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IMPACT OF REHABILITATION PROGRAM FOR ELDERLY PATIENTS WITH HIP FRACTURE AT SOHAG UNIVERSITY HOSPITAL

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ABSTRACT

Rehabilitation plays an important role in improving functional recovery of patients in all stages of care.
Aim: To evaluate impact of rehabilitation program for elderly patients with hip fracture.
Materials and Method: Quasi-experimental study was conducted in inpatient orthopedic department and follow-up was done at orthopedic outpatient the clinic at Sohag University Hospital. Purposive sample was done on 76 patients at divided into two groups equal number for each group (38). Data was collected from September 2014 to September 2015. Data was collected by using two tools.
Tool (I): A structured interview sheet included two parts.
Tool (II): included three parts, Assessment of walking condition, level of pain & Modified Barthel Index.
Results: About two thirds of elderly patients aged between 60 to 70 years, more than half of them were females, most common type of hip fracture was intertrochanteric fracture, and main cause of hip fracture is due to falling down.
Conclusion: There is a statistical significant difference between study and control groups regarding incidence of complications, walking ability and level of dependency.
Recommendations: It is necessary to increase the role of nurses to bring about public awareness about hip fracture through the mass media, and also booklet about rehabilitation instruction for the elderly and their relative.

Keywords: Hip fracture, Elderly, Rehabilitation program

INTRODUCTION

Hip fractures are a major cause of illness, disability and death in the elderly people, with an incidence increasing with age. The frequency of hip fractures is increasing by 1-3% per year in most areas of the world. According to the epidemiologic projections, this worldwide annual number will rise to 6.26 million by the year 2050. The growth of population will be more marked in Asia, Latin America, Middle East and Africa than in Europe and North America, and 70% of the fractures will occur in these regions (Dailiana *et al.,* 2013 & Nagai; Okawa, 2016). Post-operative complications are divided into two main groups, medical and surgical. Medical complications include urinary tract infections, pneumonia, atelectasis, deep vein thrombosis, skin breakdown, and delirium. Surgical complications include post-operative wound breakdown or drainage, and return to the operating room for revision or additional surgery from either infection or acute hip dislocation (Kane *et al.,* 2012).

Hip fracture is a serious injury in older people and can contribute to their death or loss of independence. Normally surgery is performed and followed by care in a ward under the supervision of orthopedic staff. Additional rehabilitation within the hospital is sometimes provided by a geriatrician and other health professionals. Sometimes, the emphasis is on early discharge from hospital with multidisciplinary rehabilitation provided to the patient at home (Anu, 2014).

Rehabilitation is a personalized, interactive and collaborative process, reflecting the whole person. It enables an individual to maximize their potential to live a full and active life within their family, social networks, education/training. Rehabilitation is a standard approach to postoperative care for patients with hip fractures. Rehabilitation often includes physical therapy and functions to stretch and strengthen the spinal and muscles. Effective strategies are needed to reduce the burden on healthcare providers and to improve patient quality of life and outcome after hip fracture (Abou-Setta *et al.,* 2011; Thomas *et al.,* 2016).

Demand for gerontological nursing care has been rising as a result of the demographic shift towards an aging population and the increased complex care needs of older adults. During hospitalization, older adults have an increased likelihood of developing complications. Nurses hold a key position to positively impact patient outcomes using no pharmacology nursing interventions in such population to help older adults regain adequate function after hospitalization (Kolanowski *et al.,* 2010; Wyk *et al.,* 2014).

Significance of the study:

Hip fracture is a devastating injury for both patient and family – often resulting in impaired mobility, increased reliance on others, diminished health and sometimes death. Worldwide, the incidence of all hip fractures is 80 per 100 000 individuals. Increase in the average lifespan has greatly augmented the incidence of these fractures. Almost nine out of 10 proximal femur fractures occur in patients older than 65 years of age, and about three out of four occur in women. As many as 28% of older hip fracture patients die within one year of fracture and, of those that survive, it is estimated that between 24% to 75% will not return to their pre-fracture level of independence (El-Ghandour, 2014).

Aim of the study

To evaluate impact of rehabilitation program for elderly patients with hip fracture.

Research hypothesis

After application of rehabilitation program it improved the ability to perform daily living activities, and reduce complications following hip fracture surgery for elderly patients.

Research design

Quasi-experimental research design was utilized in this study.

Setting

The study was conducted in the inpatient orthopedic department and follow up in the orthopedic outpatient clinic at Sohag University Hospital.

Patients

The study included a purposive sample of elderly patients attending the orthopedic department for one year who had hip fracture (76 individuals) elderly person aged 60 years and above. They were divided into two groups namely study and control group. Group I used as study group and group II used as control group and equal number for each one (38).

Tools of the study

Tool I: A structured interview sheet: It was developed by the researcher to collect the necessary data. It consisted of two parts:

Part (I): personal characteristics such as; age, gender, residence, level of education, occupation, marital status, and living.

Part (II): Medical history; full history was taken from elderly which consisted of assessment of past and present history.

Tool II: It consisted of three parts, used before and after program to evaluate the impact of rehabilitation program :

Part (I): Assessment of walking condition before fracture and after the fracture which include four items.

Part (II): Assessment level of pain using The Wong-Baker Faces Pain Rating Scale (Wong *et al.,* 2010).

Part (III): The Modified Barthel Index (MBI) is designed to determine the degree of independence in activities daily living (ADLs).

MATERIAL AND METHOD

I-Preparatory phase and administrative design

An official letter approval was obtained from the Dean of Faculty of Nursing at Sohag University to the director of Sohag University Hospital to obtain the necessary approval to conduct the study. This letter included a permission to collect the necessary data and explain the purpose and nature of the study.

II-Pilot study

Before performing the main study, a pilot study was carried out on 8 elderly patients constituting about 10% of the total study sample. The purpose of pilot was to test the clarity of the sheet and to do the necessary modification. Also to estimate the time needed. Those who shared in the pilot study were not included in the main study sample.

III-Ethical considerations

An informed consent for participation in the study was taken verbally from elderly persons after full explanation of the aim of the study. They were informed that their participation in this study was voluntarily. Also the study protocol and tools were approved by the Faculty Ethical Research Committee.

IV- Procedure/ Data Collection

The researcher develops the program through four stages (assessment, planning, implementation and evaluation phase).

Based on review of the current local and international literature about hip fracture using books, web sites, articles, and magazine, the researcher prepared the program; which was revised by professor of orthopedic surgery at Sohag University, assistant professor of community health nursing and lecturer of gerontological nursing at Assiut University to test the validity of tools and content of program. According to the opinions of experts necessary modifications were made.

A. Assessment phase:

At initial introduction of the researcher to elderly to initiate line of communication was done, the nature and purpose of rehabilitation program was explained, then the sheets were filled up before implementation the program to assess needs of elderly.

B. Planning phase:

The arrangement of conducting the program was done during this phase. The sessions and time of the program were decided. The chosen elderly patients were divided into study and control group. Other facilities were checked and arranged during this phase as teaching place, audiovisual aids and handout.

Teaching time: The time of teaching was decided according to coordination between the researcher and each elderly patient individually.

Teaching place: The study program was conducted in the inpatient orthopedic department and follow up in the orthopedic outpatient clinic at Sohag University Hospital.

Teaching methods and materials: It was important, before implementing the rehabilitation program, to prepare simple teaching instruments and audiovisual aids to be used; as lecture, discussion, brainstorming, picture and handout.

C. Implementation phase:

The rehabilitation program was conducted during the period from September 2014 to September 2015, three days weekly, the average number which interviewed was 1-2 elderly per week. The approximate time spent during filling of sheet was 30 minute according to respond of patient, and the total number of session was 5.

Implementation of the rehabilitation program in the first session, an orientation to the program and its purpose was done along with pretest. Second session demonstrated the exercise for improving walking ability such as (legs, feet, hip and resistance exercises). Third session was about necessary nutrition, fourth session about environment safety and finally fifth, the post test was implemented by using the same format of the pretest.

D. Evaluation phase:

After implementing the rehabilitation program for elderly patients, reassessment was done by the posttest after 2 weeks and 2 months from implementing and completing the program to assess participant's walking ability, incidence of complications and the level of dependency.

V- Statistical analysis:

The data obtained were reviewed, prepared for computer entry, coded, analyzed and tabulated. Descriptive statistics (i.e., frequencies, percentages, mean and standard deviation) were done using SPSS version 20. Chi-square and *t*-test was used to compare differences in the distribution of frequencies among different groups. Statistical significance was considered at $p < 0.05$.

Result:

Table 1 showed that more than two thirds (68.4%) of study group aged between 60 to less than 70 years compared to more than two fifths (42.1%) of control group. Regarding to sex, it was found that little more than half (52.6%) of study group were males compared to more than two fifths (42.1%) of control group while rest of them were females.

Table 1: Distribution of personal characteristics among studied sample

Personal characteristics	Groups				X^2 Test	*P*-value
	Study (n=38)		Control (n=38)			
	No.	%	No.	%		
1. Age (years):						
60-	26	68.4	16	42.1	3.324	0.190 NS
70-	10	26.3	14	36.8		
≥80	2	5.3	8	21.1		
2. Gender:						
Male	20	52.6	16	42.1	0.422	0.516 NS
Female	18	47.4	22	57.9		
3. Educational level:						
Educated	2	5.3	4	10.5	2.810	0.590 NS
Uneducated	36	94.7	34	89.5		
4. Current Occupation:						
Worked without cash	34	89.5	32	84.2	3.226	0.358 NS
Worked for cash	4	10.5	6	15.8		
5. Marital status:						
Single	2	5.3	2	5.3	1.048	0.790 NS
Married	22	57.9	20	52.6		
Divorced	0	0.0	2	5.3		
Widow	14	36.8	14	36.8		
6. Residence:						
Urban	12	31.6	14	36.8	0.117	0.732 NS
Rural	26	68.4	24	63.2		
7. Living status:						
With Family	38	100.0	34	89.5	2.140	0.146 NS
Alone	0	0.0	4	10.5		

NS: Not Significant Difference

As regards educational level, it was observed that high percentage of elderly patients were uneducated (94.7%) compared to 89.5% of control group. Concerning on marital status, the present study showed that more than half of studied sample were married. Regarding to their residence, it was found that the about two thirds of them lived in rural areas. Also the finding showed that the majority of study samples were living with family.

This table 2 revealed that cardiovascular diseases is the most frequent diseases; comorbidity index observed that less than one third (31.6%) of study group hadn't any diseases compared to only 10.5% of elderly patients on control group, while 5.3% of them had more than 5 diseases.

Table 2: Distribution of past history for studied and control group

Past History	Groups				X^2 Test	*P*-value
	Study(n=38)		Control(n=38)			
	No.	%	No.	%		
1. Medical diseases#						
▪ No medical history of diseases	12	31.6	4	10.5	5.771	0.567 NS
▪ Cardiovascular diseases	22	57.9	22	57.9		
▪ Diabetes	8	21.0	14	36.8		
▪ Renal diseases	2	5.3	2	5.3		
▪ Respiratory diseases	4	10.5	4	10.5		
▪ Others	4	10.5	12	31.6		
2. Numbers of diseases						
▪ None	12	31.6	4	10.5	3.474	0.324 NS
▪ (1–2 diseases)	16	42.1	22	57.9		
▪ (3–4 diseases)	10	26.3	12	31.6		
3. Frequencies of falls:						
▪ No.	26	68.4	18	47.4	1.761	0.624 NS
▪ < 2.	6	15.8	10	26.3		
▪ 2–4.	2	5.3	4	10.5		
▪ > 4	4	10.5	6	15.8		
4. Previous fracture:						
▪ Yes	8	21.0	8	21.0	0.00	1.00 NS
▪ No	30	79.0	30	79.0		
A. **Site of fracture**						
▪ Arm	2	25.0	0	0.0	2.666	0.264 NS
▪ Leg	4	50.0	8	100.0		
▪ pelvis	2	25.0	0	0.0		
B. **Duration since previous fracture:**						
▪ < 5	2	25.0	2	25.0	1.2	0.548 NS
▪ 5-10	2	25.0	0	0.0		
▪ ≥10	4	50.00	6	75.0		

NS: Not Significant Difference #: more than one answer

Concerning frequencies of falls in the past year; it was noticed that 68.4% of the study group had no history of falling before fracture compared to 47.4% of control group. Regarding the presence of previous fracture, about one fifth (21.0%) of the studied sample had previous fracture. Regarding site of previous fracture; it was found that 50.0% reported of leg fractures compared to 100% of control group.

This table 3 presents the type of fracture; it observed that 57.9% had Intertrochanteric fracture. As regard to cause of fracture; about three quarters of studied sample reported that cause of fracture is fall. Regarding the place of fall, it found that the majority (92.9%) of study group the incident occurred at home compared to less than three quarters of control group.

Table 3: Distribution of present history

Present history	Groups				X^2 Test	*P*-value
	Study (n=38)		Control (n=38)			
	No.	%	No.	%		
1. Side of hip fracture:						
▪ Right	22	57. 9	22	57. 9	0.000	1 .0
▪ Left	16	42.1	16	42.1		NS
2. Type of hip fractures:						
▪ Femoral neck.	12	31.6	16	42.1	0.486	0.784
▪ Intertrochanteric	22	57.9	18	47.4		NS
▪ Subtrochanteric	4	10.5	4	10.5		
3. **Causes of hip fracture**:						
▪ Accident	10	26.3	8	21.0	0.146	0.703
▪ Fall	28	73.7	30	79.0		NS
A. **Place of fall**♦						
▪ Home	26	92.9	22	73.3	3.136	0.208
▪ Work-place/ office	2	7.1	2	6. 7		NS
▪ Passage	0	0.00	6	20.00		
B. Causes of fall♦						
▪ Slipped	16	57.1	12	40.0	2.683	0.443
▪ Lost balance	4	14.3	10	33.3		NS
▪ felt faint/dizzy	8	28.6	6	20.0		
▪ Unknown	0	0.00	2	6. 7		
4. **Time from fracture to hospital arrival:**						
▪ < 24 hrs.	28	73.7	28	73.7	0.000	1.0
▪ > 24hrs	10	26.3	10	26.3		NS
5. **Time from fracture to operation (day):**						
▪ Within day	0	0.00	8	21.0	5.416	0.067
▪ 1-2	10	26.3	6	15.8		NS
▪ >2	28	73.7	24	63.2		
6. Discharge to:						
▪ Home	32	84.2	30	79.0	0.232	0.890
▪ Other acute hospital ward	4	10.5	6	15.7		NS
▪ In-hospital death	2	5.3	2	5.3		
a. The causes of intra-hospital death♦						
▪ Circulatory disease	2	100.0	0	0.0	2.00	0.157
▪ Respiratory disease	0	0.0	2	100.0		NS
7. Walking ability:						
▪ without aid	34	89.5	30	79.0	0.792	0.374
▪ with a cane	4	10.5	8	21.0		NS

NS: Not Significant Difference

Table 4 showed that there was a high statistically significant difference between the study and control group regarding walking ability after two weeks, and two months from hip fracture operation.

Table 4: Comparison between the study and control group regarding to walking ability

Walking ability	Groups												*P*-value		
	Study (n=38)						Control (n=38)								
	Pre		2nd weeks		2nd months		Pre		2nd weeks		2nd months		Pre	2nd weeks	2nd months
	No	%	No	%	No	%	No	%	No	%	No	%			
without aid	34	89.5	0	0.0	10	26.3	30	79.0	0	0.0	0	0.0			
with a cane	4	10.5	10	26.3	20	52.6	8	21.0	0	0.0	12	31.6			
with walker	0	0.0	24	63.2	6	15.8	0	0.0	16	42.1	14	36.8	0.173	0.00**	0.00**
bedridden	0	0.0	4	10.5	2	5.3	0	0.0	22	57.9	12	31.6			
Total	38	100.0	38	100.0	38	100.0	38	100	38	100.0	38	100.0			

**Statistically significant P < 0.05*

Table 5 showed that mean level of pain pre operation was noticed to be 2.68 in the study group compare to 2.89 in the control group. As regard level of pain two months after hip fracture operation, it was observed that mean level of pain was 0.68 in the study group compare to 1.31 in the control group.

Table 5: Comparison between the study and control groups regarding level of pain preoperative, two weeks, and two months post program

Level of Pain	Groups		*T* test	*P* value
	Study	Control		
	Mean ± SD	Mean ± SD		
Pre-operative pain	2.684±2.527	2.895±1.085	0.472	0.638
Pain after two weeks	1.947±1.845	2.263±0.978	0.932	0.354
Pain after two months	0.684±1.275	1.316±1.275	2.158	0.034*

In table 6 it was noticed that 47.4% of study group did not have any complications compared to 15.8% only of control group.

Table 6: Distribution of postoperative incidence of complications for elderly patients after implementing rehabilitation program

Incidence of complications	Groups								X^2 Test	*P*-value
	Study (n=38)				Control (n=38)					
	2nd weeks		2nd months		2nd weeks		2nd months			
	No	%	No	%	No	%	No	%		
Non	18	47.4	18	47.4	6	15.8	6	15.8		
Urinary tract infection	2	5.3	6	15.7	4	10.5	12	31.5		
Respiratory infection	4	10.5	0	0	4	10.5	4	10.5	**17.18**	**0.01***
Wound Infection	6	15.7	2	5.3	4	10.5	10	26.3		
Deep venous thrombosis	0	0.00	0	0.00	4	10.5	0	0.00		
Dislocation of hip joint	0	0.00	2	5.3	2	5.3	8	21.0		
Pressure ulcer	0	0.00	2	5.3	2	5.3	6	15.7		
Others	2	5.3	2	5.3	2	5.3	6	15.7		

Table 7 showed the findings that there were significant differences between the study and control groups regarding level of dependency following operation after two weeks and two months.

Table 7: Comparison between the study and control groups regarding levels of dependency in pre-fracture, two weeks, and two months post program.

Level of dependency	Groups						*P*-value		
	Study (n=38)			Control (n=38)			Pre	2nd weeks	2nd months
	Pre	2 nd weeks	2nd months	Pre	2nd weeks	2nd months			
Total 0-24	0.0	5.3	5.3	0.0	15.8	26.3	0.182	0.001*	0.000*
Severe 25-49	0.0	31.6	10.5	5.3	63.1	31.6			
Moderate 50-74	10.5	36.8	23.7	18.4	21.1	36.8			
Mild 75-90	10.5	26.3	44.7	18.4	0.00	5.3			
Minimal 91-99	79.0	0.00	15.8	57.9	0.00	0.00			

DISCUSSION

As regards personal characteristics of the elderly patients in the study group indicated that highest percentage of the sample had age ranged between 60 - 70 years, while 5.3% of them aged 80 years or more. This finding is similar to the result of Deka *et al.,* (2015) who found that about two thirds (62.5%) of studied sample had age ranged between 50 - 70 years. Also this result was supported by Vochteloo *et al.,* (2013) who found that about 7.0% of the studied sample was 80 years and more. But, this finding disagrees with Paula *et al.,* (2015) and Griffin *et al.,* (2016) who found that hip fracture was more prevalent among populations aged 80 years and more. This can be interpreted that the difference between the studies might be due to the fact that elderly patients with hip fracture at 80 years of age had co-morbidities diseases which make them medically unstable to perform surgery. So these patients were excluded from the present study because inclusion criteria needed patient who can undergo surgery.

Concerning the place of residence, result reveals that about two thirds of elderly patients were living in rural areas and the rest of them were living in urban areas. Possible explanation for this high prevalence of hip fracture are the insufficient medical care service in the rural areas of Egypt and a lack of awareness among the elderly not understanding the importance of consulting a doctor regarding their illnesses. Interpersonal variations, environmental and life style factors might explain the differences between Egyptian elderly living in different governorates in Egypt.

The current study findings revealed that the prevalence of co-morbidities diseases among the patients. It was showed that cardiovascular diseases were the most common prevalent among elderly patients, more than half of the studied sample had cardiovascular disease. This finding is consistent with Paruk and Cassim, (2012) who found that more than half of studied sample had cardiovascular diseases.

The present study revealed that intertrochanteric fracture was highly prevalent among studied sample. This result agree with Makridis *et al*., (2014) and Keswani *et al*., (2016) who reported that more than half of the studied sample had intertrochanteric fracture. This present study disagrees with Shyu *et al*., (2012) who found that about one third of studied sample had intertrochanteric fracture.

As regard to cause of fracture, it was found that the main cause of hip fracture among studied sample was due to falling. This finding resembles the results of El-jedi *et al.*, (2015) who found that the main cause of hip fracture among elderly patients is falling down. Possible explanation for this result is that elderly people had fragile bone which can fracture easily from any simple problem such as fall.

As regard to time from fracture to surgery, it was

found that only 21.0% of control group were operated on the day of fracture, while about three quarters of study group were operated after two days from admission. This finding is consistent with the study conducted at Gaza by El-jedi *et al.,* (2015) who found that 27.5% of elderly patients were operated at the same day of fracture and rest of them (72.5%) were operated after three days from admission. The present study disagrees with a study conducted by Larsson *et al.,* (2016) who stated that the majority of the studied sample performed the operation within the day. There was long waiting time before surgical intervention in the present study compared with other global studies especially among elderly patients.

Concerning discharge, the finding showed that the majority of the studied sample was discharged for home. Similar findings were reported by Tarazona-Santabalbina *et al.,* (2012) who reported that about two thirds of the studied samples return home and only 4.7% of them died during their hospital stay. On the other hand the present study disagrees with Matre, (2013) who reported that only 11.9% of the studied samples were discharged. The difference between the studies can be interpreted as might be due to the cultural expectations of filial piety that is commonly encountered in Africa countries, and the ease of employing domestic helpers who are able to help with the provision of care in Egypt.

As regard to walking ability before hip fracture, the results indicated that the majority of the studied sample was walking without aid before the fracture. This result agrees with Vochteloo *et al.,* (2013) who found that a high percentage of elderly patients before hip fracture can walk without aids. On the other hand, this finding disagree with Kannus *et al.,* (2000) who found that more than half of the studied sample walk with cane. The difference between the results might be due to the fact that elderly patients in the present study were placed under younger old category (less than 70 years) who ware characterized by active, better general condition and who were walking without aids.

Concerning level of pain, the majority of the studied sample suffered from non to moderate pain. This finding is in same line with Morrison *et al.,* (2003) who reported that the majority of the studied sample suffered from no to moderate pain.Concerning postoperative complication; the present study showed that statistically significant differences between the study and control groups, less than half of the studied group reported no complications following surgery. This finding disagrees with Moppett *et al.,* (2016) who stated that there were no differences between the control and intervention regarding complication. In addition, Stenvall *et al.,* (2012) who reported that the majority of the studied sample had no complications following surgery. Concerning post-operative complications, less than one fifth of studied sample observed had pressure ulcer. This finding is nearly similar with Ahmed, (2014) who found that less than one quarter of studied sample observed had pressure ulcer.

In the present study, more than one quarter of the patients in the study had regained their pre-fracture mobility 2 months after a hip fracture. This result is in same line with Brewer *et al.,* (2011) who found that about one quarter of elderly patients returning to their pre-fracture level with respect to walking ability. This result disagrees with Vochteloo *et al.,* (2013) who found that approximately half of studied sample had regained their pre-fracture mobility after 3 months of the hip fracture. Difference between the studies might be due to long duration after hip fracture surgery.

Walking ability was significantly higher in the study group than in the control group; this finding agrees with Shyu *et al.,* (2010) who showed that walking ability was significantly higher in the study group than in the control group. The present study disagree with Krichbaum, (2007) who reported that no difference between the groups regarding walking ability. The present study suggested that standard rehabilitation and proactive discharge planning can support positively functional recovery. It is therefore, important to educate family members in caring skills and teach elderly people household rehabilitation exercises to help them recover more quickly.

In the present study, level of dependency after two months from hip fracture operation according to modified Barthel scale result presented that less than one fifth of the study group had restored their ADL at two months after surgery compared to no one of the control group. This result agrees with Olsson *et al.,* (2007) who reported that 21.0% of the intervention group had restored their ADL at discharge compared to

only 5% of the control group.

CONCLUSION

Based on the result of the present study, it can be concluded that the most common type of hip fracture among studied sample is intertrochanteric fracture; the main cause of the hip fracture is due to falling down. After implementation of the rehabilitation program there is a statistically significant difference between study and control groups regarding the incidence of complications, walking ability and level of dependency, while the majority of the studied sample did not return to pre-fracture condition.

RECOMMENDATIONS

In view of the study findings, it is recommended to increase public awareness about hip fracture prevention through the mass media. Also there is a need for expanded health education about the problem among elders in rural and urban areas of Egypt that can be achieved by health classes and home visits. Booklet must be provided about rehabilitation program. This is of great importance for the patients and their relative. Further study is required to measure the effectiveness of discharge plan taking into consideration the factors associated with hip fracture for elderly.

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