

“Can You Hear Me Now?”: Postoperative Patient-Initiated Communication With Providers

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In the days and weeks after a hospitalization, patients face a multitude of health risks in addition to their primary condition.¹ Patients experience significantly increased risks of infection, complications, and readmission after surgery. They are often unprepared to manage these risks due to breakdowns in communication with their provider.² Nearly half of hospitalized patients experience at least 1 medical error after discharge, and communication lapses between patients and providers contribute to the majority of these errors.^{2,3}

Communication needs increase after acute care hospitalizations or surgery, and this period is a key window to improve patient outcomes, decrease complications, and prevent readmission.⁴ With the increased use and accessibility of communication technologies such as email, secure messaging, and text messaging, patients have more ways than ever to contact their health care providers after discharge. Despite the critical importance of patient-provider communication (PPC) to patient safety, little is known about the nature of PPC during the postoperative period.

The hospital medicine literature has delved into the quality of PPC prior to discharge and its impact on medication adherence, adverse events, hospital resource utilization, and transfer of care to primary care physicians.³ Physicians overestimate the proportion of patients who understand discharge instructions by 27% to 32%.⁵ Among patients admitted to a general medical service, 20% to 50% are nonadherent to 1 or more medications in the postdischarge period.^{6,7} The surgery literature has examined the ability of surgeons to educate their patients, discuss treatment options, and engage their patients in shared decision-making during the preoperative period.⁴ Surgeons discuss the nature of treatment options in the majority of visits, but they deliberately gauge the patient's understanding of their options in less than 5% of visits.⁴ Although there has been extensive analysis of PPC in the preoperative period, little remains known about the mechanisms, timing, and content of patient-initiated communication in the postoperative period.

Patients have several potential ways to initiate contact with their providers in the postoperative period. As electronic communication

ABSTRACT

OBJECTIVES: Surgical patients often leave the hospital with many questions and concerns after their surgery and will contact their providers to get answers. The growth of patient-provider communication (PPC) technologies allows for many new opportunities to study postoperative patient-initiated communication. We aimed to characterize a growing body of literature on postoperative patient-initiated communication.

STUDY DESIGN: Review.

METHODS: A scoping review methodology was used to identify 17 studies analyzing patient-initiated communication in the postoperative period and to characterize key results and areas of investigation in the literature. Patient-initiated communication in the postoperative period was defined as any communication initiated by the patient after discharge.

RESULTS: The majority of studies were published between 2014 and 2018 (82.4%). Telephone calls were the most common type of medium investigated (11 studies; 64.7%), followed by secure messaging (2 studies; 11.8%). Patients most commonly initiated contact regarding study results, medications, and wounds. Common areas of investigation included communication timing and sociodemographic associations.

CONCLUSIONS: As health systems adopt new technologies for PPC, understanding how and why patients initiate contact with providers postoperatively can inform efforts to strengthen PPC broadly. Moreover, research on sociodemographic variation in communication patterns after surgery can help address communication gaps that patient groups may experience. Future research can build upon this work to improve patient outcomes and increase clinic efficiency.

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TAKEAWAY POINTS

Patient-provider communication after surgery is critical for patient safety. The growth of patient-provider communication technologies has created opportunities to study postoperative patient-initiated communication.

- ▶ This review identified 17 studies on postoperative patient-initiated communication.
- ▶ Studies analyzed phone, secure portal message, and text message communications.
- ▶ Phone communications were the most common type of medium investigated.
- ▶ Patients most commonly initiated contact regarding study results, medications, and wounds.
- ▶ Research will help create interventions accounting for different communication needs.

platforms expand, patients are increasingly using email, text messaging, and secure messaging for postoperative recovery concerns, symptom management, and health engagement.⁸⁻¹⁰ However, little is known about why patients contact their providers, what patient characteristics are associated with contact, when contact is made, and how that contact is managed by the clinical team. A deeper understanding of this postoperative communication between patients and their surgical team can inform the design of communication platforms and follow-up interventions.

As platforms for PPC evolve, awareness of how, why, and when patients initiate communication with their surgical team in the postoperative period will help improve PPC. We aim to characterize the body of surgical literature examining patient-initiated contact with surgical teams in the postoperative period and identify key results and themes upon which to build future investigations. We describe the communication technologies used by patients and providers, the reasons patients initiate contact in the postoperative period, temporal communication trends, sociodemographics of patients included in these studies, and future areas of investigation.

METHODS

A scoping study methodology was chosen for this collective review, as this methodology is ideal for mapping key results, concepts, and themes within an area of literature that has not been previously reviewed. Additionally, this methodology has potential to identify numerous areas of future research into patient-initiated communication. We utilized Arksey and O'Malley's framework for scoping studies with modifications from Daudt¹¹ by (1) defining the area of investigation; (2) identifying relevant studies; (3) selecting studies, with the establishment of inclusion/exclusion criteria; (4) collating data according to key issues and themes; and (5) summarizing results as a descriptive and numerical summary of the data and a thematic analysis.^{11,12}

Definitions of Terms

We define patient-initiated communication with surgical teams in the postoperative period as any communication (eg, phone call, text message, photograph, email) that is initiated by the patient after they leave the hospital and that is not initiated or immediately

planned or prompted by the surgical providers themselves or as part of a prespecified intervention. Although the postoperative period is usually limited to 30 days from surgery, we did not apply this constraint to make our search more inclusive. Patient-initiated communication includes communication that the patient initiates after being instructed by their provider to make contact for a certain reason (ie, because they were experiencing a specific complication) but excludes scheduled contact (ie, a check-in phone call a patient makes to a

clinic because they were scheduled to do so).

Inclusion Criteria

Using this definition of patient-initiated communication, we aimed to include all studies characterizing this communication with surgeons and surgical teams in the postoperative period, regardless of the date of publication (Figure 1). To identify these studies, we defined the following inclusion criteria: (1) includes surgical patients and providers; (2) examines communication in the postoperative period; (3) examines patient-initiated communication; (4) has an experimental, observational, randomized, or nonrandomized study design; (5) is published in a peer-reviewed scientific journal; and (6) is written in English or translated into English.

Search Strategy

We performed a search of the National Library of Medicine PubMed database, Web of Science, and Google Scholar using key terms to identify studies meeting the inclusion criteria above. The Medical Subject Heading terms and keywords we used for searches included those pertaining to patient-initiated communication, postoperative, phone, patient or web portal, secure messaging, text messaging, short message service, surgery, surgical procedures, or perioperative care. We did not have a date of publication restriction. Screening for exclusion or inclusion was done by examining the title and/or abstract. The papers were independently reviewed by 2 authors (A.S.B. and A.Y.O.), and compliance with criteria was determined. Discrepancies regarding study inclusion were discussed by 2 authors until consensus was reached.

RESULTS

Using the search methodology detailed above, we identified 1224 publications (Figure 1). We eliminated 1129 records after reviewing the title and/or abstract because they were deemed not relevant. We reviewed the full text of 95 publications. Seventy-eight records were eliminated because they did not focus on communication in the postoperative period, they did not include analysis of patient-initiated contact, or they lacked reported outcomes and quantifiable data. This resulted in the inclusion of 17 papers published between 2008 and 2018.

Mediums of Communication

The majority of studies analyzed patient-initiated phone calls to providers (Table 1¹³⁻²⁹ and Figure 2).¹³⁻²⁵ Four studies analyzed patient-initiated secure messages,²⁴⁻²⁷ 1 study investigated patient-initiated text messages to providers,²⁸ and 1 reported on digital images sent to providers.²⁹ Two studies analyzed more than 1 medium of patient-initiated communication.^{24,25} Four studies analyzed PPC across numerous surgical specialties.^{15,26,27,29} The studies in this review include patients from a wide range of surgical fields, including urology, neurosurgery, orthopedic surgery, otolaryngology, and breast surgery.

Reasons for Patient-Initiated Communication

There were several common patient concern categories across the studies and specialties (Table 2¹³⁻²⁹ and Figure 3). Insufficient pain control was the reason for 7.0% to 45.5% of postoperative communications and was the most common reason in 5 studies.^{13,14,20,24,25} Questions regarding discharge medications, including pain medications, accounted for 13.6% to 41.0% of concerns and were the primary reason for the patient-initiated communication in 1 study.¹⁶ Eight studies documented wound-related concerns, in which 12.0% to 82.3% of the patients expressed various concerns regarding wounds, such as drainage, proper bandaging, and concern for wound infection.^{13,14,16-18,23,24,28}

Reasons for patient-initiated communication also differed by specialty. Sayin and Kanan reported that 34.4% of patients undergoing breast cancer surgery asked for clarification about arm and shoulder exercises that they were instructed to do after surgery.¹⁷ In the study by Ramaseshan et al of female pelvic reconstructive surgery patients, concerns regarding urinary catheter management and urinary tract infection accounted for the largest proportion of patient-initiated calls (28.7%).²²

Temporality of Communications

Seven studies sought to characterize the timing of patient-initiated communications in the postoperative period. A study of spine surgery patients found that 45.7% of patients initiated a call within 14 days of surgery,¹³ and a study of orthopedic trauma patients found that 29.1% of patients initiated a call within 14 days of surgery.¹⁴ In a study of a safety net hospital advice line that receives more than 100,000 calls per year, medical and surgical patients initiated calls

a median of 3 days following discharge, and 31% of calls were made within 24 hours and 47% within 48 hours of discharge.¹⁵ Similarly, the majority of calls made postoperatively to a resident-managed otolaryngology phone line were made between the day of surgery and the third day after surgery.¹⁹

Sociodemographic Characteristics

Many studies reported differential communication with providers in the postoperative period based on demographic characteristics such as gender, race, primary language, and age.

Gender. In a study of secure messaging within a patient portal at a large medical center, Shenson et al reported that women and men account for nearly equal proportions of outpatient clinic visits

FIGURE 1. Paper Selection Process

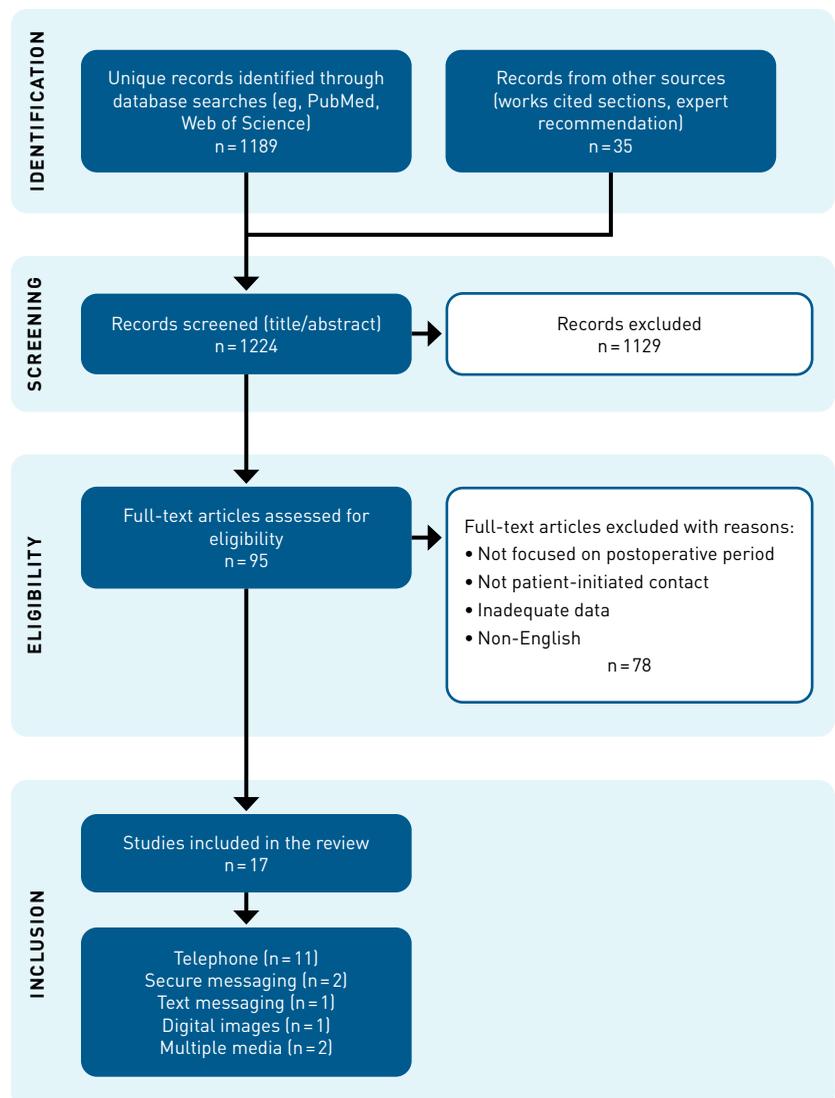


TABLE 1. Overview of the Design and Key Findings of Studies Included in This Scoping Review¹³⁻²⁹

Study	Field	Study design	Sample size	Medium	Key findings
Schimpf et al (2008) ²¹	Uro-gynecology	<ul style="list-style-type: none"> Retrospective review of clinic phone calls over 1-year period Analysis of call volume by day of week and month of year 	6868 calls	Phone	The highest mean number of calls were made on Mondays, followed by Fridays. Medication questions were the most common reason for patient calls.
Sayin and Kanan (2010) ¹⁷	Breast surgery	Prospective study on reasons that mastectomy patients at single center call follow-up clinic	174 patients	Phone	Main reasons for initiating calls were wound problems and difficulties with postoperative arm exercises.
Cooper et al (2011) ²⁸	Primary care	Prospective study of patients undergoing vasectomy who were given option to text physician if they had postoperative problems	50 patients	Text message	Concern for infection, pain, and bleeding were the most common reasons for patient-initiated text messages.
Stella et al (2014) ¹⁵	Multiple medical and surgical specialties	Prospective cohort study of caller characteristics, call timing, and reason for call	308 patients	Phone	63% of calls came from surgery patients despite surgery patients accounting for 38% of discharges. Most common issues were pain control, medication questions, and wound care. 30-day readmission higher in patients calling the advice line.
Shenson et al (2016) ²⁶	Multiple surgical specialties	<ul style="list-style-type: none"> Retrospective review of surgical clinic visits and patient-initiated secure message threads Calculated proportion of messages by specialty 	83,912 messages	Portal secure messaging	200% monthly growth in secure messaging over 3-year study period. Orthopedics, ear/nose/throat, and urology received the most messages.
Brekke et al (2016) ¹⁸	Endocrine surgery	Qualitative prospective analysis of pre- and postoperative patient-initiated phone calls and readmissions	183 patients	Phone	38% of thyroidectomy patients contacted office before surgery and 54% within 30 days after surgery. Nurses prevented unnecessary readmission in 4% of patients and appropriately escalated care in 9%.
Miller et al (2016) ²⁹	Multiple pediatric surgical specialties	Cross-sectional study at large pediatric hospital describing use of patient-generated images by clinicians for assessment of postoperative wounds	166 patients	Digital images	Of 166 digital images sent to clinicians, 121 (73%) were stored in the medical record. Urology and plastic surgery documented the highest proportion of images in the medical record. 79% of digital image encounters did not require change in clinical management, but 7% did result in an appointment with surgeon.
Morgan et al (2016) ²⁵	Urologic surgery	<ul style="list-style-type: none"> Retrospective review of electronic medical record, which included consecutive patients undergoing ureteroscopy procedures during a 15-month period Univariate and multivariate analysis of factors predictive of postoperative contact 	298 patients	Phone and secure messaging	Two-thirds of patients made patient-initiated contact with providers postoperatively. 80% of contacts involved postoperative pain. On multivariate analysis, younger age and larger ureteral access sheath were predictive of postoperative contact.
Krishnan et al (2016) ²³	Urologic surgery	<ul style="list-style-type: none"> Retrospective review of patient-initiated communication after discharge Used logistic regression and Cox proportional hazards analysis to compare readmitted and nonreadmitted patients 	440 patients	Phone	23% of patients readmitted within 30 days of discharge. Longer time to first communication was associated with lower odds of readmission. Patients with concerns relating to infection or failure to thrive were more likely to be readmitted than patients with noninfectious or urinary concerns.
Reid et al (2017) ¹³	Spine surgery	Retrospective review of factors associated with patient-initiated communication	488 patients	Phone	45.7% of patients made call to clinic within 14 days of surgery, mostly regarding pain medications and wound care.
Hadeed et al (2017) ¹⁴	Orthopedic trauma surgery	Retrospective review of factors associated with patient-initiated communication	684 patients	Phone	29% of patients made call to clinic within 14 days of discharge, mostly regarding pain control and wound care.

(continued)

TABLE 1. (Continued) Overview of the Design and Key Findings of Studies Included in This Scoping Review¹³⁻²⁹

Study	Field	Study design	Sample size	Medium	Key findings
Lehmann et al (2017) ¹⁹	Otolaryngology	Retrospective review of after-hours patient-initiated calls in pediatric hospital to assess caller demographics, clinic concerns, management	500 calls	Phone	<ul style="list-style-type: none"> • Mean of 3.7 calls per shift • Majority (64.2%) were postoperative • 52.3% of postoperative calls within 3 days of surgery • 19.9% of calls for surgical site bleeding
Robinson et al (2017) ²⁷	Multiple surgical fields	Retrospective review of patient-initiated message threads for type and complexity of communication	500 messages	Portal secure messaging	<ul style="list-style-type: none"> • 2.6 issues per thread; 67.8% of threads contained medical decision-making • Complexity was straightforward in 62%, low in 30%, moderate in 8%.
Hällfors et al (2017) ¹⁶	Orthopedic surgery	<ul style="list-style-type: none"> • Characterized nature of patient-initiated calls to a consultation phone service for patients undergoing total joint arthroplasty • Observed patient course for 2 weeks following initial call 	288 phone calls	Phone	Most calls were related to medications, wound complications, and mobilization. Most issues resolved over the phone, but 13% of calls required further evaluation in ED. Failed to detect need for further care in 0.7% of calls.
Du et al (2018) ²⁰	Urologic surgery	Retrospective review of medical record and phone surveys to analyze postoperative UCEs (patient-initiated phone calls, ED visits, and readmissions) with multivariable models of predictors of UCEs	157 patients	Phone	Phone calls were the most common encounter, and pain was the most common complaint. First-time stone procedure, stent placement, and stent removal at home were predictive of UCEs.
Ramaseshan et al (2018) ²²	Female pelvic medicine and reconstructive surgery	Retrospective review using electronic medical record to analyze patient-initiated calls to clinic during 6-month period	302 patients	Phone	<ul style="list-style-type: none"> • Significantly greater number of phone calls from patients discharged home with catheters, patients within home nursing, patients undergoing posterior colporrhaphy, and patients undergoing retropubic urethropexy • Further evaluation was needed for 37% of callers, and 1.7% of callers were readmitted.
Arpey et al (2018) ²⁴	Urologic surgery	UCEs (patient-initiated phone calls, emails, portal messages, clinic visits, ED visits, and readmissions) investigated over 3-month period to determine predictors of UCE in uni- and multivariate models	488 patients	Phone, email, and secure messaging	40% of adult and pediatric urology patients experienced an UCE, with phone calls being the most common method. Among adults, there were associations between UCEs and lower body mass index, proximity to hospital, and discharge with urinary catheter or wound care. Among children, there were associations between UCEs and surgery on urethra/ureter and discharge with a urinary catheter.

ED, emergency department; UCE, unplanned clinical encounter.

with surgeons (50.2% vs 49.8%, respectively), yet women account for a significantly greater proportion of patient-initiated messages (58.7% vs 41.3%; $P < .001$).²⁶ However, gender was not found to be a significant predictor of patient-initiated communications in 5 separate studies of spine surgery patients,¹³ orthopedic trauma patients,¹⁴ ureteroscopy patients with kidney stones,^{20,25} and postoperative adult and pediatric urology patients at a single center.²⁴

Race/ethnicity and language. Four publications reported associations by race and ethnicity. Three studies, 2 of which included racially and ethnically diverse populations, found no significant associations between race/ethnicity and patient-initiated calls following discharge.^{15,20,24} However, a significantly smaller proportion of all Spanish-speaking patients initiated calls compared with

English-speaking patients at a large safety net hospital (0.8% vs 1.9%, respectively; $P < .001$).¹⁵ In a study of a large academic center's secure messaging program, 71.5% of outpatient visits were with White patients, but 86.4% of the message threads were initiated by White patients ($P < .001$).²⁶ African American, Latino, and Asian American patients at this center initiated significantly fewer message threads relative to their clinic visit volume ($P < .001$).

Age. Age played a significant role in patient-initiated communication with providers in several studies. Stella and colleagues found that patients calling the postdischarge phone advice line were significantly older than those who did not initiate contact.¹⁵ Patients initiating messages with providers via a patient portal at a large academic center were also significantly older than the

FIGURE 2. Included Studies of Patient-Initiated Communication in the Postoperative Period by Publication Date and Medium of Communication Investigated

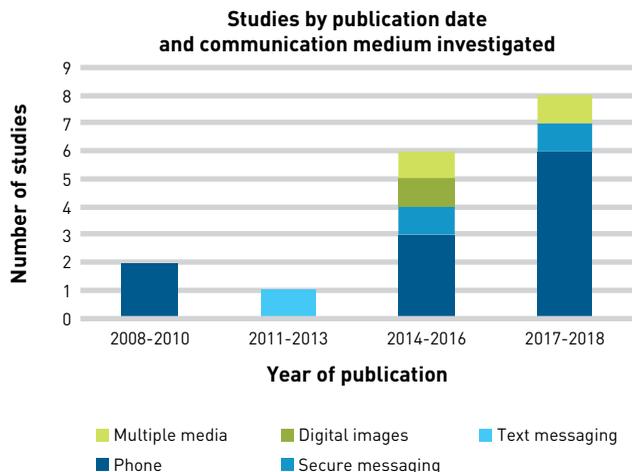


TABLE 2. Common Concerns Reported in Patient-Initiated Postoperative Communications to Surgeons¹³⁻²⁹

Concern category	Percent of complaints (%)	References
Activity restrictions and mobilization	4.9-34.4	13,14,16,17,22
Appointment scheduling	4.3-42.4	14,16,18,24,27
Bleeding	6.4-21.4	19,22,29
Fever	1.6-16.5	13,19,20,24,25
Gastrointestinal symptoms ^a	4.0-22.3	18,22-25
General medication concerns	13.6-41.0	13,15-18,22,25,27
Hematuria	2.3-10.8	20,24,25
Lower urinary tract symptoms ^b	4.5-12.2	20,22,24,25
Pathology and/or laboratory results	5.0-43.6	16-18,27
Problem with drainage tubes, stents, and/or catheters	9.1-18.8	17,20,22,24
Severe and/or uncontrolled pain	7.0-45.5	13,14,17,18,20,22,24,25,28
Suspected infection	4.3-35.7	23,24,28
Wound site problems or questions ^c	12.0-82.3	13,14,16-18,23,24,28

^aIncludes nausea, vomiting, constipation, diarrhea, and/or dysphagia.

^bIncludes urinary retention, urinary incontinence, and other voiding issues.

^cIncludes wound concerns regarding discharge, swelling, stiffness, redness, dehiscence, and/or reaction to sutures.

general outpatient population with access to the message system.²⁶ However, these were descriptive analyses and therefore not adjusted for patient complexity. By contrast, younger age was a significant predictor of patient-initiated communication among ureteroscopy patients in a multivariable model adjusted for patient complexity.²⁵

Insurance status. Because standards and expectations of PPC may differ based on insurance status, several studies investigated

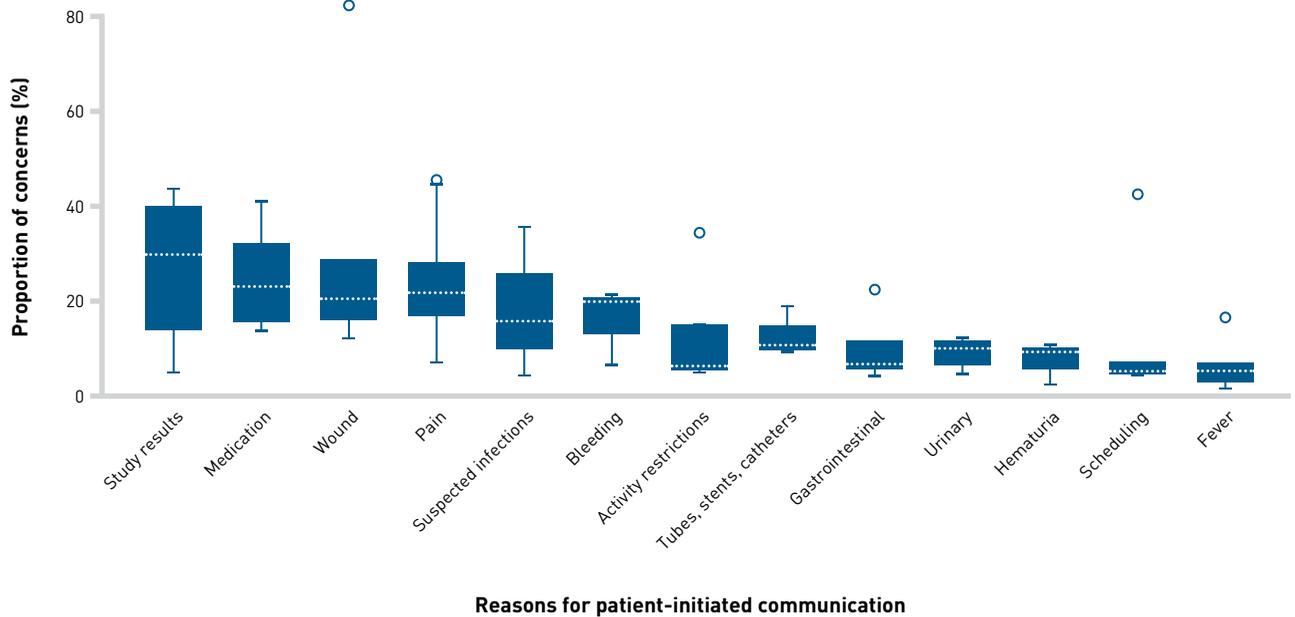
the relationship between insurance status and patient-initiated communication. At a large urban safety net hospital, uninsured patients represented a significantly higher proportion of those initiating phone calls to a high-volume patient advice line compared with those not initiating calls (30.2% vs 18.1%; $P < .001$), whereas Medicaid patients represented a significantly lower proportion of patents initiating calls vs those who did not (34.1% vs 40.9%; $P = .015$).¹⁵ In a study of patients undergoing spine surgery, these same trends persisted, with uninsured patients more likely to initiate calls within 14 days of discharge.¹³

Social support. Patients often rely on their family or community for assistance in the postoperative period. Five studies therefore analyzed whether these relationships and resources were associated with patient-initiated communications. Hadeed and colleagues' investigation of orthopedic trauma patient calls to providers hypothesized that patients with a robust support network would initiate fewer phone calls, as measured by marital and employment status. Being single or widowed was associated with 43% fewer calls than married patients in a multivariate model (odds ratio, 0.57; 95% CI, 0.33-0.93).¹⁴ On univariate analysis, being employed was associated with a 12.1% increase in calls within 14 days of discharge; however, this was not significant in their multivariate model. Arpey and colleagues did not find an association between marital status and patient-initiated communications.²⁴

Unplanned Visits and Readmissions

Because patients face numerous health risks after discharge, 4 studies described associations between patient-initiated communications and escalations in postoperative care. At a large urban safety net hospital, Stella and colleagues found the rates of unscheduled urgent care or emergency department (ED) visits were higher among patients calling an advice line vs the patients who did not call (29.9% vs 6.9%; $P < .0001$).¹⁵ Ramaseshan and colleagues found that 37.0% of callers needed further evaluation in either a clinic or ED following urogynecologic surgery, and 1.7% of callers were readmitted.²² In a study of urology patients, patient-initiated communications led to readmissions in 5.6% of adults and 3.1% of children.²⁴

Three studies also aimed to understand if patients were appropriately advised to seek postoperative care and to characterize reasons for escalating care. In a study of thyroidectomy patients at an academic center, Brekke and colleagues reported that 3.8% of patients calling the clinic postoperatively were appropriately discouraged from going to the ED, whereas 8.7% of callers were appropriately referred to the ED or a scheduled clinic visit for evaluation.¹⁸ Lehmann et al found that otolaryngology residents answering postoperative calls recommended ED evaluation for 17.2% of callers and clinic follow-up to 19.4% of patients.¹⁹ The study by Hallfors et al of patients undergoing total joint arthroplasty found that 13.1% of patients initiating calls to a phone service required further ED evaluation. The phone service did not appropriately recommend the need for further ED evaluation in 2 cases (0.7%).¹⁶

FIGURE 3. Proportions of Common Patient-Reported Concerns From the Included Studies^a

^aDotted white lines represent median. Top and bottom of blue boxes represent upper and lower quartiles, respectively. Top and bottom whiskers represent maximum and minimum values, respectively (excluding outliers). Hollow circles represent outliers (more than 1.5 times of upper quartile).

DISCUSSION

Innovation in the patterns of care delivery to surgical patients has changed the nature of communication between patients and providers in the postoperative period. The growth of PPC technologies and improved documentation of these interactions within electronic health records (EHRs) has created opportunities to study postoperative patient-initiated communication. In this scoping review, we characterized results and common areas of investigation within a growing body of literature on patient-initiated communication in the postoperative period. In this process of analyzing common results within the literature, several key themes for further investigation were revealed.

By investigating why patients contact their providers after surgery and factors that are predictive of unplanned patient-initiated communication, providers can identify areas to improve perioperative PPC; this can improve patient outcomes, clinic efficiency, and patient satisfaction after surgery.^{4,30} This review identified many common concerns across surgical specialties that lead to patient-initiated communications postoperatively. For example, insufficient pain control and medication concerns accounted for a large percentage of communications. By understanding the sources of these postoperative concerns and designing interventions to address them, surgeons can help to inform national efforts to treat postoperative pain more effectively and responsibly in the

midst of an opioid epidemic in the United States.³¹ Several studies also reported significant associations between patient-initiated communication and wound care needs. Research on patient-initiated communications regarding self-management of wounds can help surgeons improve inpatient wound care teaching, educational materials, and supplies that patients are sent home with.

The majority of studies in this growing body of literature analyzed phone calls. Secure messaging is a growing medium of PPC, and it will be important to include these communications in future analyses.³² Looking forward, artificial intelligence (AI) is likely to have wide applications in PPC. For example, the development of universal application programming interfaces, such as Substitutable Medical Applications, Reusable Technologies on Fast Healthcare Interoperability Resources (referred to as “SMART on FHIR”), will allow providers to tailor and automate applications that draw information directly from the EHR for patient use.³³ As the amount of patient-reported information to providers grows, these AI technologies will help to categorize, process, and even act on this information.

Included studies identified a number of socioeconomic variables associated with patient-initiated communication. For example, 2 studies found that uninsured patients were more likely to initiate calls after discharge. It is possible that uninsured patients are less prepared at discharge or have less access to certain medications, supplies, or other resources that aid in healing. Analysis of the

underlying reasons driving demographic and socioeconomic variation in postoperative communication may help to understand disparities in postoperative outcomes and to guide improvements in PPC. Research on the nature and frequency of patient-initiated communication after surgery can help to understand which patients are engaging less often with their health care team and are risk of being lost to follow-up.

This study reveals several challenges in defining outcome variables when studying patient-initiated communications in the postoperative period. We excluded studies that instructed patients to contact providers at a scheduled time. However, we included studies that instructed patients to contact providers if they experienced a concerning symptom. This definition makes it challenging to distinguish what is a planned vs unplanned or an avoidable vs unavoidable communication. For example, patients with pain who then contact their provider because of an agreed-upon strategy for pain management may represent a different population from patients who call but did not have specific instruction to establish contact. This distinction becomes important when trying to parse unavoidable communications that arise from planned PPC strategies from avoidable patient-initiated communications that may result from poor communication prior to discharge. Making these distinctions will be important in order to standardize and more substantively compare the results of studies.

To our knowledge, this study is the first review of a growing body of literature on patient-initiated communication with providers in the postoperative period. There have been reviews of the literature on patient-surgeon communication and the use of telemedicine for postdischarge surgical care.^{4,34} However, investigations of patient-initiated communications offer distinctly different insights into crucial postoperative concerns and potential communication gaps. Therefore, we did not include studies that included provider-initiated communications or other planned encounters. Scoping review methodologies carry the risk of not capturing all of the relevant publications. We did not limit our search by the date of publication, but it is possible that several new articles emerged between the time of writing and the time of publication because our findings suggest that research on patient-initiated communication is a rapidly evolving area of literature. This study is also limited because the included studies had variable methodologies for analyzing patient-initiated communication and patient populations, challenging our ability to make comparisons across studies. However, as a scoping review, the primary aim of this study is not to analyze key findings across studies, but to identify salient features of existing research and to suggest future areas of investigation.

CONCLUSIONS

Research on patient-initiated communication after surgery has grown in recent years. Understanding postoperative patient-initiated communication will help to improve new media of communication and AI technologies that are redefining how

patients and providers communicate. Important demographic and socioeconomic variation has been identified in this early research, which can inform the creation of more equitable communication strategies that accommodate the diversity of patient communication preferences and needs. How providers prepare for and respond to patient-initiated communications will be an important area of continued investigation. ■

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REFERENCES

- Krumholz HM. Post-hospital syndrome—an acquired, transient condition of generalized risk. *N Engl J Med*. 2013;368(2):100-102. doi:10.1056/NEJMp1212324
- Kripalani S, Jackson AT, Schnipper JL, Coleman EA. Promoting effective transitions of care at hospital discharge: a review of key issues for hospitalists. *J Hosp Med*. 2007;2(5):314-323. doi:10.1002/jhm.228
- Forster AJ, Murff HJ, Peterson JF, Gandhi TK, Bates DW. The incidence and severity of adverse events affecting patients after discharge from the hospital. *Ann Intern Med*. 2003;138(3):161-167. doi:10.7326/0003-4819-138-3-200302040-00007
- Levinson W, Hudak P, Tricco AC. A systematic review of surgeon-patient communication: strengths and opportunities for improvement. *Patient Educ Couns*. 2013;93(1):3-17. doi:10.1016/j.pec.2013.03.023
- Calkins DR, Davis RB, Reiley P, et al. Patient-physician communication at hospital discharge and patients' understanding of the postdischarge treatment plan. *Arch Intern Med*. 1997;157(9):1026-1030. doi:10.1016/s0736-4679(97)90248-1
- DiMatteo MR. Variations in patients' adherence to medical recommendations: a quantitative review of 50 years of research. *Med Care*. 2004;42(3):200-209. doi:10.1097/01.mlr.0000114908.90348.f9
- Osterberg L, Blaschke T. Adherence to medication. *N Engl J Med*. 2005;353(5):487-497. doi:10.1056/NEJMr050100
- Lu K, Marino NE, Russell D, et al. Use of short message service and smartphone applications in the management of surgical patients: a systematic review. *Telemed J E Health*. 2017;24(6):406-414. doi:10.1089/tmj.2017.0123
- Cronin RM, Davis SE, Shenson JA, Chen O, Rosenbloom ST, Jackson GP. Growth of secure messaging through a patient portal as a form of outpatient interaction across clinical specialties. *Appl Clin Inform*. 2015;6(2):288-304. doi:10.4338/ACI-2014-12-RA-0117
- Gordon CR, Rezzadeh KS, Li A, et al. Digital mobile technology facilitates HIPAA-sensitive perioperative messaging, improves physician-patient communication, and streamlines patient care. *Patient Saf Surg*. 2015;9(1):1-7. doi:10.1186/s13037-015-0070-9
- Daudt HML, van Mossel C, Scott SJ. Enhancing the scoping study methodology: a large, inter-professional team's experience with Arksey and O'Malley's framework. *BMC Med Res Methodol*. 2013;13:48. doi:10.1186/1471-2288-13-48
- Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol*. 2005;8(1):19-32. doi:10.1080/1364557032000119616
- Reid R, Puvanesarajah V, Kandil A, et al. Factors associated with patient-initiated telephone calls after spine surgery. *World Neurosurg*. 2017;98:625-631. doi:10.1016/j.wneu.2016.11.004
- Hadeed MM, Kandil A, Patel V, Morrison A, Novicoff WM, Yarburo SR. Factors associated with patient-initiated telephone calls after orthopaedic trauma surgery. *J Orthop Trauma*. 2017;31(3):e96-e100. doi:10.1097/BOT.0000000000000746
- Stella SA, Allyn R, Keniston A, et al. Postdischarge problems identified by telephone calls to an advice line. *J Hosp Med*. 2014;9(11):695-699. doi:10.1002/jhm.2252
- Hällfors E, Saku SA, Mäkinen TJ, Madanat R. A consultation phone service for patients with total joint arthroplasty may reduce unnecessary emergency department visits. *J Arthroplasty*. 2018;33(3):650-654. doi:10.1016/j.arth.2017.10.040
- Sayin Y, Kanan N. Reasons for nursing telephone counseling from individuals discharged in the early postoperative period after breast surgery. *Nurs Forum*. 2010;45(2):87-96. doi:10.1111/j.1744-6198.2010.00169.x
- Brekke A, Elfenbein DM, Madkhali T, et al. When patients call their surgeon's office: an opportunity to improve the quality of surgical care and prevent readmissions. *Am J Surg*. 2016;211(3):599-604. doi:10.1016/j.amjsurg.2015.11.008

19. Lehmann AE, Kozin ED, Sethi RKV, et al. Resident responses to after-hours otolaryngology patient phone calls: an overlooked aspect of residency training? *Laryngoscope*. 2018;128(5):E163-E170. doi:10.1002/lary.26784
20. Du K, Wang RS, Vetter J, et al. Unplanned 30-day encounters after ureterorenoscopy for urolithiasis. *J Endourol*. 2018;32(12):1100-1107. doi:10.1089/end.2018.0177
21. Schimpf MO, Steinberg AC, Tulikangas PK, LaSala CA. Patterns of telephone calls triaged by registered nurses in a urogynecology practice. *Urol Nurs*. 2008;28(3):213-216.
22. Ramaseshan AS, LaSala C, O'Sullivan DM, Steinberg AC. Patient-initiated telephone calls in the postoperative period after female pelvic reconstructive surgery. *Female Pelvic Med Reconstr Surg*. Published online September 21, 2018. doi:10.1097/spv.0000000000000636
23. Krishnan N, Li B, Jacobs BL, et al. The fate of radical cystectomy patients after hospital discharge: understanding the black box of the pre-readmission interval. *Eur Urol Focus*. 2018;4(5):711-717. doi:10.1016/j.euf.2016.07.004
24. Arpey NC, Sloan MJ, Hahn AE, Polgreen PM, Erickson BA. Unscheduled clinical encounters in the postoperative period after adult and pediatric urologic surgery. *Urology*. 2019;124:113-119. doi:10.1016/j.urology.2018.10.012
25. Morgan MSC, Antonelli JA, Lotan Y, et al. Use of an electronic medical record to assess patient-reported morbidity following ureteroscopy. *J Endourol*. 2016;30(suppl 1):S46-S51. doi:10.1089/end.2016.0079
26. Shenson JA, Cronin RM, Davis SE, Chen Q, Jackson GP. Rapid growth in surgeons' use of secure messaging in a patient portal. *Surg Endosc*. 2016;30(4):1432-1440. doi:10.1007/s00464-015-4347-y
27. Robinson JR, Valentine A, Carney C, Fabbri D, Jackson GP. Complexity of medical decision-making in care provided by surgeons through patient portals. *J Surg Res*. 2017;214:93-101. doi:10.1016/j.jss.2017.02.077
28. Cooper G, Walker J, Harris D, Stewart R, Nicol D, Ogg M. Use of text messaging to audit early clinical outcome following vasectomy in primary care. *Br J Gen Pract*. 2011;61(585):280-282. doi:10.3399/bjgp11X567135
29. Miller MW, Ross RK, Voight C, et al. Patient-generated digital images after pediatric ambulatory surgery. *Appl Clin Inform*. 2016;7(3):646-652. doi:10.4338/ACI-2015-12-CR-0168
30. Hughes TM, Merath K, Chen Q, et al. Association of shared decision-making on patient-reported health outcomes and healthcare utilization. *Am J Surg*. 2018;216(1):7-12. doi:10.1016/j.amjsurg.2018.01.011
31. Chou R, Gordon DB, de Leon-Casasola OA, et al. Management of postoperative pain: a clinical practice guideline from the American Pain Society, the American Society of Regional Anesthesia and Pain Medicine, and the American Society of Anesthesiologists' Committee on Regional Anesthesia, Executive Committee, and Administrative Council. *J Pain*. 2016;17(2):131-157. doi:10.1016/j.jpain.2015.12.008
32. Crotty BH, Tamrat Y, Mostaghimi A, Safran C, Landon BE. Patient-to-physician messaging: volume nearly tripled as more patients joined system, but per capita rate plateaued. *Health Aff (Millwood)*. 2014;33(10):1817-1822. doi:10.1377/hlthaff.2013.1145
33. Braunstein ML. Health care in the age of interoperability part 6: the future of FHIR. *IEEE Pulse*. 2019;10(4):25-27. doi:10.1109/MPULS.2019.2922575
34. Gunter RL, Chouinard S, Fernandes-Taylor S, et al. Current use of telemedicine for post-discharge surgical care: a systematic review. *J Am Coll Surg*. 2017;64(3):454-459. doi:10.1016/j.jamcollsurg.2016.01.062

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