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Preoperative rehabilitation does not affect quality of life and functional outcomes in patients following total hip or knee arthroplasty

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ABSTRACT

Background: Osteoarthritis accounts for the most disability among the elderly compared to any other disease. When conservative options no longer provide sufficient relief, joint arthroplasty becomes the treatment of choice. The majority of patients waiting for lower-limb joint arthroplasty suffer reduced quality of life and it is possible that preoperative rehabilitation improves postoperative recovery**. Objectives**: The study objective was to investigate the effect of preoperative rehabilitation on the quality of life and functional outcome. Design: Pilot randomized controlled trial with concealed allocation, assessor blinding and intention-to-treat analysis. Setting: Tertiary health service including acute and community centers**. Participants**: Sixty-four people undergoing elective lower-limb arthroplasty likely to be discharged home were included and randomly assigned to either intervention or control group. Interventions: Preoperative rehabilitation (intervention) group received one-hour sessions, twice weekly, at a community rehabilitation center for at least three and a maximum of four weeks prior to surgery. The control group did not complete any pre-surgical exercise program. Main outcome measures: The primary outcomes measured before allocation and eight weeks post-operatively were health utility and quality of life as measured by the EQ-5D-3L (formerly known as the European Quality of Life Instrument) and the Patient-Specific Functional Scale. **Results**: There were no significant between-group differences in health utility (main effect of group -0.04 (95% CI -0.16 to 0.08, p = 0.50) or Patient-Specific Functional Scale (main effect of group -0.59 (95% CI -1.8 to 0.6, p = 0.73) but the group-by-joint interaction effects for the Timed Up and Go Test (TUG) time (7.6 (95% CI -0.9 to 16.1, p = 0.08) and the EQ-5D Visual Analog Scale (-18.3 (95% CI -41.1 to 4.5), p = 0.11) were larger. Patients undergoing preoperative rehabilitation improved knee flexion by 12.6 degrees (95% CI 5.2 to 20, p = 0.001). **Conclusion:** Preoperative rehabilitation improved knee flexion but this did not translate into improved functional mobility or quality of life.

Keywords:*Osteoarthritis, Knee replacement, Hip arthroplasty, Rehabilitation, Activities of daily living.*

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INTRODUCTION

In 2000, the World Health Organization reported that osteoarthritis was the sixth leading cause of non-fatal burden in the world [1] accounting for the most disability among the elderly compared to any other disease [2]. In 2011, the total health expenditure for osteoarthritis in USA was $2.3 billion [3]. With the prevalence of osteoarthritis estimated to be 3.14 million Americans, or around 10.7% of the population by 2050 [3], the financial and disability burden imposed by osteoarthritis will remain a significant public health challenge both in the USA and globally. First-line management of osteoarthritis includes;medication, physical therapy and exercise. When these conservative options no longer provide sufficient relief, joint arthroplasty is the treatment of choice with more than 63,000 total hip and knee replacements were performed for osteoarthritis in 2010-2011 [3, 4]. Many American hospitals are already under pressure from the high number of patients requiring elective orthopedic surgery and public health is constrained by significant waiting times [3, 4].

In 2010-2011, the median waiting times were 108 and 173 days for Total Hip Replacement (THR) and Total Knee Replacement (TKR) respectivelycompared to 102 and 152 days for THR and TKR in 2004-2005 [5, 6]. This waiting time did not include the time from initial referral to initial appointment with an orthopedic surgeon [5, 6]. Patient pain and functional level

immediately pre-operatively predict pain and function six months post joint replacement surgery [7]. However, a majority of patients waiting for joint replacement surgery suffer significant declines in their quality of life while waiting [8]. If the function of patients declines pre-operatively, this in turn will increase the burden on the health system as these patients require increased length of stay and much more intensive rehabilitation [9].Exercise targeted to patients with osteoarthritis has been reported to decrease pain and improve physical function [10-12] with group classes as beneficial as individual sessions, as long as there is adequate supervision [10-12].

Several studies [13-19] have investigated pre-operative exercise programs in patients waiting for arthroplasty and have demonstrated a reduction in disability [13]; improved leg strength and faster return to function during the immediate post-operative period in TKR and THR [14-16] and up to three months post-operatively following TKR [17]. Moreover, a higher proportion of TKR and THR patients who underwent six weeks of pre-operative exercise training were discharged home instead of to inpatient rehabilitation [18]. A single study demonstrated a trend to reduced health service utilization in patients receiving pre-operative exercise [19] although the study was underpowered for this measure. This evidence suggests that provision of rehabilitation prior to arthroplasty (or preoperative rehabilitation) may reduce patient disability and financial burden on the health system [14, 17].

Therefore, the main objective of this pilot randomized trial was to investigate the effect of preoperative rehabilitation on quality of life and functional outcomes across the continuum of care in patients undergoing total hip and knee arthroplasty.

METHODS

Trial Design

This was a prospective pilot randomized controlled study with assessor blinding. The institutional human research ethical review committee of Nova Southeastern University (NSU), Florida, and Health Check centers, New York, USA gave full approval for this study (Protocol #10226B). All patients provided written informed consent and the rights of the participants were protected. Competence to consent was assumed given that participants had to provide consent to undergo joint arthroplasty.

Participants and setting

Sixty-four patients undergoing elective total hip or knee arthroplasty surgery were recruited from orthopaedic Surgical Review Clinics (SRC) in the healthcare network with a Risk Assessment and Prediction Tool (RAPT) [20] score >6. The RAPT is designed to assist in post-operative discharge planning and is based on information including age, sex, mobility and caregiver support [20]. The trial was conducted in a single American healthcare network in Brooklyn, New York, USA over the period from September 2010 to May 2012. The trial was registered on the USA and Clinical Trials Registry, ACTR Number: ATRN1261000777099.

Exclusion criteria included patients living outside the relevant catchment areas, having surgery less than 4 weeks from SRC visit, unable to follow commands, having revision surgery, wheelchair bound, having had a corticosteroid injection in the previous six months, or with a Risk Assessment and Prediction Tool (RAPT) score < 6.

Randomization

Randomization was achieved through the use of sequentially numbered, opaque envelopes with the allocation of either "intervention" or "control" sealed inside. One investigator who was not involved in recruitment or measurement using a computerized random number generator generated the random allocation sequence. Randomization was stratified by site of surgery (hip or knee) and permuted blocks of sizes 4, 6, and 8 participants (selected at random) were used.

This investigator built the random number lists, placed the group allocation into the sequentially numbered, opaque envelopes according to the computer generated random number sequence, sealed the envelopes and provided them to the investigators and clinicians involved in participants recruitment.Allied healthclinicians attending SRC enrolled participants and allocated each to a group by opening an envelope in sequential order.This occurred after initial measures were taken. Participants' allocation group, site of surgery, number, age, and gender are shown in Table 1.

Intervention

Preoperative rehabilitation Group - Pre Surgery

Preoperative rehabilitation participants were assessed at their community rehabilitation center (CRC) by a physical therapist prior to attending a one-hour group session of exercise and education. Patients in this group attended, one-hour sessions, twice a week at the CRC for a period of no less than three weeks and a maximum of four weeks prior to their surgery. If their surgery was postponed or if they did not have a surgery date, they were instructed to continue with their individual home exercise program (HEP) until they presented for surgery.

Preoperative rehabilitation Group - Post Surgery

In the first week following surgery, participants received two physical therapy visits at home to ensure that their HEP was set up, they were safe mobilizing in their home environment, and were managing their postoperative pain. Following this, the patient returned to the CRC group which contained a mixture of patients both pre and post-operative with a maximum of six in the group at any given time. Patients attended twice weekly for hourly sessions, for up to six weeks.The mix of pre and

post-operative patients in a group setting was encouraged, as it was thoughttobe a motivating influence and helps build realistic expectations about post-surgical recovery.

Specific details of the exercise group

The exercise group took the form of a circuit. Exercises at various stations included active range of movement (AROM) and strength exercises on a plinth, chair or in standing, gait re-education (including gait aid training pre-operatively), exercise bike and stair practice. A HEP was also provided for each participant, which included many of the same exercises done within the group. All prescribed exercises were individually tailored to ensure that therapeutic benefit and participant safety were maximized.

Usual Care

Control group participants received usual care as is currently practiced at Health check centers. This entails no pre-surgical exercise program.

Measurement

Primary outcome measures were the EQ-5D-3L (formerly known as the European Quality of Life Instrument) [21-23] and the Patient Specific Functional Scale [24, 25]. The EQ-5D-3L is an internationally recognized measure of health-related quality of life. The Patient Specific Functional Scale (PSFS) is used to quantify activity limitation and measure functional outcomes over time [24, 25]. The trial looked at six secondary outcome measures. AROM (for knees only) was assessed with a universal goniometry [26]. This was assessed in the most comfortable position for the patient as it has been shown there is reliable correlation between supine, prone and sitting [27].The Timed Up and Go Test (TUG) [28] was assessed as a measure of mobility which incorporates the functional tasks of standing from a seated position, walking, turning, stopping and then sitting down. Further secondary outcomes measures consisted of length of stay in the acute hospital setting, length of stay in the Rehabilitation in the Home (RITH) program, proportion of patients requiring inpatient rehabilitation and the occasions of allied health intervention between the two groups.

Follow Up

At eight weeks post-operatively, participants were re-assessed, using the same outcome measures assessed at SRC, by a blinded physical therapist at Health Check center, Physical Therapy Department.

Data Analysis and Sample Size

This pilot study aimed to determine the likely effect size of the preoperative rehabilitation intervention compared to the control in the local population and to identify the variability in each outcome measure so that a sample size calculation for a larger study can be undertaken. We sought to recruit a total of 60 patients for this pilot study and the intention to treat analysis was conducted.

Groups were compared using linear regression adjusted for baseline values of the outcome variable and number of days since surgery. A model examining the main effect of group was first investigated, followed by a model that also investigated the group-by-joint interaction effect.

Subgroup analyses were undertaken if a significant group-by-joint interaction effect was identified. Fisher's exact test was used to test between-group differences in the number of participants discharged home and to inpatient rehabilitation. Statistical analysis was performed using Stata/IC 11.2 for Windows (StataCorp LP, College Station, TX, USA) and $p < 0.05$ was accepted as statistical significance. Data are presented as mean (SD) unless otherwise specified.

RESULTS

The flow of participants through the study is reported in Fig. 1. A total of 64 participants were recruited for the trial with 32 participants randomized into each of the intervention and usual care arms. More participants were recruited than anticipated due to multiple investigators and clinical staff being involved in the recruitment simultaneously.

The sample was elderly with a higher proportion of patients undergoing total knee arthroplasty and the groups were comparable in their demographics, joint range, physical function and quality of life on recruitment (Table 1).The cohort waited a mean (SD) number of 61.1 (62.3) days from trial enrolment and pre-admission clinic assessment for surgery (Table 1). The mean (SD) acute hospital length of stay was 6.9 (2.5) days for the entire cohort. Nine (14%) patients were admitted to an inpatient rehabilitation facility post discharge from acute inpatient care.

The mean (SD) time from surgery to follow-up assessment was 63.4 (17.5) days and there was no significant difference in acute hospital length of stay between the groups (Table 2). There were no significant between-group differences in EQ-5D utility or PSFS or in the group-by-joint interaction effect for the TUG time ($p = 0.08$) and the EQ-5D VA ($p = 0.11$) (Table 2). These trends were toward preoperative rehabilitation positively influencing the TUG time and EQ-5D in total hip arthroplasty participants but not total knee arthroplasty participants (Table 2). However, there was a significant improvement in knee flexion range observed in the total knee arthroplasty group undergoing preoperative rehabilitation which did not result in improved measures on any of the functional tests (Table 2).

DISCUSSION

This trial was conducted to generate evidence that would allow a larger, appropriately powered study to be designed.

The effect sizes for the main effect of group (intervention vs. control) for both of our indicators of health-related quality of life were very small (<0.1). However, the cohort undergoing preoperative rehabilitation before total knee arthroplasty had improved knee flexion post-operatively, this difference was likely both clinically and functionally insignificant as both groups had knee flexion ranges greater than 90° (which is thought to be the minimum required for independent performance of activities of daily living) [29]. The additional gain of 13 degrees of flexion is unlikely to enable any additional functional activities.

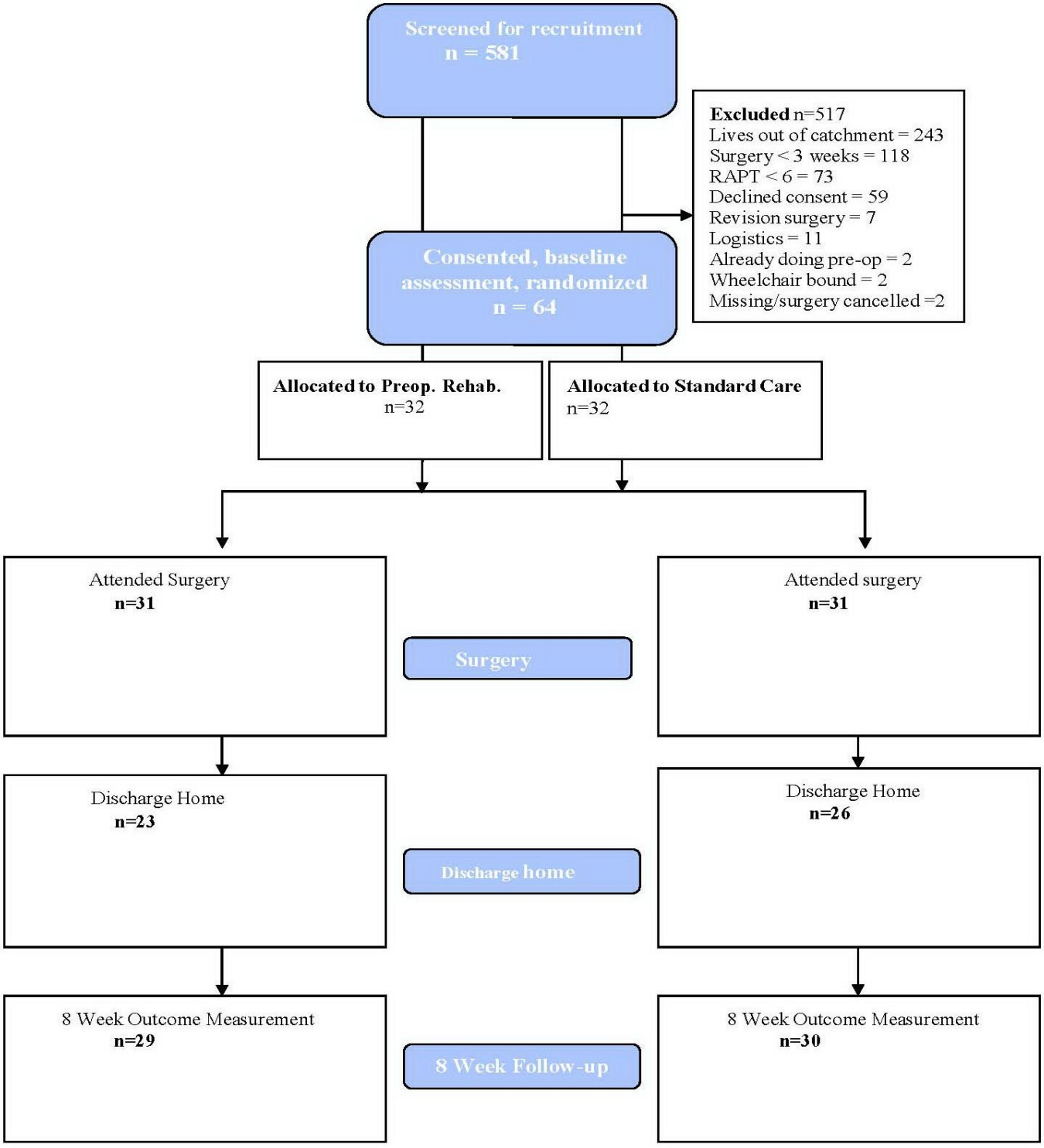

Fig. 1. CONSORT flow diagram

Table 1. Demographics of the sample, n = 64, mean (SD).

	Intervention			Control		
	Hip	Knee	Combined	Hip	Knee	Combined
N	11	21	32	12	20	32
Age	63.9 (11.7)	66.0 (8.4)	65.3 (9.6)	64.9 (9.9)	68.3 (9.1)[b]	67.0 (9.4)[e]
Gender (male, n (%))	6 (55)	10 (48)	16 (50)	6 (50)	9 (45)	15 (47)
EQ-5D-3L						
Mobility	0.07 (0.03)	0.06 (0.03)	0.06 (0.03)	0.06 (0.03)	0.05 (0.03)	0.06 (0.03)
Personal care	0.08 (0.05)	0.02 (0.05)	0.04 (0.05)	0.08 (0.05)	0.04 (0.06)	0.06 (0.06)
Usual activities	0.05 (0.02)	0.03 (0.02)	0.04 (0.02)	0.04 (0.02)	0.03 (0.02)	0.04 (0.02)
Anxiety / Depression	0.07 (0.05)	0.06 (0.05)	0.06 (0.05)	0.07 (0.04)	0.05 (0.05)	0.06 (0.05)
Pain / discomfort						
Utility	0.17 (0.06)	0.16 (0.06)	0.17 (0.06)	0.21 (0.06)	0.17 (0.06)	0.18 (0.06)
VAS	0.28 (0.38)	0.40 (0.30)	0.36 (0.33)	0.18 (0.38)	0.37 (0.32)	0.30 (0.35)
	52.3 (13.3)	52.6 (17.6)	52.5 (15.9)	43.3 (23.8)	71.3 (18.9)[a]	60.1 (24.8)[d]
Timed up and go time	19.4 (9.8)	15.3 (7.2)	16.7 (8.2)	24.4 (11.8)	15.3 (6.0)	18.7 (9.6)
Gait aid use (n)						
Knee	N/A		N/A	N/A		N/A
Flexion		107.1 (12.9)			104.5 (14.0)	
Extension		4.0 (6.6)			3.8 (5.6)	
PSFS score	2.2 (1.4)	3.3 (1.9)	2.9 (1.8)	2.0 (1.3)	3.3 (1.9)	2.9 (1.8)
Days from being placed on list till surgery	260.4 (175.4)	286.6 (150.0)	277.6 (156.9)	260.0 (138.2)	299.5 (145.1)[b]	284.2 (141.6)[e]
Days from enrolment till surgery	70.2 (53.1)	55.3 (45.7)	60.4 (48.1)	45.1 (20.1)	59.5 (61.5)[b]	53.9 (49.7)[e]
Days from surgery till follow-up assessment	57.4 (3.6)	59.5 (9.1)[c]	58.9 (7.8)[e]	68.2 (13.5)	67.4 (27.2)[b]	67.7 (22.9)

[a]n = 18; [b]n = 19; [c]n = 20; [d]n = 30; [e]n = 31

Table 2 . Comparison of clinical outcomes between groups.

	Intervention			Control			Main effect of group (95% CI)	Group-by-joint interaction
Site of surgery	Hip	Knee	Combined	Hip	Knee	Combined		
N	9	20	29	11	19	30		
EQ-5D utility	0.69 (0.23)	0.62 (0.27)	0.64 (0.26)	0.64 (0.23)	0.70 (0.12)	0.68 (0.17)	-0.04 (-0.16, 0.08), p=0.50	-0.12 (-0.36, 0.12), p=0.33
EQ-5D VAS	78.3 (19.0)	66.8 (22.7)	70.3 (22.0)	65.9 (15.1)	73.2 (15.7)	70.5 (15.7)	0.51 (-10.3, 11.4), p = 0.93	-18.3 (-41.1, 4.5), p=0.1
PSFS	5.0 (2.0)	4.7 (2.1)	4.8 (2.0)	5.5 (2.6)	5.5 (2.3)	5.5 (2.4)	-0.59 (-1.8, 0.6), p = 0.32	-0.42 (-2.9, 2.0), p=0.7
TUG time (seconds)	8.9 (1.5)	11.8 (6.8)	10.9 (5.8)	17.7 (16.9)	10.5 (5.2)	13.2 (11.3)	-0.76 (-5.0, 3.4), p = 0.72	7.6 (-0.9, 16.1), p=0.08
Log TUG Time(seconds)	2.2 (0.2)	2.4 (0.5)	2.3 (0.4)	2.6 (0.6)	2.3 (0.4)	2.4 (0.5)	-0.04 (-0.25, 0.17), p=0.71	0.42 (-0.00, 0.85), p=0.05
LOS in acute	6.2 (1.8)	7.3 (2.6)	6.9 (2.4)	7.2 (3.8)	6.7 (1.9)	6.9 (2.7)	0.03 (-1.3, 1.4), p = 0.96	1.5 (-1.4, 4.4), p=0.30
Log (LOS)	1.8 (0.3)	1.9 (0.3)	1.9 (0.3)	1.9 (0.4)	1.9 (0.3)	1.9 (0.3)	0.01 (-0.15, 0.17), p = 0.91	0.16 (-0.2, 0.5), p=0.3
Knee flexion (degree)	N/A	110.8 (10.6)	N/A	N/A	98.2 (11.1)	N/A	12.6 (5.2, 20.0), p = 0.001	N/A
Knee extension	N/A	12.9 (8.5)	N/A	N/A	13.3 (6.4)	N/A	-0.60 (-5.7, 4.6), p = 0.82	N/A
N (%) requiring inpatient rehab	1 (11)[a]	4 (21)[b]	5 (18)[c]	3 (27)	1 (5)	4 (13)	N/A	N/A

*positive coefficient indicates favourable result for intervention. N/A = unable to calculate group by joint interaction effect due to only being measured in the total knee arthroplasty patients. [a]p = 0.59 (Fisher"s exact test). [b]p = 0.34 (Fisher"s exact test). [c]p = 0.73 (Fisher"s exact test

No research to date has evaluated the contribution of increased knee range of motion to functional activities. In this cohort, the increased knee range of motion did not translate into improved functional outcomes.

There was a trend to post-operative improved EQ VAS and TUG times in the patients who attended preoperative rehabilitation and underwent hip arthroplasty as evidenced by the group- by-joint interaction effects which suggests that preoperative rehabilitation affects patients undergoing hip arthroplasty and knee arthroplasty differently. This is consistent with the results of a previous systematic review which suggested that more research was required for preoperative rehabilitation in total hip replacement surgery but that preoperative rehabilitation for total knee replacement surgery did not improve outcome, although only five papers were included in that review [30].

Several more recent studies have demonstrated improved post-operative outcomes and reduced disability [13, 17, 31] although a recent randomized controlled trial demonstrated no benefit of eight weeks of preoperative rehabilitation in activities of daily living, pain or quality of life three months following hip or knee arthroplasty [32].

The possible reasons for the difference in observed outcomes in this study are heterogeneity in the selection of outcome measures; differences in the intensity and duration of preoperative rehabilitation and differences in the patient populations with different inclusion/exclusion criteria. The inclusion criteria targeted patients who were assessed as likely to be discharged home (using the RAPT), which resulted in the recruitment of a healthier cohort with less comorbidity than would otherwise generally be expected.

This hypothesis is supported by the finding that there were also no differences observed in the proportion of patients discharged to inpatient rehabilitation in this cohort compared to a prior study which demonstrated an improvement in the number of patients discharged home following joint arthroplasty with pre-operative exercise training [18]. It is possible that there would be a larger effect size of preoperative rehabilitation in patients who had more disability or functional impairment at baseline and this should be taken into account when designing larger multi-center randomized controlled trials of preoperative rehabilitation.

It is also possible that the usual care provided to patients within the American context is more comprehensive than that in other regions, which has implications for the conduct and interpretation of clinical trials of rehabilitative intervention [33].Few studies have focused on the potential benefits of preoperative rehabilitation on health service utilization and there is preliminary evidence that pre-operative exercise may reduce health service utilization [19]. Health service utilization was not assessed in this study due to the inherent challenges associated with collecting service and cost data across the healthcare spectrum.

The patients recruited in this study received pre- operative training in a community health setting, and were then admitted to acute hospitals for their procedure, before being transferred either to an inpatient rehabilitation facility or directly home into the community where they resumed their postoperative exercise training. The systems and records currently in place at many health services make it difficult or even impossible to track occasions of service and resultant healthcare costs. There is significant imperative on the healthcare system, decision-makers and the government to utilize healthcare resources in the most cost-effective manner and urgent attention is needed to ensure that this data is easily available and collectable in order to inform resource allocation.

There were some key limitations to this study. As this was an unfunded study, the small cohort of treating therapists available may have influenced blinding. The therapists who recruited patients at preadmission clinic were responsible for inpatient care and community rehab groups contained both pre and post-operative patients meaning that outpatient care was unblinded.

The characteristics of the patient population and the geography of the surrounding area likely impacted patient willingness and ability to attend community rehabilitation. The study was unable to assist with transport to and from the facility and eligible participants who otherwise met the inclusion criteria may have been unable to participate as a result. The study may have contained participants who were accessing alternative therapies or private physical therapy; and this wasn't measured or controlled for.

As previously identified, the inclusion criteria of the study may have resulted in a study group that were of a higher pre-morbid level of function; for example, excluding patients with a RAPT score <6, which may not have been a true representation of the population. The exclusion criteria did not adequately define factors such as cognitive impairment or level of dependence on a wheelchair for mobility, implying that patients could have been excluded or included on the basis of individual perception on the part of recruiting therapists. It is also acknowledged that the impact of other factors, such as individual surgeons and their surgical preferences, post-op complications and the intensity of acute allied health intervention, that may contribute to patient outcomes were not controlled or measured in this study. Finally, follow-up measures were conducted on average 8.8 days (mean difference) later in the usual care group and this would need to be standardized in future studies.

Future studies should separate arthroplasty groups in order to more adequately power large randomized controlled trials to elicit any functional benefit of preoperative rehabilitation and in particular emphasize greater collaboration across the continuum of care to measure the cost-effectiveness of preoperative rehabilitation.

It would also be beneficial to repeat the study with an expanded inclusion criteria (e.g. RAPT <6) to determine the impact of the study on patients who were of a lower functional level pre-operatively.

Future studies should focus on ensuring blinded assessors and therapists; providing transport assistance or exploring ways of delivering pre-operative rehabilitation independently of a

healthcare setting (e.g.telehealth), involvement of other healthcare professionals, such as allied health assistants, in delivering pre-operative rehabilitation may also be an important area to explore in the context of optimizing therapy in a constrained financial environment.

CONCLUSION

The addition of preoperative rehabilitation to usual care significantly improved knee flexion range of motion recovery post-operatively however this did not translate into function or quality of life benefits.

There may be differingeffects of preoperative rehabilitation in total hip arthroplasty patients compared to total knee replacement patients although the reasons for this are unclear.This Phase II study was underpowered to detect differences and future larger randomized controlled trials are required to validate these findings.

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الملخص العربى

البرنامج التأهيلى قبل جراحة استبدال مفصل الفخد أو الركبة لا يؤثر على نوعية الحياة ونتائج الأداء الوظيفى بعدهما

الغرض من البحث:- تعانى الغالبية العظمى من المرضى على قوائم الانتظار لإجراء عملية استبدال مفصل الفخد أو الركبة من تدنى نوعية الحياة ويفترض أن البرنامج التأهيلى قبل الجراحة يحسن التعافى بعد اجراءها. وهدفت هذه الدراسة إلى دراسة تاثير البرنامج التأهيلى قبل الجراحة على نوعية حياة المرضى ومستوى ادائهم الوظيفى بعدها. **.صميم البحث :-** دراسة تحكمية تعتيمية لعينة عشوائية مع النية لتحليل نتائجها . **مكان البحث :-** المستشفيات والمراكز الصحية المحلية .**المشاركون:-** شارك فى هذه الدراسة 64 شخص بقوائم الانتظار لإجراء عملية استبدال مفصل الفخد أو الركبة والمرجح عودتهم بعدها إلى منازلهم. **.لتداخلات:-** تلقت مجموعة عشوائية برنامج تأهيلى قبل جراحة استبدال مفصل الفخد أو الركبة مكون من ساعة علاجية مرتين اسبوعياً لمدة لم تقل عن ثلاثة أسابيع ولم تزد عن اربع قبل العملية الجراحية بالمقارنة بمجموعة على قائمة انتظار نفس العملية ولم تتلقى اى برنامج تأهيلى قبلها . **مقاييس النتائج الرئيسية:-** تم قياس مستوى الأداء الوظيفى ونوعية الحياة للمرضى المشاركين بالبحث قبل تحديد المجموعة التى وزعوا عليها وبعد 8 اسابيع من اجراء العملية . **النتائج:-** لا توجد فروق ذات دلالة إحصائية بين المجموعتين عند قياس النتائج الرئيسية وتلاحظ فقط أن المرضى الذين تلقوا البرنامج التأهيلى قبل عملية استبدال مفصل الركبة تحديداً تحسن لديهم ثنى المفصل ب 12.6 درجة مقارنة بمن لم يتلقى اى برنامج تأهيلى قبل العملية . **الخلاصة:-** البرنامج التأهيلى قبل جراحة استبدال مفصل الفخد أو الركبة حسن فقط درجة ثنى مفصل الركبة ولكن هذا لم يترجم إلى تحسن بالأداء الوظيفى أو نوعية الحياة لمن تلقاه اثناء التعافى بعد الجراحة.

مفتاح كلمات البحث:- التهاب المفاصل، العملية الجراحية لإستبدال مفصل الفخد أو الركبة، التأهيل، حركة المفصل، انشطة الحياة اليومية.