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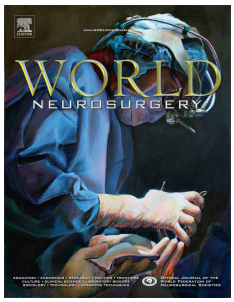

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Risa Reid, BA, Varun Puvanesarajah, MD, Abdurrahman Kandil, MD, Baris Yildirim, MD, Adam L. Shimer, MD, Anuj Singla, MD, Francis H. Shen, MD, Hamid Hassanzadeh, MD

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Factors Associated with Patient-Initiated Telephone Calls After Spine Surgery

Risa Reid BA[1], Varun Puvanesarajah MD[2], Abdurrahman Kandil MD[1], Baris Yildirim MD[1], Adam L. Shimer MD[1], Anuj Singla MD[1], Francis H. Shen MD[1], Hamid Hassanzadeh MD[1]

[1]Department of Orthopaedic Surgery, University of Virginia, Charlottesville, VA
[2]Department of Orthopaedic Surgery, Johns Hopkins Hospital, Baltimore, MD

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Corresponding Author:

Hamid Hassanzadeh, MD
Department of Orthopaedic Surgery
University of Virginia
Box 800159 HSC
Charlottesville, VA 22908
Phone: 434.243.0266
Fax: 434.243.0242
Email: hh4xd@hscmail.mcc.virginia.edu

Abstract

Background: Telephone calls play a significant role in the follow-up care of postoperative patients. However, further data is needed to identify the determinants of patient-initiated telephone calls following surgery as these factors may also highlight potential areas of improvement in patient satisfaction and during the hospital discharge process. Thus, the goal of this study is to determine the number of postoperative patient telephone calls within 14 days following surgery and establish the factors associated with patient-initiated calls as well as reasons for calling.

Methods: A retrospective chart review of all spine surgeries performed at our institution from January 1, 2014 through January 2, 2015 was completed. Patient demographics, perioperative and operative variables, and telephone encounter data were collected. The primary outcome was a patient-initiated telephone call within 14 days after surgery. Secondary outcomes included reporting and analyzing the reasons for patient phone calls, analyzing which procedures were associated with the most telephone calls, and conducting a multivariate analysis to determine independent risk factors for patient calls.

Results: Of the 488 patients who underwent surgical procedures, 222 patients (45.7%) made a telephone call within 14 days after surgery. 61 patients (27.48%) called regarding pain control. 54 patients (23.87%) called with bathing/dressing/wound questions. Other common categories include: other (21.17%), medication problems (15.77%), weight bearing status/activity restrictions (5.14%), fever (3.15%), bowel management (1.35%), work notes (1.35%), and anticoagulation questions (0.45%). Factors associated with a telephone call within 14 days postoperatively included increased BMI (p=0.031), lower number of comorbidities (p=0.043), telephone call within two weeks prior to surgery (p=0.027), American Society of Anesthesiology (ASA) score of 2 (p=0.036), discharge disposition to home (p=0.003), and elective procedure (p=0.006). Multivariate analysis revealed that fusion procedures (OR: 2.16, 95% CI: 1.05 – 4.45, p = 0.037) and ASA score of 3-4 (OR: 0.55, 95% CI: 0.31 – 0.96, p = 0.036) were independently associated with increased and decreased propensity, respectively, towards making a phone call within two weeks.

Conclusions: Postoperative patient-initiated telephone calls within 14 days following spine surgery are very common, occurring after almost half of all procedures. By evaluating such determinants, patient care can be improved by better addressing patient needs during and

prior to discharge to prevent potential unnecessary postoperative calls and improve patient satisfaction.

Level of Evidence: Retrospective chart review, Level IV

Key Words: telephone calls; spinal surgery; patient satisfaction

Key Points:

- Determinants of telephone calls in postoperative patients are a very important yet under-researched area of interest.
- Factors associated with telephone calls following spinal surgery include pain control, bathing/dressing/wound questions, and medication problems.
- Exploring such determinants of postoperative patient-initiated telephone calls may lead to an effective tool for measuring clinical outcomes and patient satisfaction with regards to hospital discharge.

Introduction

The postoperative period is often a time of uncertainty and anxiety for patients. With the recent trend of increasing outpatient procedures and decreasing hospital length of stay, patient education materials are often being developed and provided pre-operatively.[1,2] Patient telephone calls after surgery may place significant burden on clinic personnel.[3] Further, as the healthcare system moves toward outcome-based medicine with greater emphasis on patient satisfaction, the need to improve safety, efficiency, and communication at the time of discharge increases.[4,5]

Patient satisfaction following surgery has recently been identified as an important prognostic indicator of clinical outcomes.[6] Insofar as patient satisfaction has been linked to the success of both doctors and hospitals,[7] it is a commonly used tool for evaluating the quality of healthcare delivered to postoperative patients. Patient satisfaction following orthopaedic procedures, in particular, has emerged as a critical element in establishing quality healthcare as research has shown an association between patient outcomes and patient satisfaction scores.[8,9] Specifically with regards to spinal surgery, patient satisfaction with outcome may be directly correlated to 1-year improvement in pain and disability.[10] Additional studies have addressed the validity of correlating satisfaction with outcome.[11,12] However, discrepancy among means of measuring and quantifying patient satisfaction still exist.

Follow-up telephone calls by healthcare providers have been used as a cost-effective method for managing postoperative patients. Such calls have been tied to an increase in patient satisfaction as well as a reduction in the number of outpatient follow up visits.[13] While studies have explored how post-operative telephone calls from healthcare providers to patients strongly correlate with higher levels of patient satisfaction, there is limited data concerning what factors increase the likelihood of patient telephone calls following orthopaedic spine procedures. In addition, data on patient satisfaction, especially with regards to how it relates to post-operative telephone calls, and factors associated with post-operative telephone calls following spine surgery remains scant.

After discharge, patients rely on information from perioperative counseling and written discharge instructions[14]. Inadequate or unclear information, as well as unanticipated issues, can lead to additional, and often unnecessary, healthcare utilization[15]. Often, a patient's first step is to attempt to contact the physician's office directly via telephone call.

As telephone calls have been reported to play a significant role in the follow-up care of postoperative patients, studies are needed to further explore the determinants of patient-initiated telephone calls following spine surgery. This data may aid in determining which patients were more likely to call following orthopaedic spine procedures and identify potential areas of improvement in the discharge process by examining reasons for patient calls. Thus, the primary aim of this study is to determine the number of postoperative patient telephone calls within 14 days following surgery and establish the factors associated with patient-initiated calls as well as reasons for calling.

Methods

After institutional review board (IRB) approval was obtained, a retrospective chart review of all surgeries performed at our institution by the orthopaedic spine division from January 1, 2014 through January 2, 2015 was completed. For each patient, demographic, operative, and perioperative variables were collected. In addition, all telephone calls documented as a telephone encounter note by nursing staff in our electronic medical records system (Epic, Verona, WI) was collected. For this study, telephone call data included all phone calls to the physicians' clinic office made by patients, including calls made by a third party on their behalf. If calls were made after clinic hours, documentation of patients' messages was recorded by nursing staff and also included in the study. Exclusion criteria included patients who died during the hospitalization and subsequent surgeries in patients with more than one surgical encounter.

The primary outcome was a patient-initiated telephone call within 14 days after surgery. Orthopaedic spine patients are routinely scheduled for a follow up appointment two weeks after surgery. The 14-day interval was thus chosen because a patient call prior to the first clinic appointment indicates a possible deficiency in the hospital discharge process. Secondary outcomes included reporting and analyzing the reasons for patient phone calls, analyzing which procedures were associated with the most telephone calls, and conducting a multivariate analysis to determine independent risk factors for patient calls.

Data analysis was performed using Stata version 11.0 (College Station, TX: StataCorp LP.). Univariate statistical analysis was performed using the two-sample Student t-test for continuous variables, chi-square test for categorical variables, and two-sample Wilcoxon rank-sum for non-parametric variables (i.e. length of stay). We used post-hoc analysis for the categorical variables to determine the significant differences within each

category. A binary logistic regression model was used to determine which variables were predictive of whether or not a patient called after discharge. In our logistic regression model, we controlled for age, length of stay, obesity, number of allergies, number of comorbidities, gender, marital status, employment status, insurance status, worker's compensation status, ASA score, discharge location, and various surgical characteristics. Multivariate outcomes were reported as odds ratios (OR) with 95% confidence intervals. Statistical significance was set at a p value <0.05.

Results

Demographics

A total of 488 patients underwent surgical procedures by one of four orthopaedic spine surgeons during the study period. Patients were on average 55.5±16.2 years old (median: 56 years). Two hundred and seventy-one patients (55.5%) were male. One hundred and twenty-seven patients (26%) were identified as smokers, with a cohort-wide average body-mass-index (BMI) of 31.2±7.7 kg/m^2. ASA was noted to be 1 or 2 in 260 (53.3%) patients. Medicare/Medicaid patients comprised 49.8% of the cohort, while other/private insurance accounted for 40.6% of the cohort.

Surgical procedures were classified as elective in 401 cases (82.2%). Fusion procedures were identified in 323 cases (66.2%), while decompression without fusion accounted for 30.7% of cases. The remaining cases were characterized as biopsies, irrigation and debridement, or other cases. A posterior approach was used in 80.0% of cases, while anterior and combined anterior-posterior approaches were used in 16.3% and 3.7% of cases, respectively. Following surgery, mean length of stay was 5.60±8.68 days.

Phone Call Characteristics

Two hundred and twenty-two patients (45.7%) made a telephone call within 14 days after surgery. The mean number of days between discharge and phone call was 5.40±3.71 days (median: 4, range: 1 to 14 days). 25 percent of phone calls were made within 2 days following discharge and 75 percent were made by day 7 following discharge. For those who called within 14 days of discharge, the mean number of phone calls was 1.51 with a median of 1 call per patient. Thirty-six patients (16.2%) made their first phone call outside of the working hours (9:00 am – 5:00 pm).

Of the two hundred and twenty-two patients who made a telephone call within 14 days after surgery, 61 patients (27.48%) called regarding pain control. 54 patients (23.87%) called with bathing/dressing/wound questions. Other common categories of patient-initiated telephone calls include: other (21.17%), medication problems (15.77%), weight bearing status/activity restrictions (5.14%), fever (3.15%), bowel management (1.35%), work notes (1.35%), and anticoagulation questions (0.45%) [**Figure 1**]. Reasons for phone calls that were incorporated in the category entitled "other" included questions about follow-up, insurance coverage, bone stimulator use, swelling, brace use, numbness, lab/imaging results, chest pain, and a patient fall.

When comparing the cohort of patients who made phone calls with those who did not, significant differences were noted between the two cohorts. Factors associated with a telephone call within 14 days postoperatively included increased BMI (p=0.031), lower number of comorbidities (p=0.043), telephone call within two weeks prior to surgery (p=0.027), American Society of Anesthesiology (ASA) score of 2 (p=0.036), discharge disposition to home (p=0.003), and elective procedure (p=0.006). Patients that were uninsured or had private/other insurance were also more likely to call than those patients that had Medicare/Medicaid. There was no significant association between telephone calls and age, operative time, gender, distance from hospital, number of allergies, smoking status, marital status, type of pain medication at discharge, inpatient vs. outpatient status, surgical approach, site of surgery (cervical vs. thoracolumbar/lumbosacral), worker's compensation status, or type of surgical procedure (fusion vs. decompression) [**Table 1**]**.**

Multivariate logistic regression analysis revealed that fusion procedures (OR: 2.16, 95% CI: 1.05 – 4.45, p = 0.037) and ASA score of 3-4 (OR: 0.55, 95% CI: 0.31 – 0.96, p = 0.036) were independently associated with increased and decreased propensity, respectively, towards making a phone call within two weeks [**Table 2**].

Discussion

Determinants of telephone calls in postoperative patients is a very important yet under-researched area that may ultimately serve as an effective tool for measuring clinical outcomes and patient satisfaction with regards to the discharge process. Our study found that of the 486 patients who underwent spinal surgery, nearly half (45.7%) made a telephone call within 14 days after surgery, with a mean of 5.4 days between discharge and placing a telephone call. The average number of phone calls was 1.5. Per institutional

protocol, patients did not initially receive a follow up call from physician or surrogate and all call data included in the study were calls made by patients or either a surrogate on their behalf. Of the patients who called, the most common identifiable reasons for calling were pain control (28%), bathing/dressing/wound questions (24%), and medication problems (16%). The pain control category included patients who complained of significant pain at time of call on their current pain regimen; whereas, requests for an unchanged refill, allergic reaction to medications, and medications (other than those used for pain) that were deemed ineffective were all considered as medication problems.

The most common patient identifiers associated with telephone calls were high BMI, lesser number of comorbidities, and ASA score of 2. Other common factors that were associated with a telephone call within 14 days postoperatively included whether or not the procedure was elective, if the patient made a telephone call within two weeks prior to surgery, and discharge disposition to home. On multivariate analysis, both lower ASA score and fusion procedures were noted to be significantly associated with increased likelihood of phone calls.

Previous studies have examined determinants of patient phone calls following surgery. Morgan et al found that two-thirds of patients made unprompted contact with a healthcare provider and 80% of contacts involved postoperative pain.[16] This finding is consistent with our study, as we similarly found that pain control was the most common reason for telephone calls within 14 days after surgery. Similarly, Ovesen et al found that pain was one of the main determinants of unscheduled contacts after outpatient tonsillectomy.[17] As pain is an immediate and addressable concern and often times the reason behind seeking medical attention in the first place, our study findings are within reason and consistent with previous literature.

While telephone calls remain an understudied aspect of patient care, clinical practices are well aware of their influence on patient satisfaction and outcomes. To the authors' best knowledge, our study is the first to utilize patient initiated telephone calls as a possible surrogate for patient satisfaction postoperatively. This study design is in contrast to other recent studies,[18,19,20] which have employed survey questionnaires as a means to grade and correlate patient satisfaction. Our study demonstrated that patients who ultimately called within fourteen days were more likely to have underwent an elective procedure, called prior to the procedure, or been discharged home. We believe that these findings are due to the fact that patients falling into these three categories were more likely

in control of their surgical experience from the start and thus were more likely obliged to call if issues arose postoperatively.

Additionally, patient satisfaction has been studied as a component of patient care that is affected by time.[21] Patients are generally more satisfied with their healthcare experience when physicians spend more time with them discussing health-related information.[22] Patients who undergo elective procedures have also been found to have an increased likelihood of having a shorter hospital course[23] and thus, less time interacting with their healthcare providers. With less interaction time comes fewer opportunities for patients to ask questions, and subsequently, patients are more likely to have questions postoperatively after discharge.

Another finding that was noted was that patients who called within fourteen days had an elevated BMI and fewer comorbidities. Several studies have shown obesity to be a risk factor for increased pain.[24,25,26,27] Rohrer et al revealed that, in comparison with patients with normal body mass, patients with BMI greater than 35 had higher odds of experiencing pain scored 7 or over after adjusting for physical limitations, co-morbidity, age, and gender.[28] Oyeyemi also observed a significant difference between the normal weight and overweight group and between normal weight and obese group on pain outcome.[29] It is our thought that since an elevated BMI has been shown to be correlated with increased pain, pain control issues may lead patients with higher BMI to call more frequently than others. While elevated BMI and comorbidities have both been linked to increased postoperative complications, Schoenfeld et al demonstrated that only certain types of medical comorbidities such as cardiac disease, preoperative neurologic abnormalities, prior wound infection, corticosteroid use, and history of sepsis were independent predictors for the development of one or more complications following spine surgery.[30] Although patients with a higher number of comorbidities are more likely to have one of the aforementioned complications, our study did not specifically control for independent comorbidities and thus cannot conclude that our patients with a greater number of listed comorbidities included those that have been specifically linked to postoperative spine complications. Moreover, patients with fewer comorbidities may also have fewer medical concerns to manage and be more inclined to call when a problem specifically arose after spine surgery rather than patients with more comorbidities who are used to juggling the various issues that arise from their medical conditions.

As mandates for adherence to best care practices and patient satisfaction become more ubiquitous,[31] it is increasingly important that we continue to research areas where improvement can be made. Whereas our study did not find any significant association between telephone calls and smoking status, type of pain medication at discharge, and inpatient vs. outpatient surgeries, Sigmundsson et al identified the following as factors that decrease the likelihood for satisfaction: previous spine surgery, smoking, unemployment, back pain exceeding 1 year, and back pain predominance. Fusion surgery did not predict satisfaction.[32]

On multivariate analysis, our study demonstrated that fusion over decompression surgeries were associated with a greater likelihood of making a telephone call 14 days after surgery. As fusion spinal surgeries are more invasive procedures than spinal decompression surgeries and pain control was the most common reason for making a telephone call, patients who underwent fusion spine surgery may have experienced more pain following surgery and thus were more likely to call secondary to increased pain control issues. This conjecture is further supported by a study by Pourtaheri et al that noted that fusion procedures had increased post-operative paraspinal muscle atrophy,[33] which has been correlated with worse clinical outcomes after lumbar spine surgery.[34] Unfortunately, the exact reason for higher phone calls among fusion spine surgery patients was unable to be specifically discerned from our data and further analysis is warranted.

Additionally, lower ASA score on multivariate analysis was also associated with increased incidence of telephone calls 14 days after surgery. ASA classification has been used frequently as a predictor of postoperative outcomes.[35,36,37] Although higher scores have been shown to be associated with increased risk of surgical complications,[38] Whiting et al demonstrated that patients with ASA score > 2 were significantly less likely to follow-up.[39] Thus, patients with lower ASA scores may be more likely to follow-up postoperatively and make a telephone call within 14 days after surgery.

The study has several advantages in that it uniquely examines patient-initiated telephone calls postoperatively as a metric for patient satisfaction as compared to follow-up patient surveys. Telephone calls are becoming increasing valuable tools for grading effective patient-doctor communication and patient satisfaction, and the present study highlights factors that influence patients making a telephone call and reasons behind such calls.

Our study also has some limitations that must be considered. One limitation was the relatively small number of patients in our study, which may limit generalizability. Our study did not include patients who may have used our institution's new electronic portal as a means to address their postoperative concerns. In addition, some telephone calls may have been placed and answered by clinic staff, but not documented in our electronic medical record platform. Thus, our study may not have captured all reasons for patient-initiated contact with their healthcare provider after surgery in its entirety. Although patient satisfaction is widely seen as a good indicator of success after spinal surgery, Missios et al, demonstrated that undergoing elective spine surgery in hospitals with a higher percentage of patient-assigned high satisfaction scores was not associated with a decreased rate of discharge to rehabilitation, mortality, or hospitalization charges, though study authors did note an association with decreased length of stay.[40] Therefore, further research is needed to determine the exact value of patient satisfaction metrics, particularly patient-initiated phone calls, and how they can be used to ascertain specific patient outcomes following discharge.

Conclusion

Postoperative patient-initiated telephone calls within 14 days following spine surgery are very common, occurring after almost half of all procedures. Such calls are most frequently associated with pain control, bathing/dressing/wound questions, and medication problems. Lower ASA scores and fusion procedures were independently associated with increased likelihood of a patient making a telephone call. By evaluating such determinants, patient care can be improved by better addressing patient needs during and prior to discharge to prevent potential unnecessary postoperative calls and improve patient satisfaction.

Figure Captions

Figure 1: Why do patients call? Graph showing the relative distribution of reasons for telephone calls within fourteen days after surgery. "Other" category includes questions concerning follow-up, insurance, bone stimulator use, swelling, brace use, numbness, lab/imaging results, chest pain, and a patient fall.

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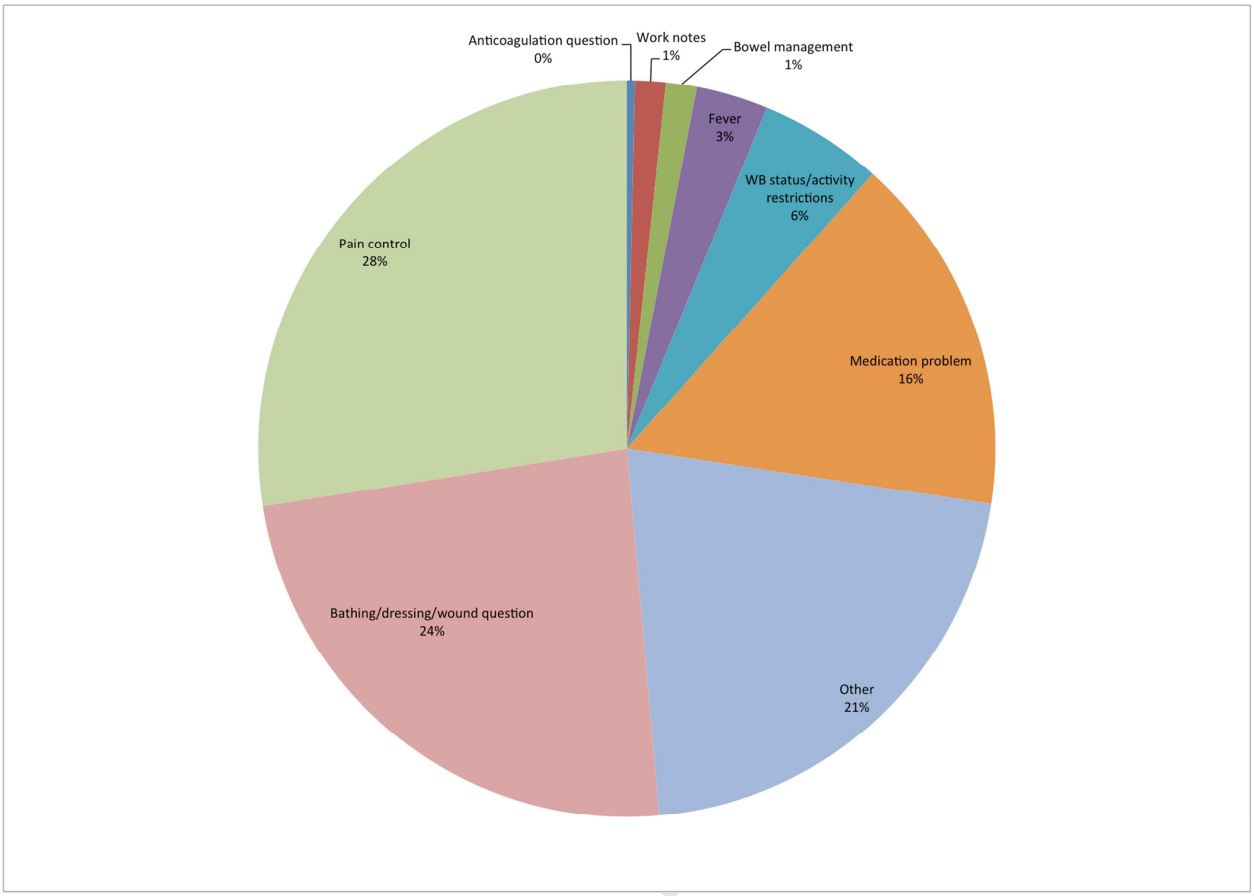
Variable	Phone call placed within 14 days	No phone call placed within 14 days	P-value
Age (Mean±SD)	54.0 ±15.0	56.4 ± 16.8	0.112
Operative time in minutes (Mean±SD)	281 ± 108	275 ± 107	0.577
Body Mass Index (BMI) (Mean±SD)	**32.1 ± 8.2**	**30.5 ±7.2**	**0.031**
Distance from hospital in miles (Mean±SD)	70.2 ±62.7	69.0 ± 72.0	0.848
Number of allergies (Mean±SD)	1.9 ± 2.7	1.7 ±1.9	0.275
Number of comorbidities (Mean±SD)	**9.6 ± 7.2**	**11.0 ±8.2**	**0.043**
Gender	Female = 45.5%	Female = 43.9%	0.731
Smoking status	Yes = 29.7%	Yes = 23.1%	0.091
Marital status	Single = 21% Married = 56% Other = 23%	Single = 21% Married = 51% Other = 28%	0.312
Telephone call within 2 weeks prior to surgery	**Yes = 24.3%**	**Yes = 16.3%**	**0.027**
Type of pain medication at discharge	Dilaudid = 13.3% Norco = 5.3% Percocet/Roxicodone = 62.5% Other = 3.0%	Dilaudid = 17.1% Norco = 7.2% Percocet/Roxicodone = 86.0% Other = 8.6%	0.387
American Society of Anesthesiologists (ASA) Score	1 = 5.4% **2 = 55.0%** 3 = 37.8% 4 = 1.8%	1 = 3.0% **2 = 44.7%** 3 = 49.2% 4 = 3.0%	**0.036**
Inpatient (IP) vs. Outpatient (OP) status	IP = 80.2% OP = 19.8%	IP = 82.2% OP = 17.8%	0.570
Discharge disposition	**Home = 81.0%** Facility/Rehab = 19.0%	**Home = 68.9%** Facility/Rehab = 31.1%	**0.003**
Elective?	**Yes = 87.8**	**Yes = 78.3%**	**0.006**
Insurance	**Uninsured = 12.6%** **Medicare/caid = 44.6%** **Private/Other= 42.7%**	Uninsured = 7.2% Medicare/caid = 53.8% Private/Other= 39.0%	**0.047**
Worker's Comp	Yes = 2.8%	Yes = 2.3%	0.746
Fusion/Decompression	Fusion = 70.4 Decompression = 29.6	Fusion = 66.3 Decompression = 33.7	0.337
Approach	Anterior=15.4 Posterior=81.4 Both=3.2	Anterior=16.7 Posterior=79.1 Both=4.2	0.759
Location	Cervical: 24.9 TLS: 75.1	Cervical: 30.0 TLS: 70.0	0.207
Length of Stay (Mean±SD)	**4.1 ± 4.6**	**6.8 ± 10.8**	**0.030**

Table 1. What types of patients call? Significant values are bolded.

Variable	Odds Ratio	95% CI	P-value
Age ≥ 60 years	0.60	0.34 - 1.08	0.614
Male gender	1.16	0.70 – 1.91	0.577
Obesity (BMI ≥ 30 kg/m^2)	1.42	0.85 – 2.38	0.180
≥ 9 Comorbidities	1.24	0.72 – 2.14	0.446
> 1 Allergy	0.83	0.49 – 1.40	0.492
ASA 3-4	**0.55**	**0.31 – 0.96**	**0.036**
Marital Status			
Single	(ref)	(ref)	(ref)
Married	0.90	0.42 – 1.90	0.778
Other	0.63	0.28 – 1.42	0.264
Insurance			
Uninsured	(ref)	(ref)	(ref)
Medicare/Medicaid	0.83	0.30 – 2.36	0.732
Private/Other	0.54	0.19 – 1.52	0.242
Worker's Compensation	2.51	0.50 – 12.57	0.264
Length of Stay ≥ 3 days	0.83	0.41 – 1.69	0.614
Non-Elective Surgery	0.49	0.20 – 1.32	0.166
Fusion (vs Decompression Alone)	**2.16**	**1.05 – 4.45**	**0.037**
Approach			
Anterior	(ref)	(ref)	(ref)
Posterior	1.35	0.61 – 2.98	0.461
Combined (Anterior-Posterior)	1.38	0.31 – 6.09	0.674
Discharge Other than Home	0.83	0.42 – 1.64	0.590
Call Before Surgery	1.70	0.92 – 3.16	0.093

Table 2. Multivariate analysis of determinants of patient-initiated phone calls within two weeks. Significant values are bolded.



Highlights:

- Determinants of telephone calls in postoperative patients are a very important yet under-researched area of interest.
- Factors associated with telephone calls following spinal surgery include pain control, bathing/dressing/wound questions, and medication problems.
- Exploring such determinants of postoperative patient-initiated telephone calls may lead to an effective tool for measuring clinical outcomes and patient satisfaction with regards to hospital discharge.

Abbreviations List:

ASA: American Society of Anesthesiology

BMI: Body Mass Index

CI: Confidence Interval

IRB: Institutional Review Board

OR: Odds Ratio