

Preoperative Educational Classes in Elderly Patients May Not be Necessary Prior to Elective Joint Arthroplasty

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Abstract

Preoperative arthroplasty classes decrease complications and readmissions, however, in-person classes are inconvenient for elderly patients with mobility limitations. This retrospective review included 232 patients (305 joints) with in-person preoperative educational classes (IPC) and 155 patients (192 joints) with telephone preoperative educational classes (TC). Compared to IPC, TC patients had a shorter length of stay ($P < .009$), but a greater percentage made at least one postoperative clinic call (22.8% vs 40%; $P < .001$). No differences were noted in complications, but emergency room visits significantly decreased for total knee TC patients ($P = .039$). The increase in clinic calls may be addressed through focused changes to the preoperative telephone dialogue, providing a safe and efficient alternative to IPCs.

Keywords

Elective Joint Arthroplasty; Preoperative Education

Abbreviations

GMH = Global Mental Health

GPH = Global Physical Health

HOOS JR = Hip Disability and Osteoarthritis Outcome Score Joint Replacement

IPC = in-person preoperative educational class

KOOS JR = Knee Injury and Osteoarthritis Outcome Score Joint Replacement

PA = physician assistant

PROMIS = Patient-Reported Outcomes Measurement Information System

TC = telephone class

THA = total hip arthroplasty

TKA = total knee arthroplasty

UKA = unicompartmental knee arthroplasty

Introduction

Attending a surgical education class prior to undergoing joint arthroplasty has been shown to reduce length of stay,¹⁻⁴ lower readmission rates,^{1,5} and increase functional activity^{1,6} compared to patients not attending a class. These benefits extend to patient outcomes, with previous research reporting decreased patient anxiety^{3,7,8} and improved patient satisfaction.^{4,8} The advantages of the surgical education class are closely tied to the timing and delivery of content. Optimally, the class should empower patients to take an active role in perioperative care, create realistic expectations regarding surgical outcomes, and a better understanding of discharge requirements.⁹

Despite the clear advantages of preoperative educational classes, barriers to access include travel requirements and limited functional mobility for patients requiring arthroplasty. Telehealth platforms have been previously evaluated to increase accessibility and preserve the benefits of preoperative educational classes.¹⁰⁻²¹ Conducting preoperative classes via telehealth has been shown to be beneficial in rural or lower resource settings to reduce travel time and costs,²² but they require technical support and adjustments to clinical operations. Individual telehealth educational services are not necessarily practical, and group telehealth services are not widely performed due to issues regarding medical privacy, especially at high volume arthroplasty institutions. Furthermore, while preoperative patient education classes via telehealth may have many benefits, they can represent a barrier for elderly patients who may be less proficient with technology.²³

In an effort to provide the benefits of telehealth without the technical aspects, the current study site implemented a short, 15- to 30-minute preoperative educational telephone call (TC) to replace a 2-hour, in-person preoperative educational class (IPC). Replacing the IPC with an abbreviated TC discussion was hypothesized to potentially decrease patient education and preparation which would result in inadequate wound care, poor understanding of home exercises or increase postoperative patient utilization of emergency or urgent access health services. It was also hypothesized that poor preoperative education and preparation could negatively influence postoperative patient reported outcomes. Therefore, the purpose of this study was to compare patient reported outcomes, postoperative complications, and postoperative clinic phone call incidences, between patients attending a preoperative IPC or receiving a preoperative TC prior to elective joint arthroplasty.

Materials and Methods

These data were prospectively collected as part of an on-going joint registry at the current study site, including total hip arthroplasty (THA), total knee arthroplasty (TKA) and unicompartmental knee arthroplasty (UKA), performed by a single, fellowship trained arthroplasty surgeon. The study compared 2 consecutive cohorts of 232 joint arthroplasties following a preoperative IPC (September 2019 to March 2020) and 155 joint arthroplasties following a preoperative TC (May 2020 to October 2020).

Prior to March 2020, all preoperative visits were conducted in-person. A typical class was held 1 week prior to surgery, with approximately 4 to 8 patients per class. Each patient was encouraged to bring a family member or alternative postoperative caregiver to the class, to ensure both the patient and the postoperative caretaker would be informed of preoperative, surgical and postoperative protocols, and recovery expectations. All IPC were conducted by the same nurse who provided scripted information for surgical preparation, including visual demonstration of preoperative self-cleaning procedures as well as instructions for postoperative wound care. Additionally, visual aids were used to demonstrate postoperative wound care. A member of the physical therapy team would review postoperative expectations, exercises, and the functional criteria required to achieve safe discharge. The physical therapist was also responsible for educating patients on home exercises and safe execution of activities required for daily living. Patients were given ample time to ask questions and information competency was evaluated through summary conversations. Following the group educational class, each patient was individually counseled by the physician assistant (PA), during which time unanswered questions could be addressed. The patient then completed other preoperative surgical requirements, such as cardiologist and/or anesthesiologist evaluation, if indicated.

Beginning in May 2020, preoperative IPC was converted to a TC. Patients were individually called by a PA specializing in joint arthroplasty service. This PA is distinctly separate than the clinical nurse who performed the IPC education. However, the information given was the same as the clinical nurse as this instruction was fairly scripted due to the narrow focus of the surgeries being performed. Aside from potential differences in personality or speaking style, the information given was identical. Phone calls were performed by the PA 3 to 7 days prior to surgery. Due to the caseload (approximately 15 surgeries per week) and the requirement for individual TC instruction, the time in which the PA could engage with the patient was limited and typically resulted in about 15 to 30 minutes of verbal instruction. A caretaker or family member was not required to be present on the call. The primary focus of the call was to discuss the same perioperative issues addressed in the IPC. Without the benefit of visual aids of the IPC, the TC focused on preoperative preparation and early postoperative expectations similar to the IPC. Patients were given an opportunity to ask questions before the call ended. All educational visual materials were provided to the patient on the day of surgery following arrival to the surgical admission center. One of several experienced surgical admission center nurses was present to review the written material and answer specific questions prior to surgery. The written material reviewed was the same material normally presented during the IPC.

As part of the standard of care, all patients completed either the knee injury and osteoarthritis outcome score joint replacement survey (KOOS JR)²⁴ or the hip disability and osteoarthritis

outcome score joint replacement survey (HOOS JR)²⁵ both preoperatively then again at 6-weeks following surgery. All patients also completed the patient-reported outcomes measurement information system (PROMIS) survey which includes the Global Physical Health (GPH) and Global Mental Health (GMH)²⁶ modules both preoperatively then again at 6-weeks following surgery. The KOOS, JR contains 7 items from original KOOS survey, coded from 0 to 4 (range 0-28), and then converted to an interval score (range 0 to 100), where 0 represents total knee disability and 100 represents perfect knee health.²⁴ The HOOS, JR contains 6 items from the original HOOS survey, coded from 0 to 4 (range 0-24) and then converted to an interval score (range 0 to 100), where 0 represents total hip disability and 100 represents perfect hip health.²⁵ The GPH and GMH scores are based on 4 items, each using 5-category response scales, and can be converted to a T-Score metric allowing for comparisons to a general (normative) population to provide summary of health and mental status, respectively.²⁶ Other data collected included the number of and reason for patient telephone calls made to the orthopedic clinic or primary care physician within 6-weeks following surgery. Reasons for calls were grouped as follows: (1) Medical – unrelated to surgery; (2) Medical – related to surgery; (3) Medication – not including refill requests; (4) Wound Concerns – potential infection; (5) Wound Closure Concern – related to the wound covering coming off or reaction; (6) Administrative – including return to work letter requests; and (7) Physical Therapy questions. Requests for medication refills within 6 weeks were not included in the total calls, as these are considered standard requirements for patient care. Additionally, 90-day emergency room visits, which were defined as a patient returning to be seen in the emergency room but not admitted, and 90-day readmissions, which were defined as readmissions to the hospital for at least 1 night for any reason were reported in this study. Patients who presented to the emergency room and subsequently re-admitted were recorded as readmissions only.

Descriptive statistics, including means, standard deviations, and frequencies, were created for patient demographics for each joint by IPC or TC. Chi-square tests were performed to compare total calls and total emergency room visits between IPC and TC recipients. Joint specific independent t-tests and chi-square tests were also performed to determine differences between IPC and TC recipients. All statistical analyses were completed with SPSS software version 25 (IBM Corp, Armonk, NY) with a significance level of $P < .05$.

Results

Patient demographics and patient reported outcomes between in-person and telephone classes are presented in **Table 1**. There were no differences regarding demographics for patients undergoing THA. For patients undergoing UKA, the TC group was significantly younger than the IPC group ($P = .021$). For patients undergoing TKA, TC patients had lower body mass

index ($P=.006$), were more commonly male ($P=.049$) and had higher preoperative KOOS JR ($P=.042$) and GPH scores ($P=.032$) than IPC patients. For TC recipients undergoing unilateral arthroplasties, the number of patients discharged on the day of surgery increased for THA ($P=.006$), TKA ($P<.001$) and UKA ($P=.008$). For bilateral arthroplasties, no significant increase in outpatient discharge was noted.

Overall, the proportion of patients making at least 1 postoperative clinic telephone call was 40% for TC compared to 22.8% with IPC recipients ($P<.001$). The categorical representation of the reason for the calls is presented in **Table 2**. By joint,

the proportion of patients calling the clinic increased significantly following TC implementation for THA (24.7% to 47.5%, $P=.003$) and UKA (14.9% to 33.3%, $P=.039$) patients. Phone calls following TKA also increased, (25.0% to 36.8%, $P=.088$) however, the difference was not statistically significant. The proportion of all patients seeking treatment at the emergency room decreased from 9.5% in IPC to 3.2% ($P=.013$) for TC patients (**Table 1**). This was driven by the significant decrease in emergency room visits for TKA patients (16.3% to 5.4%, $P=.039$). There were no significant differences in hospital readmissions or early postoperative complications (**Table 1**).

Table 1. Comparison of Patient Demographics, Patient Reported Outcome Scores, Length of Stay, Postoperative Phone Calls, Readmissions and Major Complications for Each Arthroplasty Procedure Performed at the Straub Medical Center Between September 2019 – October 2020 Between Patients Receiving In-Person Preoperative Classes (IPC) and Telephone Calls Only (TC) – Mean (SD)/freq (%).

	Total Hip Arthroplasty			Total Knee Arthroplasty			Unicompartmental Knee		
	IPC	TC	P-value	IPC	TC	P-value	IPC	TC	P-value
Number of Patients	93	59		92	57		47	39	
Number of Joints	119	70		131	77		55	45	
Age	66.0 (9.3)	66.9 (10.2)	.590	69.3 (9.1)	70.0 (7.8)	.599	72.2 (8.9)	67.6 (9.2)	.021
BMI (kg/m ²)	27.6 (5.8)	27.1 (6.1)	.613	30.5 (5.1)	28.1 (4.8)	.006	28.8 (4.8)	29.7 (4.8)	.411
Males	47 (50.5%)	25 (42.4%)	.207	44 (47.8%)	36 (63.2%)	.049	21 (44.7%)	21 (53.8%)	.265
K/HOOS JR	47.8 (15.1)	45.5 (19.2)	.416	44.1 (14.5)	48.8 (11.7)	.042	46.4 (11.2)	45.2 (18.0)	.704
GPH	39.0 (6.2)	39.2 (7.2)	.825	39.4 (5.8)	41.5 (5.7)	.032	38.6 (6.2)	40.6 (5.7)	.124
GMH	45.4 (8.7)	47.9 (10.6)	.124	48.8 (8.9)	50.3 (7.8)	.308	47.4 (7.8)	48.8 (8.5)	.428
Length of Stay									
Unilateral (SDD)	8 (11.9%)	16 (33.3%)	.006	4 (7.5%)	18 (48.6%)	<.001	27 (69.2%)	31 (93.9%)	.008
Bilateral (OP)	14 (53.8%)	9 (81.8%)	.107	29 (74.4%)	15 (75.0%)	.609	7 (87.5%)	5 (83.4%)	.692
90-day Calls*			.003			.088			.039
None	70 (75.3%)	31 (52.5%)		69 (75.0%)	36 (63.2%)		40 (85.1%)	26 (66.7%)	
One	16 (17.2%)	12 (20.3%)		19 (20.7%)	17 (29.8%)		5 (10.6%)	5 (12.8%)	
>1	7 (7.5%)	16 (27.1%)		4 (4.3%)	4 (7.0%)		2 (4.3%)	8 (20.5%)	
90-day ER Visits	3 (3.2%)	1 (1.7%)	.495	15 (16.3%)	3 (5.4%)	.039	4 (8.5%)	1 (2.6%)	.244
90-day Readmissions	0 (0.0%)	0 (0.0%)	--	0 (0.0%)	1 (1.8%)	.378	1 (2.1%)	0 (0.0%)	.547
Periprosthetic Infection	1 (1.1%)	0 (0.0%)	.612	0 (0.0%)	0 (0.0%)	--	0 (0.0%)	0 (0.0%)	--
DVT	0 (0.0%)	0 (0.0%)	--	2 (2.2%)	0 (0.0%)	.385	0 (0.0%)	1 (2.6%)	.447
PE	0 (0.0%)	0 (0.0%)	--	0 (0.0%)	1 (1.8%)	.378	0 (0.0%)	0 (0.0%)	--

SD = standard deviation; freq = frequency; K/HOOS JR = KOOS JR and HOOS JR; BMI = body mass index; GPH = global physical health; GMH = global mental health; SDD = same day discharge; OP = discharge within 24 hours following surgery; * = P-value evaluates "None" vs "One" and ">1"; ER = emergency room; DVT = deep vein thrombosis; PE = pulmonary emboli

Call Reason	Total Hip		Total Knee		Unicompartmental Knee	
	IPC	TC	IPC	TC	IPC	TC
Medical (Unrelated)	13 (40.6%)	16 (22.9%)	3 (10.3%)	6 (21.4%)	0 (0.0%)	5 (13.5%)
Medical (Related)	8 (25.0%)	18 (25.7%)	2 (6.9%)	6 (21.4%)	2 (20.0%)	7 (18.9%)
Medication (Not Refill)	3 (9.4%)	5 (7.1%)	5 (17.2%)	4 (14.3%)	2 (20.0%)	2 (5.4%)
Wound Concern	1 (3.1%)	18 (25.7%)	4 (13.8%)	3 (10.7%)	1 (10.0%)	8 (21.6%)
Wound Care Question	1 (3.1%)	2 (2.9%)	4 (13.8%)	1 (3.6%)	0 (0.0%)	6 (16.2%)
Administrative	6 (18.8%)	8 (11.4%)	10 (34.5%)	7 (25.0%)	5 (50.0%)	6 (16.2%)
Physical Therapy	0 (0.0%)	3 (4.3%)	1 (3.4%)	1 (3.6%)	0 (0.0%)	3 (8.1%)
Total Calls	32	70	29	28	10	37

Discussion

The primary objective of this study was to evaluate the impact on patient safety and clinical operations following elective joint arthroplasty after transitioning from a required preoperative IPC to individual telephone instruction. The most important findings of this study were that 6.3% fewer TC patients sought treatment at the emergency room and there were no significant differences regarding major postoperative complications found between the two groups. Only 1 patient in the THA IPC group suffered a periprosthetic infection ($P=.612$), there were no other infection recorded. Two patients in the TKA IPC group developed a deep vein thrombosis (DVT) compared to none in the TC group ($P=.385$) with only one DVT occurring in the UKA TC group ($P=.447$). Only 1 patient in the TKA TC group suffered a pulmonary embolus ($P=.378$). No other major or significant complications occurred during this period. The current study did not result in any other major complications such as death, stroke, myocardial infarction, significant bleeding issues or other serious systemic complications. However, complications following such routine, standardized procedures performed at the current study site are rare²⁷⁻³⁷ making statistical comparisons difficult. Additionally, length of stay decreased for unilateral patients and was unchanged for bilateral patients. The transition away from preoperative classes unfortunately occurred amid the pandemic; therefore, fears regarding corona virus exposure could have dissuaded patients from seeking additional in person treatment, which may constitute a limitation on the findings of this study. The increased call volume in the TC group, may have led to general medical concerns being adequately addressed by healthcare providers, thereby averting unnecessary emergency room visits. Another reason for increased call volume in the TC group may be due to inadequate preoperative education and preparation leading to more postoperative questions or concerns. Patients receiving IPC education spent significantly greater time discussing perioperative care issues with multiple clinical staff and furthermore, were encouraged to involve a family member who would assist with postoperative care. The additional education and assistance of educated caregivers or

family members may have contributed to overall better preparation and decreased anxiety or misunderstandings following surgery. TC recipients did not have the benefit of involving family members and thus all information had to be understood and retained by the individual patient. Nevertheless, these results demonstrate that removal of the IPC did not result in increased postoperative complications. Based on these results, a 15-30 minute individualized TC to review preoperative instructions and expectations can be used effectively as a substitute for the time consuming (2-4 hour) IPC.

While the TC addressed post-arthroplasty safety procedures, over the course of 6 weeks, the calls increased from 71 (IPC) to 135 (TC), corresponding to an additional 11 (2%) calls per week. While several reasons were noted for the additional call volume, a significant increase from 6 (IPC) to 29 (TC) calls regarding wound concerns was noted following TC implementation. As discussed in the previous paragraph, there are likely several reasons for the increased call volume noted in the TC group, the most significant of which may be the lack of an educated family member or caretaker. The lack of multiple educated family members or caretakers decreases social support and likely increases anxiety and concerns regarding postoperative wound care and expectations, however, this did not result in increased wound complications or infections between groups (**Table 1**). There was also an increase in surgery-related medical questions among the TC group, primarily concerning postoperative symptoms such as pain, nausea and/or constipation. The need for preoperative emphasis and education regarding these common issues is supported by previous research.^{6-8,39,40} The magnitude of information on these subjects, however, is difficult to fully discuss during the TC and likely contributes to the increased questions following surgery. This highlights the need for visual aids^{9,14} or additional instructional media perhaps accessible through electronic patient portals, and/or the inclusion of a family member or caretaker during the call to decrease confusion, misunderstanding or increase retention regarding postoperative instructions and expectations.

The TC changes necessary to preemptively address wound and medical questions, however, will also add further burden to the single PA responsible for carrying out these individual calls. The high surgical volume of the current study site, which averages 15 cases each week, resulted in 7.5 hours spent providing preoperative counseling. Prior to the transition, the 2 hours of group counseling provided by a nurse and physical therapist was followed by approximately 10-15 minutes with a PA to discuss specific concerns. The 4.5 hours of total time saved each week (5 hours saved for PA) could be a significant limitation if implementing a preoperative TC is being considered as standard of care. However, with virtual meeting capabilities increasing, future research should evaluate the feasibility and effectiveness of group TC via a teleconference platform to increase the number of patients per session while allowing questions to be asked anonymously.³⁸

The results of this study should be viewed in light of its limitations. First, the current study site has significant experience (>10 years) delivering multi-disciplinary coordinated patient care related to hip and knee arthroplasty. As such, significant resources such as trained and specialized PAs, preoperative clinical nurses and physical therapists are available to provide IPC or TC instruction. These resources may not be available in all settings, therefore, results may not be generalizable. Additionally, a selection bias, favoring the TC recipients, may be present as pandemic-related fears may have selected out older and unhealthier patients from choosing to undergo surgery during this time. These same fears may have also contributed to the decreased emergency room visits following surgery as patients may have feared in person exposure to medical facilities during the pandemic. Furthermore, while an experienced PA performed all TC consultations and instructions, the discussions with patients were subject to the variability of interactions between different patients and could not be scripted or prerecorded. Therefore, patients may have had slightly different aspects of perioperative care discussed based on the individual questions asked. This may have introduced variability in the actual content of TC discussions between patients that could have introduced inconsistencies. Finally, only 6-week follow up KOOS JR, HOOS JR, GPH and GMH scores were reviewed, therefore, longer term clinical impact cannot be inferred. A strength of this study, however, is that 155 joint arthroplasties could be reviewed within a short period due to the high-volume nature of the current study site; furthermore, follow up for the time period reviewed was complete. This time period is critical, as it covers the resumption of elective surgery during the COVID-19 pandemic. Another important strength of this study is that all patients reviewed here received identical surgical care with a very mature and stable surgical protocol. The only difference in treatment of these 2 groups was the way preoperative education was delivered due to the pandemic. All other surgical variables and/or techniques applied were identical and consistent. Therefore, the current study was able to analyze the clinical impact of a single significant change

to clinical practice forced to occur as a result of a drastically changed clinical environment (pandemic).

Conclusion

A condensed preoperative preparatory TC appears to provide sufficient educational preparation for patients about to undergo elective joint arthroplasty as demonstrated by the low incidence of postoperative complications, readmissions and decreased emergency room visits. However, a significant increase in postoperative clinic call volume was experienced, specifically related to questions regarding the surgical wound or related medical concerns. With greater education focused on the most common concerns identified here during the preoperative preparatory TC, the postoperative increase in call volume could be significantly decreased. This study has demonstrated that the labor-intensive IPC is not necessary to maintain high outpatient discharge rates and low postoperative complications following joint arthroplasty. However, individualized TC education is inefficient, and for practices with high volume and limited resources, individual preoperative TC preparation for joint arthroplasty surgery may not be sustainable and perhaps should be limited for use during unusual circumstances such as pandemic responses.

Conflict of Interest

None of the authors identify a conflict of interest.

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