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Feasibility of using an automated call service to collect quality of life and functional outcome data in trauma patients

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ABSTRACT

Objectives Following up trauma patients after discharge, to evaluate their subsequent quality of life and functional outcomes, is notoriously difficult, time consuming, and expensive. Automated systems are a conceptually attractive solution. We prospectively assessed the feasibility of using a series of automated phone calls administered by Emmi Patient Engagement to survey trauma patients after discharge.

Methods Recruitment into the study was incorporated into the patient discharge process by nursing staff. For this pilot, we included trauma patients discharging home and who were able to answer phone calls. A script was created to evaluate the Extended Glasgow Outcome Scale and the EuroQol EQ-5D to assess functional status and quality of life, respectively. Call attempts were made at 6 weeks, 3 months, 6 months, and 1 year after discharge.

Results A total of 110 patients initially agreed to participate. 368 attempted patient encounters (calls or attempted calls) took place, with 104 (28.3%) patients answering a least one question in the study. 21 unique patients (19.1% of those enrolled) completed 27 surveys.

Conclusions Automated, scripted phone calls to survey patients after discharge are not a feasible way of collecting functional and quality of life data.

Level of evidence Level II/prospective.

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ There are multiple validated tools and instruments that can be used to assess a patient's quality of life and functional outcome after injury and hospital discharge; however, collecting such data is difficult and time consuming. This study aimed to evaluate the feasibility of using an automated system to collect data on trauma patients after discharge.

WHAT THIS STUDY ADDS

⇒ The results of this study do not support using an automated system to collect data on trauma patients' quality of life and functional outcomes after injury.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ This study shows that an automated system should not be used to collect data on trauma patients' functional outcome or quality of life after injury and that alternatives should be sought.

INTRODUCTION

Mortality is often the main measure used to assess trauma center performance. While clearly important, there are other valuable indicators of the quality of care. Several validated scales and questionnaires can provide standardized measures of quality of life and functional status. Tools that can be used to quantify function include the Functional Capacity Index,[1 2] the Functional Independence Measure[3] and the Glasgow Outcome Scale and Extended Glasgow Outcome Scale (GOS-E).[4 5] Quality of life can be assessed using instruments such as the Short Form health surveys[6] and the EuroQol EQ-5D (EQ-5D).[7]

However, collecting quality of life or functional status data is difficult. 'Steady state' is typically not reached for several months or even years after injury, and these instruments require an investment of time and training to administer.[8–10] The routine administration of these tools at select intervals, including up to 2 years after a patient's discharge, makes intuitive sense, but there are barriers, and–usually–resource limitations. Even when conducted by telephone, in a busy trauma center, the volume of work typically requires several full-time employees.[9] This represents investments that few institutions are able to make. Furthermore, it is also often difficult to establish contact, obtain consent, and interview patients once discharged.

An automated data collection system is therefore an attractive alternative. Several technology companies provide customizable automated telephone services to both follow-up patients after discharge and to facilitate ongoing and outpatient care. These systems are already widely used for service-related survey work, or scheduling follow-up. The purpose of this pilot study was to determine if we could adapt an automated system to collect functional outcomes and quality of life data on patients after discharge from our trauma service.

METHODS

Study design and setting

We designed and conducted this prospective observational study at the University of Alabama

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at Birmingham (UAB) Hospital, a level 1 trauma center verified by the American College of Surgeons. The center evaluates approximately 6500 trauma patients per year and admits approximately 4500.

Entry criteria

Nursing staff recruited patients as part of the routine discharge process. Trauma patients discharging home from the acute trauma care unit (ATCU) who had a normal level of consciousness were invited to take part. Nursing staff on the ATCU provided patients with an information sheet containing information about the study, including that the study would be conducted via an automated call service, and, if agreeable, recorded their telephone numbers. Provision of their telephone number was considered consent to participate in the study. To be included, patients had to be English speaking and 18 years or older. For this pilot, we excluded patients who would not be returning to a place of permanent residence including those discharging to a skilled nursing or long-term care facility. Patients who did not have capacity to agree to participate and patients who did not have access to a telephone were also excluded.

Technology

We used Emmi Solutions patient engagement technology, which is a part of Wolters Kluwer Health (Wolters Kluwer, Philadelphia, PA). The company provides a customizable automated calling system typically used to facilitate follow-on care after discharge. The timing of calls was determined by the service provider based on prior patient engagement experiences.

Patients received scripted phone calls from Emmi Solutions acting on behalf of UAB Surgery, Division of Trauma & Acute Care Surgery. The script (online supplemental appendix 1) was designed in conjunction with Emmi Solutions and included the GOS-E and the EQ-5D to assess functional status and health-related quality of life, respectively. This study was registered with EuroQol. Each call took less than 10 minutes to complete. Calls were made at 6 weeks, 3 months, 6 months, and 1 year after discharge. Responses were recorded and reports were periodically provided to the principal investigator at UAB. Patients who did not answer the first call attempt were called one additional time. The automated calls were stopped if a patient did not answer the second call.

Analysis

The number of patients initially recruited served as the denominator. After the initial calls were made, we obtained both the total number of patients who engaged in the study along with details of their responses. For bivariate analysis of demographics and outcomes of patients enrolled and not enrolled in the study, we used Wilcoxon rank-sum and χ^2 tests to compare continuous and categorical variables, respectively. A p value <0.05 was regarded as statistically significant. Analysis was conducted using Microsoft Excel (Microsoft, Redmond, WA) and SAS V.9.4 (SAS).

RESULTS

Baseline characteristics

Between December 2020 and June 2021, up to 894 eligible patients were discharged home from the ATCU, and 110 agreed to participate in the study. The number of enrolled patients decreased over time (figure 1), and no patients were enrolled after the seventh month of the study, and it was stopped. The baseline characteristics of these enrolled patients are shown in table 1. The median age was 43 (IQR: 28–57), the majority were male (77, 70%) and white (64, 58.2%). The median Injury Severity Score was 12 (IQR: 8–17). Most patients had been injured by a blunt mechanism (74, 73.3%). In comparing demographics, insurance

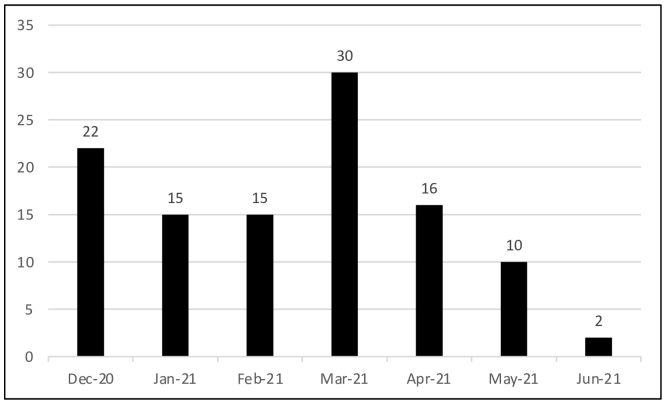

Figure 1 Number of patients enrolled by month.

Table 1 Demographics and outcomes of patients enrolled and not enrolled in study

	Enrolled	Non-enrolled	P value
Demographics			
Age			
Years, median (IQR)	43.0 (28.0–57.0)	39.0 (28.0–57.0)	0.531
Gender			0.758
Male, n (%)	77 (70.0)	528 (67.3)	
Female, n (%)	33 (30.0)	254 (32.4)	
Race/ethnicity			0.370
White, n (%)	64 (58.2)	442 (56.4)	
Black, n (%)	40 (36.4)	297 (37.9)	
Asian, n (%)	2 (1.8)	3 (0.4)	
Hispanic/Latino, n (%)	4 (3.6)	30 (3.8)	
Insurance			0.016
Commercial	45 (40.9)	292 (37.2)	
Government/other	9 (8.2)	61 (7.8)	
Medicaid	6 (5.5)	98 (12.5)	
Medicare	2 (1.8)	68 (8.7)	
Self	46 (41.8)	244 (31.1)	
Worker's compensation	2 (1.8)	21 (2.7)	
Injury characteristics			
Injury mechanism			0.699
Blunt injury, n (%)	74 (73.3)	500 (75.9)	
Penetrating injury, n (%)	20 (19.8)	126 (19.1)	
Burn, n (%)	7 (6.9)	33 (5.0)	
Injury Severity Score (ISS), median (IQR)	12.0 (8.0–17.0)	10.0 (5.0–17.0)	0.214
Outcomes			
Length of stay, median (IQR)	4.4 (2.1–8.5)	3.7 (1.9–6.8)	0.191
ICU days, median (IQR)	4.0 (3.0–7.0)	4.0 (3.0–7.0)	0.772
Ventilator days, median (IQR)	2.0 (1.5–4.0)	3.0 (2.0–5.0)	0.289

ICU, intensive care unit.

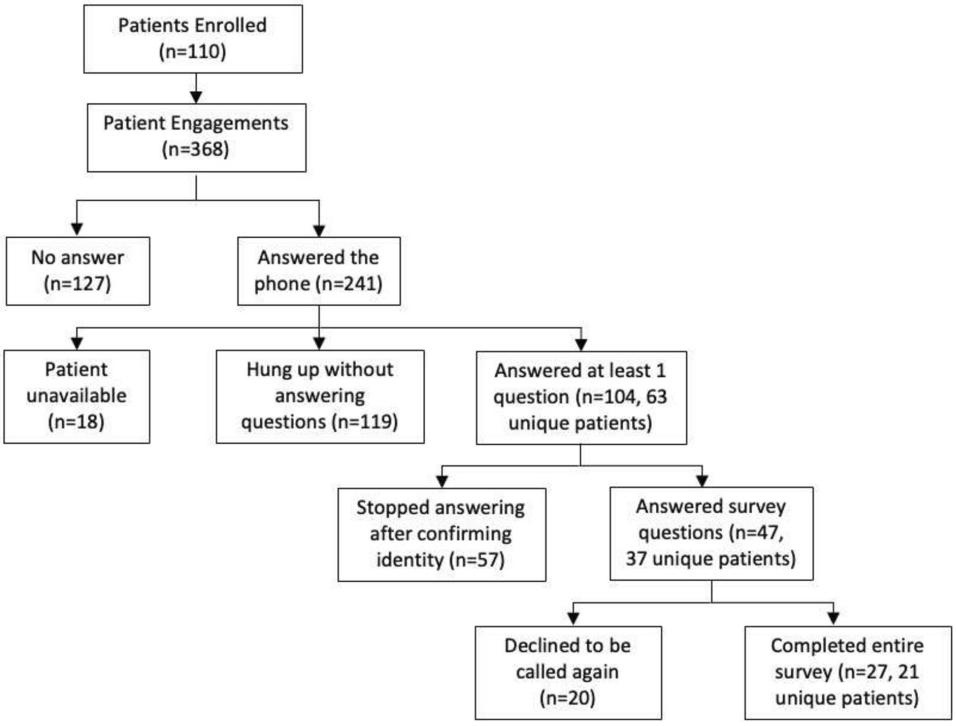

Figure 2 Flow sheet of patient engagement.

status, injury characteristics and outcomes between those who agreed and did not agree to participate, there were no differences in demographics, injury characteristics or outcomes, although those willing to participate were more likely to be self-pay (41, 41.8%) and less likely to have Medicare (2, 1.8%) or Medicaid (6, 5.5%) (p=0.016).

Engagement

A total of 533 call attempts were made to 110 patients over the course of the study period. We grouped these calls into 368 separate patient engagements by accounting for the 139 instances in which two phone calls were attempted. These 368 separate patient engagements resulted in 27 completed surveys by 21 patients (19.1%). This comprised an overall completed survey response rate of 7.3% for patient engagements.

Of the 368 patient engagements, 127 resulted in no answer with the majority either going to voicemail (68, 53.5%), timing out, or reaching a busy line. In 137 encounters, the call was answered but the person hung up, whereas in the remaining 18 the patient was not available (figure 2). The median duration of the answered calls was 0 minute 55 seconds (IQR: 0 minute 36 seconds to 1 minute 31 seconds). The median duration of calls among those who completed the survey and agreed to be called again was 7 minutes 7 seconds (IQR: 6 minutes 33 seconds to 7 minutes 24 seconds).

Extended Glasgow Outcome Scale

Scoring of the responses for the GOS-E was performed according to published guidelines.[4] The evaluation was completed 42 times. Most patients (n=37, 88.1%) scored a 3 or a 4, indicating lower and upper severe disability, respectively. No respondents scored a 1 (death) or 2 (vegetative state), which would be expected for patients able to discharge home with a normal level of consciousness (table 2).

EuroQol EQ-5D

The EQ-5D survey was completed 45 times (table 3) with only four (8.7%) of respondents reporting a full state of health with the best possible score (11111). Most respondents (36, 78.3%) reported limitations in three or more of the five domains. The EuroQol vertical visual analog scale median score was 67.5 (IQR: 42.5–93.75).

DISCUSSION

To our knowledge, this is the first study that has attempted to use an automated system to collect postdischarge data on quality of life and functional outcomes after injury. Although these outcomes are important in guiding the advancement of trauma care, they are difficult and expensive to collect.[9 10] A simple, automated means of collecting this information would therefore be very attractive and have wide applicability.

Table 2 Scores of respondents (n=42) that completed the GOS-E (GOS <3 excluded)

GOS-E score	n (%)
3—Lower severe disability	12 (28.6)
4—Upper severe disability	25 (59.5)
5—Lower moderate disability	2 (4.8)
6—Upper moderate disability	1 (2.4)
7—Lower good recovery	0 (0)
8—Upper good recovery	2 (4.8)

GOS-E, Extended Glasgow Outcome Scale.

Table 3 Distribution of respondents (n=45) into the five domains of EQ-5D

Domains	1—No problems, n (%)	2—Problems sometimes, n (%)	3—A problem all of the time, n (%)
Ability to move around	14 (31.1)	27 (60.0)	4 (8.9)
Ability to perform self-care	25 (55.6)	15 (33.3)	5 (11.1)
Ability to perform usual activities	10 (22.2)	24 (53.3)	11 (24.4)
Issues with pain or discomfort	8 (17.8)	20 (44.4)	17 (37.8)
Issues with anxiety or depression	21 (46.7)	18 (40.0)	6 (13.3)

Unfortunately, this pilot study shows that the use of the Emmi Solutions system to collect outcome data results in poor response rates—even in a population of patients who had capacity, had previously agreed to participate in the study, were able to take telephone calls, and were discharged straight to home. We also found that the enthusiasm of nursing staff to enroll patients—which required a brief explanation of the study and recording of their telephone number—waned over time. Even if the data collection were otherwise feasible, a dedicated staff may be needed to engage and enroll patients in such a mechanism. Prior studies have shown that intensive follow-up by dedicated interviewers and at times supervisory staff was required to drive patient participation.[9 10]

Only a small number of trauma patients who had initially agreed to participate in the study prior to discharge ultimately participated in the survey a single time, with even fewer patients completing multiple surveys. Although these findings are disappointing, they are not entirely unexpected. Historically, trauma patients have been difficult to follow-up as many do not have established care, lack insurance, or have accurate contact information in an accessible and updated registry.[9 11] Interestingly, our study found that patients who agreed to participate were more likely to be self-pay, and those with Medicare or Medicaid were less likely to participate.

There is also a significant burden associated with automated calls. Many people are only too familiar with unsolicited 'robocalls' and often do not wish to engage with such interruptions. Anecdotally, in this study, nurses reported that patients declined enrollment simply because they did not want to answer phone calls after discharge. Lastly, although the GOS-E is relatively easy to collect over the telephone, the same may not be the case for the EQ-5D, which is more complex to administer, and can result in early frustration. Given the obvious selection/completion bias in this study, the GOS-E and EQ-5D results we obtained are not likely to be representative, and it is not possible to draw inferences from our data.

Although this study was ultimately unsuccessful, the information provided is still useful in eliminating a potential method of gathering patient information. The search for a cheap, efficient, and 'easy' method of collecting postdischarge functional and quality of life data continues. Other technology-based solutions—such as a web-based app, phone-based app, or text messaging—may result in better engagement, but require additional development, testing, and evaluation.

Contributors JB, JW, SS, and JOJ developed the idea for this study. JB, JW, and EWB conducted the literature search. JB, JW, SS, RG, and JOJ contributed to study design. JB, JW, SS, RG, and JOJ participated in data acquisition. EWB, JB, JW, SS, RG, and JOJ contributed to data analysis and interpretation. EWB and JB drafted the article. JW, SS, RG, and JOJ critically revised the final article. All authors reviewed and approved the final article. EB accepts full responsibility for the work and/or the conduct of the study, had access to the data, and controlled the decision to publish.

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Patient consent for publication Not applicable.

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