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Follow-up telephone calls to patients discharged after undergoing orthopaedic surgery: double-blind, randomised controlled trial of efficacy

Abstract

Aims. To evaluate the effectiveness of a follow-up telephone call to reduce the number of issues after hospital discharge and increase patient satisfaction.

Background. The post discharge period is often a time of uncertainty and risk. The decreasing length of hospital stays has increased the need for specific instructions about the post discharge period. A telephone follow-up could be a valuable tool to fill this information gap.

Design. Double blind randomised controlled trial.

Methods. The participants included medium or low intensity orthopaedic patients. We implemented a structured telephone follow-up call conducted by a senior orthopaedic nurse to provide educational support to the intervention group (n=110), while the control group (n=109) received routine care after being discharged. Data were collected between September 2011 and January 2012. Statistical differences between the two groups were tested using Chi-square test or Wilcoxon rank sum test, as appropriate. A linear regression model was performed to investigate factors involved into post discharge outcomes.

Results. The intervention group had a statistically significant reduction in all post discharge problems except for pain and mobilization; the group also had a lower chance of experiencing frequent or severe problems. The educational intervention and prior poor health had a strong correlation with problems after discharge. Patients who received a telephone follow-up call believed the information provided was valuable.

Conclusion. This nurse-led follow-up intervention significantly contributed to solving or reducing post discharge health problems and contributed to reduce unnecessary burden on the community health

system.

Relevance to clinical practice. A nurse-led telephone follow-up may be a simple, feasible and low cost tool to improve patients' outcomes after discharge.

Summary Box

What does this paper contribute to the wider global clinical community?

- A telephone follow-up intervention reduces the number of health problems post discharge for orthopaedic surgery patients. Moreover, the frequency and intensity of post discharge problems decreased.
- Patients with poor health benefit from the follow-up after hospital discharge; this could prevent an unnecessary burden on the community health system.
- Patients consider the information received by telephone follow-up valuable.

Keywords: Telephone Follow-Up, nurse-led intervention, post-discharge problems, patient discharge, orthopaedic patients, nursing.

Introduction

The period that follows hospital discharge can be filled with uncertainty and strain for patients. Any missing home care guidelines, difficulty in dealing with medications, and unclear indications regarding which normal activities to take part in affect the first few days after discharge (Bull 2000). Many patients encounter several problems in the first week after discharge (Shepperd et al. 2004). Adverse events that occur in this period might negatively affect the process of healing and the wellbeing of patients. Moreover, a decline in hospitalization duration and an increase in day surgery procedures significantly reduce health professionals' time to adequately prepare patients for discharge and can cause an increase in postoperative problems (Parker et al. 2002).

Italian health plans are aimed, in a post-discharge setting, at accessing early and flexible care from nurses to avoid premature readmission in acute settings. These plans also seek to promote broad management of clinical problems properly carried out by nurses.

Background

There is much debate as to whether there is a need to follow up patients, as well as the role and place of nurse-led initiatives (Young et al. 2013). Patients expressed few concerns about follow-up conducted by a nurse (Earnshaw & Stephenson 1997). In many care settings, nurses are now providing follow-up services. Much of the research shows that patients are not only receptive to but actively want such an addition to their health care (Cox & Wilson 2003). There are different ways to provide a person centered follow-up. A face to face approach seems to be effective, but it could be considered time consuming by the patients and it is less feasible in the current economic climate. Beaver et al. (2006) suggested that telephone follow-up was a feasible approach as patients were happy to discuss sensitive issues over the phone.

Since many of the problems that patients encounter after discharge relate to training needs (Bull 2000)

and patients are reluctant to ask health professionals questions, telephone follow-ups (TFUs) made by nurses can be effective in reducing problems reported after discharge (Hartford 2005, Caljouw & Hogendorf-Burgers 2010). TFUs can be a good way to provide health education on managing symptoms and recognizing complications earlier; this can reassure patients and provide a quality discharge. Cox et al. (2003) state that TFUs can play an important role, “information can be reinforced, thereby increasing compliance, and ensuring the physical and emotional comfort of the patient”.

Telephone follow-ups may be considered *social complex interventions* (Lindsay 2004), that is, interventions characterized by actions that are difficult to define and control, contain many contextual factors and can vary from one patient to another.

Education via telephone, to which most people have access, can facilitate the productivity of nurses during periods when they would be unable to perform direct patient care due to, for example, pregnancy or physical disability.

Only three studies have described the effects of TFUs after discharge of orthopaedic surgery patients (Hodgins et al. 2008, Mandy et al. 2000, O’Brien et al. 1999). Unfortunately, they are not comparable because they utilize different methodologies and sampling methods. In some of these studies the sample size was insufficient to draw statistically significant conclusions. Moreover, in these studies there are several methodological problems related to the intervention.

The most recent systematic review on this topic supports TFU intervention upon discharge (Mistiaen & Poot 2006). According to the International Association for Ambulatory Surgery, Dewar et al. (2004) recommend a follow-up contact the day after discharge. To the best of our knowledge, there have been no similar studies on the Italian population; we therefore undertook this study.

In this study we tested the hypothesis that a follow-up program, aimed at patients discharged after low and medium complexity orthopaedic surgery and carried out by a nurse's structured intervention, can reduce difficulties that may arise in the period after discharge, decrease premature contacts with the

health system and foster patient satisfaction (Braun et al. 2009). A telephone follow-up performed by an expert nurse (Benner 1982) in orthopaedics was used. An educational intervention structured to solve problems encountered in the period after discharge was provided.

The Study

Aim

The aim of this study was to evaluate the effectiveness of an educational telephone follow-up intervention after patients underwent low or medium intensity orthopaedic surgery.

Design

This was a double blind, randomized controlled trial carried out in Italy. Participants were recruited between September 2011 and January 2012. Once enrolled, the patients were randomly assigned to either the intervention or the control group. Both groups were assessed during their first ambulatory visit after discharge, on average 7-15 days later.

Participants

This study took place in an orthopaedic teaching hospital, which provides the most comprehensive range of neuromusculoskeletal health care in northwest Italy. Participants were selected from two inpatient orthopaedic surgery units. Eligible patients were all adults aged 18 or over undergoing elective low or medium complexity orthopaedic surgery. The way to determine 'medium-low intensity' patients was an ASA score <3 and age of patients < 80 years old. Inclusion criteria included preserved cognitive skills, ability to be contacted by telephone, residence in Piedmont (Italy) and written consent to participate in the study. Exclusion criteria included complex discharge to a long-term care facility, moderately complex discharge to community care services, an outpatient medical visit the day after discharge or surgery paid for by a private health insurance company.

Interventions

- Patients assigned to the control group received routine care and instructions for discharge; those assigned to the intervention group received the same care at discharge, followed by a follow-up telephone call carried out by a nurse specialised in orthopaedics. The call was made 24-96 hours after discharge. We studied several measures to reduce variability and increase the effectiveness of the intervention. All the calls were made by the same nurse. The telephone follow-up was designed to give the nurse the opportunity to assess the overall health of the patient in the period after discharge by identifying experienced and potential problems. A standard operating protocol to address all potential problems, including those not expressed by the patient but included in the study design, was created. The protocol was needed to guide nurses and standardize the sequence of questions asked during the call. It was also used to record whether an educational intervention or reinforcement technique was carried out.

Sample size

The sample size needed was derived from the results of a pilot study with 36 patients per group (72 cases and controls). After fixing the first type error at 0.05 and a power of 80%, we observed that 130 patients per group (given an anticipated dropout rate of 10%) are enough to identify a difference of at least two post operative events and a difference of 0.5 in the satisfaction scale.

Randomization – sequence generation

The randomization was determined using a computer program (Research Randomizer). A permuted-block randomization was used. One researcher generated a sequence of random numbers to allocate participants to the two groups. A different researcher used the list to randomize the patients in blocks of 18 and allocate them to either the intervention or to the control group.

Randomization – allocation concealment

This was a double-blind study. Patients were informed that the factors influencing their problems after discharge would be studied, but they were kept unaware of the aim of the study in order to eliminate a potential source of question/response bias. Patients were informed that they might not receive any phone-call, and were kept unaware of the content of the potential phone call so as not to create further bias. Allocation sequences were concealed until interventions were assigned.

Randomization – implementation

Potential participants were identified during their first day of hospitalization by trained staff who explained the aim of the study to them and requested written consent for participation. Every day the list of all the included patients was communicated to a researcher who conducted the randomization.

Blinding

Patients were blind to their treatment allocation throughout the study. The nurses who administered the questionnaire during the ambulatory visit were unaware of group assignment. The analyst was blind to study group allocation.

Data Collection

Outcomes

Three goals were selected to fill in the gap in the literature on the efficacy of TFUs. The goals represent different aspects of the experiences that patients might face after discharge. The outcomes were the number of post-discharge problems, the number of healthcare service accesses after hospital discharge and patient satisfaction. All the outcomes were assessed for both groups after completing the follow-up. All participants were contacted for data collection during the first ambulatory visit after discharge, on average 7-15 days later. This duration was selected to be short enough for the patients to easily remember the problems that occurred after discharge. A questionnaire was constructed to measure the chosen outcomes.

Demographics

Sex, age, site of surgery, length of hospitalization, level of education, distance of residence from the hospital, presence or absence of a care giver and health status before surgery were considered.

Primary outcome

Problems after discharge

We identified 11 predefined problems: pain, problems with medication, problems in taking medicines, problems in performing routine activities including mobility, bathing, dressing, bowel management, eating or meal preparation, anxiety and, if prescribed, orthopaedist indicated exercises and use of orthopaedic devices. For each problem the patient had the opportunity to express, through a Likert scale of frequency (never, sometimes, often), the presence or absence of the problem and the frequency of presentation. The health status after surgery was also investigated.

Secondary outcomes

Variables related to contacts with the health system

The percentage of patients who had premature contact with the healthcare system was calculated. These contacts included telephone calls to the ward, outpatient or home visits with the general practitioner, outpatient visits to a specialist, emergency department admissions, contact with relatives or friends working in the health care system and hospital re-admissions.

Satisfaction

The elements of patient satisfaction measured were the usefulness of the information received prior to discharge, how helpful the information received was in the period after hospitalization, assessed through a Likert scale with three variables (Not at all, Somewhat, Very) and overall satisfaction post-admission (Unsatisfactory, Satisfactory, Excellent).

Validity and reliability

The study had strong internal validity. A qualified nurse with 7 years of experience in an orthopaedic ward was selected to carry out the intervention. The researchers were not involved in the intervention or the assessment of patients.

A standard operating protocol was designed to ensure the study could be reproduced. The protocol for exploring problems post discharge was tested before the study began via 10 test calls. Each of these calls was observed by an external expert to ensure the effectiveness of the educational intervention. At the end of every call, problems were discussed.

No validated tool to assess the outcomes in this study existed. Therefore, a multidisciplinary group, composed of nurses, orthopaedists and physicians, built a questionnaire according to international standards for treatment and management. The questionnaire was tested for clarity, comprehensibility, and ease of completion. The questionnaire was then submitted for review and consensus by a group of experts. The instrument demonstrated clarity and conciseness. Reliability and validity were tested on 219 questionnaires. Principal components analysis supported the questionnaire's construct validity and unidimensional structure. Our scale had a good reliability. Cronbach's α was 0,81 (95% confidence interval: 0.77 to 0.84). (Nunnally & Bernstein 1994)

Ethical considerations

The study protocol was approved by a hospital ethics board. The study conforms to the principles of good research practice and all patients provided written consent to participate. Patients could stop the trial at any time without negative consequences.

Data analysis

Analyses were carried out according to the intention to treat principle. The baseline characteristics of the population and the problems encountered post-admission were compared between groups using the Wilcoxon rank sum and chi square tests for quantitative and qualitative variables respectively. A multivariate linear regression was also conducted to evaluate the relationship between the number of

problems encountered post-intervention and the possible independent factors related to it. All tests conducted were two-tailed and p-values less than 0.05 were considered significant. To test the questionnaire it is been used principal component analysis and cronbach's α . The analyses were performed with SAS software (SAS Institute Inc., Cary, NC, USA) version 9.2.

Results

Participant enrollment and dropouts

Patients were enrolled between September 2011 and January 2012; the total sample included 219 patients. 110 were analysed in the intervention group, while 109 in the control group. Of the 275 patients randomized at the beginning of the study, 56 subjects were lost at follow-up, with an average retention rate of 80%. The reasons for the losses were similar in the two groups: patients did not attend the outpatient visit or failed to return the questionnaire (Figure 1).

Baseline data

Of the 219 subjects, 120 were male (54.8%) and 99 female (45.2%), with a mean age of 47 years (range = 18-80, Table 1). The most represented surgical site was the knee (28%). The mean duration of hospitalization was 2.1 days (range = 1-5). After testing the differences with the appropriate tests (see Data analysis section), there were no statistically significant differences in the demographics of the participants between the groups. The problems reported after discharge were not associated to an asymmetric health status distribution between the two groups ($p = 0.75$).

One-hundred-thirty-six patients were allocated to the intervention group. Forty-two calls were made on the third day after discharge (30.9%). One-hundred-twenty-seven telephone follow-up calls were completed. In the remaining cases ($n = 9$) the nurse was not able to contact the patient. In each call the nurse spoke directly to the patient. The average duration of a call was 4.89 minutes (range = 1.5-18.1). According to the surveys conducted by the nurse, mobilization (29.1%), pain (23.6%) and bathing

(19.7%) were the problems that patients reported most frequently. The nurses adopted educational interventions in the majority of cases (n = 74, 56.5%) while in 43.5% of cases (n = 57) they adopted reinforcement techniques on information already acquired by the patient.

No negative effects have been reported about the telephone follow-up intervention.

Outcomes

Post-discharge experience

In the period after discharge only 11 patients did not report any problems (5%). Pain was the most frequently reported problem in both groups (67.2% and 78.8% respectively). Problems related to mobilization, bathing and dressing were represented in more than 50% of cases in both groups. Patients who received the educational intervention had an average of 1.7 problems less than those who did not receive the call. The gap between problems reported on an occasional basis and problems reported frequently on the Likert scale was even more evident; patients who received the call had an average of 1.23 fewer “frequent” problems than the subjects who did not receive any call.

There was a statistically significant reduction for the intervention group in the frequency of problems reported except for pain and mobilization (Table 2). Subjects who received the educational intervention had, on average, a 10% lower chance of reporting frequent problems. Problems with routine activities like dressing and bathing had a reduction of 15.8 and 14.7 per cent respectively.

The results of the regression analysis are shown in Table 3. Despite the predictor variables investigated, the model explains only 21% of the variability. The variables analysed did not have a linear relationship with the increase in problems. Only two variables play a significant role as predictors. The first variable is the educational intervention, which is directly linked to the reduction in problems after discharge ($p < .0001$). The second variable is the health status prior to surgery; a low health status, assessed using a numerical scale of 1-10, is associated with a greater number of problems reported ($p < .0001$).

Contact with the health system

Thirty-nine patients had premature contact with the healthcare system, 18 patients belonged to the intervention group, 21 to the control group. There were no substantial differences in the motivations for contact. No one requested advice from relatives or friends working in the health system in either group. One subject in the intervention group and 2 subjects in the control group were readmitted to the hospital. There was no statistically significant difference between groups.

Patients' perception of quality of care

The remaining items on the questionnaire dealt with the quality of service. There was no statistically significant difference between the intervention group and control group regarding the overall experience of hospitalization ($p = 0.07$) or the clarity of the information received during hospitalization ($p = 0.08$). However, patients who received the phone call said that the information they received was more useful ($p = 0.004$).

Discussion

Effectiveness of telephone follow-up

Unlike Hodgins (2008), who did not find significant results, in our study we found a statistically significant effect of the telephone follow-up intervention on reducing problems after discharge from the ward. We addressed many of the limitations of previously published articles; for example, knowing that calls may be ineffective if made too soon, the phone calls were generally made 48 hours after discharge. Moreover, calls were balanced to be neither too short nor too long and to investigate all factors recognized as potentially problematic. Furthermore, the possibility of having dedicated resources had a positive impact on the outcome of the study. Although the literature does not provide a gold standard duration (Mistiaen & Poot 2006), we found an average time of about 5 minutes proven enough to provide educational information and reinforce notions previously acquired. The call duration may vary greatly

depending on the objectives and the type of patient enrolled in the telephone follow-up.

The rate of premature contacts with the health system was similar between the two groups, and the types of contact were nearly identical. The number of contacts occurring prematurely proved to be rather low (18%).

Regarding the patients' perceived quality of care, those who received the intervention found the advice useful, suggesting that the gap in information during hospitalization was filled via the telephone intervention (Parker et al 2002, Bostrom et al. 1996).

Problems post-discharge

This study highlights the fact that patients face many problems in the days after hospital discharge. Despite this, the majority of patients positively evaluated the overall experience. Our study supports the use of a nurse-led educational intervention made through telephone follow-up calls. The fact that the intervention group had a statistically significantly reduced number of problems that are typically managed by nurses, such as management of medication, drug administration and activities of daily life, demonstrates that these factors are pertinent ones to include in a discharge plan. Ward nurses play a central role in the evaluation and control of pain and in mobility management. In telephone follow-ups, these two issues were the only ones that did not significantly differ between the groups. This may be because nurses had little opportunity to adapt post-operative analgesic protocol to the post-discharge setting. Additionally, regarding mobility, an effective educational intervention may require a face-to-face encounter to demonstrate correct methods of mobilization, which is not possible through a telephone call. Overall, the TFU led to a reduction in frequency and intensity of problems reported for all the items included.

The presence or absence of a caregiver, although not significant in this study, may have contributed to the number of problems reported. Patients that are less able to manage activities of daily living, as stated by Mistiaen et al. (1997), will report many more problems in the absence of a caregiver. Even if In future

research it could be helpful investigate more about the role of caregivers and their needs in taking care of patients underwent orthopaedic surgery. The variables that account for a statistically significant increase in the number of problems reported were, as expected, “not having received the educational intervention” and “low health status”.

In contrast to other studies, the variables “age” and “sex” were not related to an increase in problems reported in the period after discharge (Meleis & Lindgren 2001, Jones et al. 2003, Buurman et al., 2010, Rytter et al., 2010). This may be due to the fact that our study considered only medium or low intensity elective surgery, so old or fragile patients formed a small proportion of the study participants. The surgery site was not associated with the number of problems reported, although a strong association was noted in shoulder surgery. This may be explained by more invasive surgical techniques used in shoulder surgery or the mobility limitation caused by the immobilisation of the anatomic site. Regarding the relation between the duration of hospitalization and the effectiveness of the TFU, the analysis showed that the educational intervention was effective for patients admitted to day surgery and for those who underwent surgery of medium intensity and were hospitalized for several days.

Additionally, assigning a central role to the patient both during the hospitalization and at home with a well designed educational intervention accounts for a significant reduction of problems and an increase in the confidence of the patient. This helps ensure a faster recovery to normal lifestyle.

Relevance to Clinical Practice

Regarding the implications of TFUs in clinical practice, there is evidence that the telephone follow-up may be a relatively simple, accessible and low cost tool that is able to improve communication between the hospital and the patient after discharge. In an era of reduced resources, enhancing hospital discharge protocols for patients having a low health status could be useful to ease the burden on the community health system. It is also possible to adjust pre-discharge information protocols on pain and mobilization in order to increase the efficiency of the nurse phone call. The improvement of TFUs will also provide a

more efficient allocation of human resources, allowing nurses who cannot engage in direct patient care to contribute to the health care system.

Limitations

One limitation of this study is that it was conducted during the cold season in Italy although a similar study found no statistically significant differences between seasons (Hodgins *et al.* 2008).

Additionally, as previously noted, the regression model explained only 21% of the variability. This could be due to personal characteristics that were not considered and contextual factors that are difficult to control.

Another limitation is that it was not possible to analyze the factors related to the low number of patients who had early contact, nor it was possible to investigate the number of hospital readmissions. Based on the study of Jack *et al.* (2009) it would be interesting to assess the number of readmissions to the hospital after the introduction of a discharge program including a TFU.

Conclusions

Reduced hospitalization times force health professionals to consider alternative ways to provide appropriate information. The information allows patients to proactively recognize signs and symptoms of problems they may face immediately after discharge and handle them as soon as possible. Health professionals will need to change the patient's role from a passive onlooker to a leading actor in the healing process. Providing all the information to the patient in the acute phase after surgery is not effective; instead, information should be provided both pre- and post-discharge.

This study highlights the importance of providing proper education and information to patients undergoing orthopaedic surgery by experienced nurses after discharge. Such an intervention can contribute to reducing problems at home. The educational activities here provided were considered helpful by the patients enrolled in our study. These activities could be implemented as a standard

intervention 3-4 days after discharge and may be useful in other care settings as well.

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Figure 1 Study Flowchart. ITT, intention-to-treat

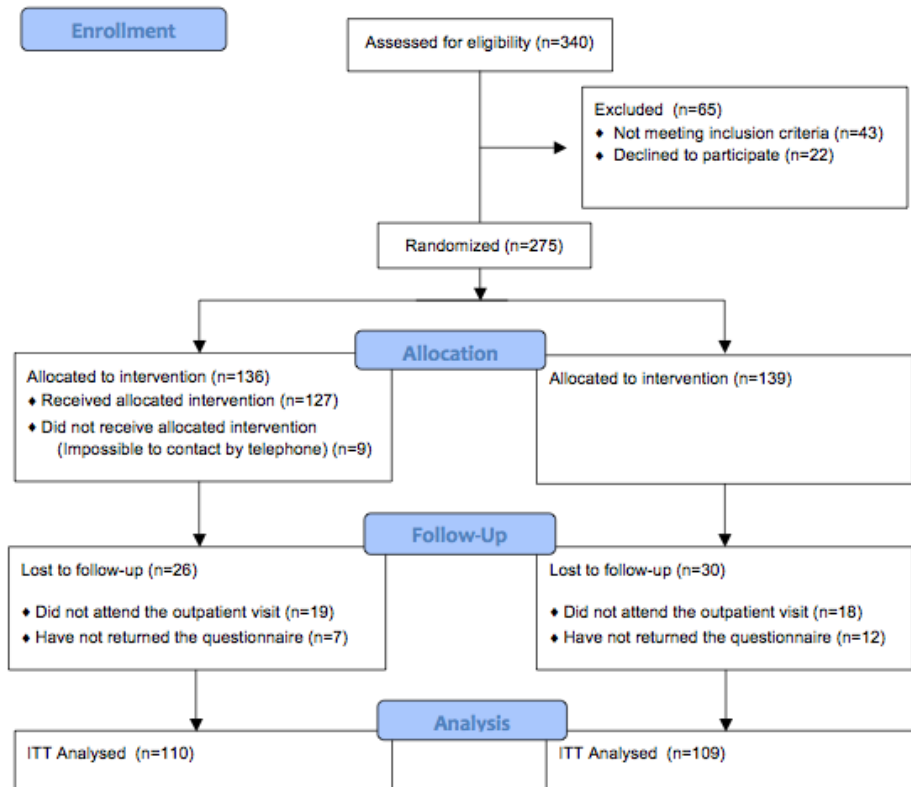


Table 1 Demographic characteristics of the sample ($N=219$) by group

Characteristic	Intervention Group ($n=110$)	Control Group ($n=109$)	<i>P-value</i> *
Male [n (%)]	63 (57.3)	57 (52.3)	0.50
Age [years, M (SD)]	45 (14.6)	50 (14.8)	0.06
Operative Procedure [n (%)]			
Shoulder	10 (9.1)	20 (18.4)	0.20
Hand/Wrist	21 (19.1)	26 (23.8)	
Knee	35 (31.8)	26 (23.8)	
Foot/Ankle	29 (26.4)	26 (23.8)	
Other	15 (13.6)	11 (10.2)	
Length of hospital stay [$days$, M (SD)]	2,18 (0.87)	2.04 (0.78)	0.15
Education [n (%)]			
Primary School	5 (4.5)	6 (5.5)	0.59
Secondary School	33 (30.1)	41 (37.7)	
High School	59 (53.6)	49 (44.9)	
Higher Education	13 (11.8)	13 (11.9)	
Distance from hospital [Km, M (SD)]	22.9 (28.2)	20.7 (21.0)	0.97
Prior health status, 10-point numeric rating scale [M (SD)]	7.2 (2.11)	7 (2.15)	0.47
Lives with a caregiver [n (%)]	88 (80%)	92 (84.4%)	0.48

*P-values resulted from Wilcoxon sum rank tests for quantitative variables and Chi-square tests for qualitative variables.

Table 2 Problems post discharge by group

Problem	Intervention Group (<i>n</i> =110)		Control Group (<i>n</i> =109)		<i>P</i> -Value*
All Problems [<i>n</i> , <i>M</i>]	393 (3.57)		572 (5.25)		
	Sometimes	Frequently	Sometimes	Frequently	<.0001
	311 (2.8)	82 (0.74)	357 (3.27)	215 (1.97)	
By Individual Problem [<i>n</i> (%)]					
Pain	53 (48.1)	21 (19.1)	54 (49.5)	32 (29.3)	0.07
Medications management	8 (7.3)	2 (1.8)	11 (10.1)	14 (12.8)	0.004
Medicines management	6 (5.5)	-	7 (6.4)	7 (6.4)	0.02
Mobility	49 (44.5)	13 (11.8)	44 (40.4)	25 (22.9)	0.09
Bathing	54 (49.1)	16 (14.5)	48 (44.0)	33 (30.3)	0.01
Dressing	50 (45.4)	9 (8.2)	44 (40.4)	25 (22.9)	<.0001
Bowel management	18 (16.4)	10 (9.1)	33 (30.3)	20 (18.3)	0.002
Eating or meal preparation	14 (12.7)	5 (4.5)	18 (16.5)	16 (14.7)	0.02
Anxiety	28 (25.4)	2 (1.8)	36 (33.0)	11 (10.1)	0.008
Prescribed exercises	14 (12.7)	-	27 (24.8)	13 (11.9)	<.0001
Use of orthopaedic devices	17 (15.4)	4 (3.6)	35 (32.1)	10 (9.2)	0.002

**P*-values resulted from Wilcoxon Chi-square tests

Table 3 Multivariate linear regression of factors associated with participants' rating of post discharge outcomes

Variable	Number of Problems	
	<i>Beta (SE)</i>	<i>p-value</i>
Educational Phone Call	-2.67 (0.54)	<.0001
Sex	0.20 (0.54)	0.70
Age	0.01 (0.02)	0.59
Operative Procedure		
Shoulder	1.49 (1.04)	0.15
Hand/Wrist	0.37 (0.95)	0.69
Knee	0.37 (0.91)	0.68
Foot/Ankle	0.33 (0.92)	0.72
Length of hospital stay	-0.08 (0.32)	0.81
Education	-0.23 (0.36)	0.53
Distance from hospital	0.01 (0.01)	0.37
Prior health status	-0.49 (0.12)	<.0001
Presence of home help postdischarge	1.16 (0.69)	0.10
R ²		0.21