flow and higher rehabilitation costs might be expected in inpatient settings with more female patients.

Another significant result is related to the household variable. Our results show that fat mass and lower limb with OA weight were different in patients that lived alone from those who lived with their families. Participation in physical activity in older adults is influenced by a number of variables including demographic factors such as gender, education, and marital status (Park, Elavsky, & Koo, 2014). Additionally, choices of older adults to be regularly physically active are influenced by social support from family members or friends, availability of facilities for exercise and/or recreational activities, personal determinants especially one’s motivation, self-efficacy and self-regulation skills (Park et al., 2014). Based on these factors, it is not surprising this study shows that those who lived with family had a body mass composition suggesting better nutrition and a more active lifestyle than those living alone.

According to previous studies it was expected that the preoperative functional status of the patient would be a significant predictor of rehabilitation outcome (Kennedy et al., 2006; Mitchell et al., 2007; Moncada et al., 2006). Various studies indicated that the period between surgery and the beginning of rehabilitation was higher for patients older than 75 years old, who lived alone and presented with pain at admission (Graf, 2006; Hoogeboom et al., 2009; Janssen et al., 2002; Sadr Azodi et al., 2006). However, in our study, most variables related to dependence on mobility were not significant, except for the MFS scores and pain intensity.

According to Yeung et al. (Yeung et al., 2010) patients who scored low on the FIM on admission were more dependent in basic functional activities when compared to patients who had higher scores, and may accordingly take longer to achieve safe and independent/supervised mobility needed to return home. In the same study, the authors conclude that the admission FIM score has been found to be associated with longer LOS in patients with hip fractures and stroke, but whether FIM can predict LOS has not been previously examined in people following joint replacement.

**Limitations**

This study had certain limitations. Firstly, related to the total sample size and non-probabilistic sampling methods used, which can limit the extrapolation of the results. Secondly, as LOS is likely to be affected by many patient and non-patient related factors and only some patient and system characteristics were included in the analysis. It is possible that other variables, such as surgical technique (anterior or posterior) or post-surgical variables, are also important determinants of rehabilitation outcome and LOS. Considering that many multi-dimensional factors can possibly affect LOS, the option of focusing on selected pre-surgical variables suggested by the literature allowed a greater depth of analysis. Thirdly, we did not control for the severity of OA and a uniform measure of severity of disease, possibly from the surgeons’ preoperative assessments, would have ideally been included in the patient characteristics. A final limitation of this study is that data were collected from only one inpatient setting which limits the generalization of the results.

Further research is needed to examine if different intervention strategies (e.g. altering the intensity, frequency and/or duration of functional training) in overweight patients will shorten the LOS of inpatients following THA and to analyse if different geographic location influenced the studied factors.

Also seem important that further studies should be systematically conducted about different types of social support in influencing physical activity behaviours and which resources are important elements in promoting physical activity for older adults with OA, and a variety of types of social support can be created or enhanced via social network and policy interventions to promote physical activity for seniors.

**Conclusion**

The purpose of this study was to bring attention to factors that may prolong hospitalization and delay the start of a rehabilitation program (and therefore influence patient recovery) following THA. The predictors found in this pilot study can facilitate our understanding of the potential LOS and rehabilitation outcomes of inpatients. The results showed that hypertension, type 2 diabetes mellitus, dyslipidaemia and hypercholesterolemia were the most common diagnosed comorbidities in the study group. LOS was mainly influenced by the lower limb without OA, followed by pain intensity and overweighed patients. The time period between surgery and the beginning of the rehabilitation program, was influenced primarily by MFS scores and secondarily by pain intensity. Significant differences in body mass composition were evident between males and females, and between those patients living with family from those living alone. This suggests that gender and social support may be important determinants in LOS and rehabilitation outcome following THA. The implications for clinical practice of identifying the factors that can impact on the rehabilitation program and LOS will allow better prediction of the discharge of the patients, support resource allocation and can contribute to the overall improvement in the healthcare of older adult patients requiring a THA.

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