

## Original Article

# Value of rapid rehabilitation nursing in patients with hip fracture and its influence on patients' pain

Yunjuan Liu<sup>1</sup>, Xing Long<sup>2</sup>

Departments of <sup>1</sup>Surgery, <sup>2</sup>Traumatology, Nanhua Hospital, Nanhua University, Hengyang, Hunan, China

Received June 29, 2019; Accepted September 11, 2019; Epub November 15, 2019; Published November 30, 2019

**Abstract:** Objective: To explore the value of rapid rehabilitation nursing in patients with hip fracture and its influence on patients' pain. Methods: Ninety-eight patients with hip fracture admitted to our hospital from July 2015 to December 2018 were randomly selected, and divided into research group and control group, 49 patients in each group. The control group was nursed under routine nursing mode, while the research group was nursed under rapid rehabilitation nursing mode. Then the two groups were compared in Harris hip score, Barthel index, sedation-agitation scale (SAS) score and self-rating depression scale (SDS) score before and after nursing, compared in pain at 1 day, 7 days and 15 days after surgery based on visual analogue scale (VAS), and then compared in getting out-of-bed time, hospitalization time, complications within 1 month after surgery, nursing satisfaction and life quality after 1 month of surgery. Results: Before nursing, the two groups showed no significant difference in Harris hip score, Barthel index, SAS score and SDS score (all  $P > 0.05$ ), but after 1 month of nursing, the research group showed better in those aspects than the control group (all  $P < 0.05$ ). At 1 day after surgery, the two groups showed no significant difference in VAS score ( $P > 0.05$ ), and at 7 days and 15 days after surgery, the two groups showed significantly lower VAS score, but the research group showed significant higher VAS score than the control group (both  $P < 0.05$ ). The research group experienced significant earlier getting out-of-bed time, shorter hospitalization time, lower complication rate and higher nursing satisfaction and life quality after 1 month of nursing than the control group (all  $P < 0.05$ ). Conclusion: Rapid rehabilitation nursing can significantly promote postoperative rehabilitation, relieve postoperative pain and improve negative emotions, nursing satisfaction and life quality for patients with hip fracture, so it is worth of promotion.

**Keywords:** Rapid rehabilitation nursing, hip fracture, application value, pain

## Introduction

As a common orthopedic disease mainly occurring in elderly patients, hip fracture shows an increasing incidence and continuous increase in the number of elderly people [1]. Hip fracture usually shows as a kind of femoral neck fracture or intertrochanteric fracture for severe calcium loss in the elderly, which causes severe pain and hinders the patients in living, seriously affecting the quality of life of patients [2, 3]. At present, hip fracture is mainly treated through surgical treatment, but for elderly patients, surgery always brings fear and doubts about the effect of postoperative rehabilitation. Those negative emotions are not conducive to postoperative rehabilitation [4, 5]. A study has found that proper nursing may be conducive to postoperative recovery for patients with hip fracture and it also did not specify a nursing mode or method for use [6].

As a kind of nursing mode based on evidence-based medicine, rapid rehabilitation nursing has developed rapidly in recent years, which mainly promotes postoperative recovery and effectively reduces complications based on effective nursing mode for patients [7]. Rapid rehabilitation has been widely adopted in orthopaedics, and has obtained good results in spinal fractures and other orthopedic diseases under knee arthroplasty for a long time [8, 9]. Hip joint is mostly nursed based on health education to patients in the past, which mainly aims to provide stronger basis for clinical nursing of patients with hip fracture [10]. Rapid rehabilitation nursing is a nursing mode frequently adopted for orthopaedics, so it may also be suitable for patients with hip fracture.

In order to provide a better nursing mode for the patients with hip fracture to promote recovery, this study explored the application of rapid

# Effect of rapid rehabilitation nursing on patients with hip fracture

rehabilitation nursing in patients with hip fracture and its relief on pain.

## Materials and methods

### General materials

A total of 98 hip fracture patients with a mean age of  $66.29 \pm 4.61$  years admitted to our hospital from July 2015 to December 2018 were randomly selected and divided into research group and control group, 49 patients in each group. The control group was nursed under routine nursing mode, while the research group was nursed under rapid rehabilitation nursing mode.

### Inclusion criteria and exclusion criteria

Inclusion criteria: Patients between 55 and 75 years old diagnosed with hip fracture based on imaging and without other organs dysfunction who actively cooperate for the study [11]. Exclusion criteria: Patients with lower extremity deformity before fracture, severe hepatic renal dysfunction, communication obstacle or cognitive impairment or psychiatric history; patients combined with organ injury or other fractures or combined with other malignant tumor; patients unwilling to cooperate for the experiment. All patients and their families agreed to participate in the experiment and signed an informed consent form. The experiment has been approved by the Hospital's Ethics Committee.

### Nursing methods

The control group were nursed under routine nursing mode after being admitted to the hospital, which mainly included supervising patients to complete preoperative examinations, urging them to make preoperative preparations, including preoperative administration and enema, preparing medical records, medicines and others for patients in advance, closely monitoring and recording the patients' vital signs and observing their wounds timely to replace dressings for them in case of much exudates and observing their urine and feces for their smooth urination and defecation.

The research group was nursed under rapid rehabilitation nursing after being admitted to the hospital, which mainly included preoperative nursing, postoperative nursing and postoperative rehabilitation training and guidance. The details were as follows: (1) Preoperative nursing: In addition to preoperative nursing

necessary in routine nursing, it was also required to introduce the necessity, general procedure and precautions to the patients and their family members before surgery, maintain a good communication with them, pay close attention to the patient's emotional state to promptly guide and help them to alleviate their bad mood such as black mood, fear or anxiety by meeting their needs as much as possible, encourage them to express their feelings of pain on their own, tell them that pain from hip fracture is normal and provide appropriate pain relief measures. (2) Postoperative nursing: Closely monitor the patients' vital signs to prevent complications, adopt compressive stockings or pressurizer for long-term bedridden patients to squeeze their lower extremity veins and increase quantity of reflux of venous blood, so as to prevent deep venous thrombosis, actively pay attention to patients' psychological state and provide guidance for them in case of problems. (3) Postoperative rehabilitation training and guidance: Firstly, introduce the necessity of postoperative rehabilitation training and guidance and its process and precautions to the patients and their families. In the early stage, the patients were instructed to take active exercise on bed, while the patients' pain was observed during exercise, and pain relief measures were given if necessary. In the later period, the patients were instructed to take further exercise for joint motion, muscle strength and body flexibility when they can adapt to some basic activities. Their training intensity and training were adjusted according to their hip function recovery to help them gradually take independent movement with rehabilitation equipment instead of passive movement under the consideration of avoiding secondary injury for excessive movement. The above rehabilitation measures were taken to promote rehabilitation of patients. In the whole process of rehabilitation, it was necessary to maintain positive and good communication with patients, give them positive feedback, encourage them to insist on rehabilitation training, and give them appropriate dietary guidance.

### Observation indexes

The two groups were assessed in hip fracture function using the Harris hip score, and the criteria were as follows: 90-100 points were excellent, 80-89 points good, 70-79 points fair and points < 70 poor [12]. The two groups were assessed in life self-care ability using Barthel index before nursing and after one month of

## Effect of rapid rehabilitation nursing on patients with hip fracture

**Table 1.** General materials

Factors	The research group (n = 49)	The control group (n = 49)	X <sup>2</sup> /t	P
Gender			0.041	0.839
Male	28 (61.76)	27 (58.82)		
Female	21 (38.24)	22 (41.18)		
Age (Y)			0.041	0.839
≥ 66	27 (55.88)	26 (52.94)		
< 66	22 (44.12)	23 (47.06)		
BMI			0.060	0.806
≥ 22	25 (58.82)	23 (55.88)		
< 22	24 (41.18)	26 (44.12)		
Coagulation function				
APTT s	28.21 ± 2.21	28.17 ± 2.23	0.089	0.981
PT s	11.69 ± 1.04	11.73 ± 1.05	0.190	0.851
FIB g/l	3.11 ± 0.12	3.13 ± 0.11	0.860	0.392
Underlying diseases			0.165	0.921
Diabetes	12 (24.49)	13 (26.53)		
Hypertension	14 (28.57)	15 (30.61)		
No underlying diseases	23 (46.94)	21 (42.86)		
Education level			0.043	0.837
With junior high school diploma and below	29 (59.18)	30 (61.22)		
With junior high school diploma and above	20 (40.82)	19 (38.78)		
Nutritional status			0.221	0.895
Good	20 (40.82)	21 (42.86)		
General	16 (32.65)	17 (34.70)		
Poor	13 (26.53)	11 (22.45)		

nursing [13]. The higher the score, the better the patient's self-care ability. Then the two groups were assessed in negative emotions using SAS score and SDS score before nursing and after 1 month of nursing [11, 12]. And the two groups were assessed in pain situation at 1 day, 7 days and 17 days after surgery, respectively, using VAS, and recoded and observed in getting out-of-bed time and hospitalization time. They were also recorded and compared in complications, including lower limb deep venous thrombosis, pressure sore and constipation during 1 month after surgery, and recorded and compared in nursing satisfaction using a self-made nursing satisfaction questionnaire and in quality of life after 1 month of surgery using a quality of life scale (QLQ-C30) [13-15].

### Statistical methods

SPSS18.0 software (Bizinsight (Beijing) Information Technology Co., Ltd.) was adopted for statistical analysis of data obtained. Count data were analyzed by chi-square test, and measurement data were expressed as mean ±

standard deviation. Comparison between the two groups was tested by independent, and comparison within groups before and after nursing was tested by paired t. P < 0.05 indicated statistical difference.

### Results

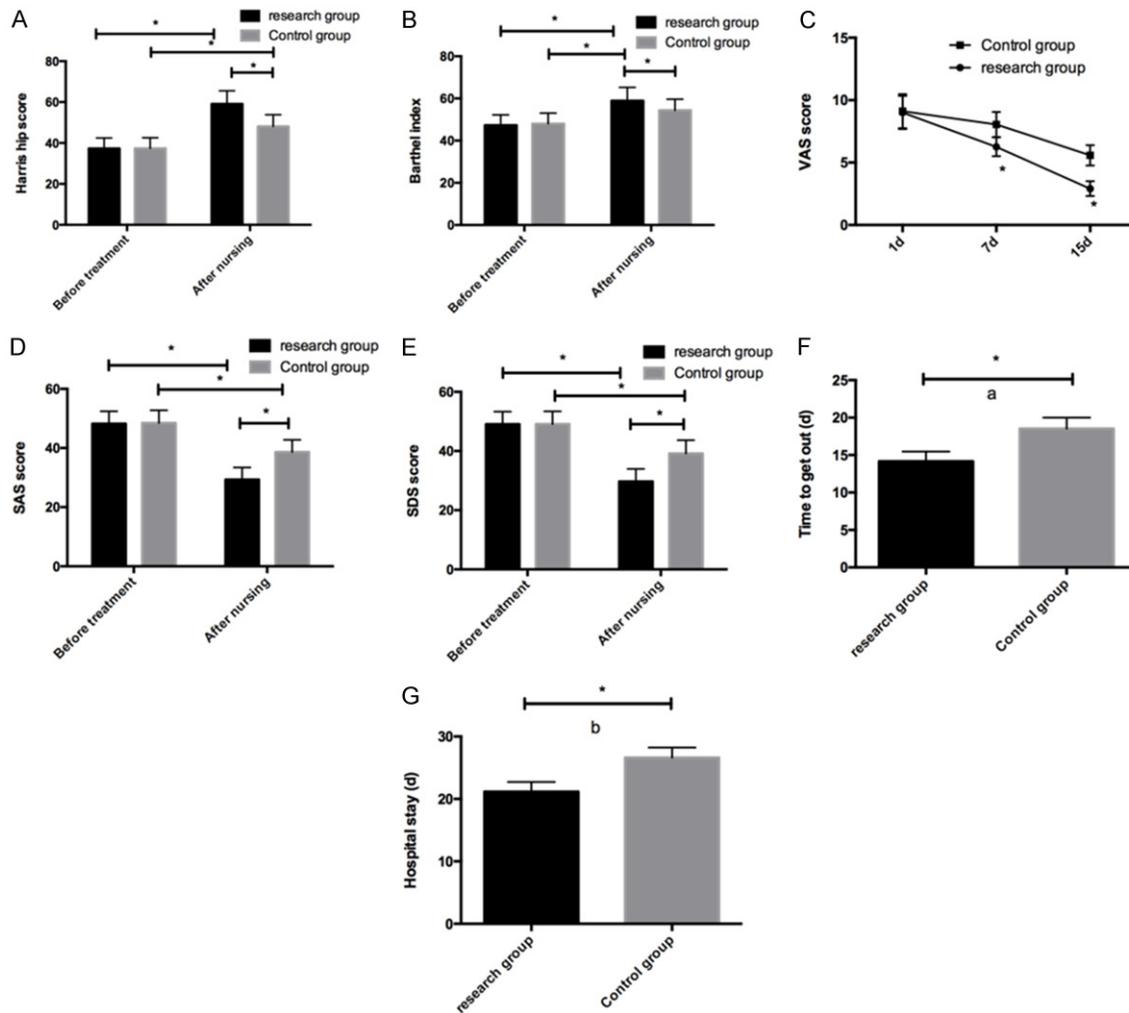
#### Comparison in general materials

There were no significant differences in gender, age and body mass index (BMI) between the two groups (all P > 0.05), which were comparable. More details are shown in **Table 1**.

#### Comparison between the two groups in Harris hip score, Barthel index, VAS, SAS and SDS scores, getting out-of-bed time and hospitalization time

The two groups showed no significant difference in Harris hip score, Barthel index, SAS score and SDS score before nursing (all P > 0.05) and showed significantly higher Harris hip score (A) and Barthel index (B), and significantly

## Effect of rapid rehabilitation nursing on patients with hip fracture



**Figure 1.** Comparison between the two groups in Harris hip score, Barthel index, VAS, SAS and SDS scores, getting out-of-bed time and hospitalization time. A. After one month of nursing, both the two groups showed significantly higher Harris hip score, and the research group showed significantly higher Harris hip score than the control group; B. After one month of nursing, both the two groups showed significantly higher Barthel index, and the research group showed significantly higher Barthel index than the control group; C. Both the two groups showed significantly lower VAS score at 7 d and 15 d after surgery than that at 1 d after surgery, and the research group showed significantly higher VAS score than the control group at 7 d and 15 d after surgery; D. After one month of nursing, the research group showed significantly lower SAS score than the control group; E. After one month of nursing, the research group showed significantly lower SDS score than the control group; F. The research group experienced significantly earlier getting out-of-bed time than the control group; G. The research group experienced significantly less hospitalization time than the control group. Note: \*indicates  $P < 0.05$ .

lower SAS score (D) and SDS score (E) after one month of nursing (all  $P < 0.05$ ), and the research group showed significantly higher Harris hip score and Barthel index and significantly lower SAS score and SDS score than the control group after one month of surgery (all  $P < 0.05$ ). At 7 d and 15 d after surgery, both the two groups showed significantly lower VAS score than that at 1 d, and the research group showed significantly higher VAS score than the control group (all  $P < 0.05$ ) (C). The research group

experienced significantly earlier getting out-of-bed time (F) and less hospitalization time (G) than the control group (both  $P < 0.05$ ). More details are shown in **Figure 1**.

### *Complications in the two groups within 1 month after surgery*

The research group showed a significantly lower complication rate than the control group ( $P < 0.05$ ). More details are shown in **Table 2**.

## Effect of rapid rehabilitation nursing on patients with hip fracture

**Table 2.** Complications in the two groups within 1 month after surgery

Item	The research group (n = 49)	The control group (n = 49)	X <sup>2</sup>	P
Deep venous thrombosis	1 (2.04)	4 (8.16)	1.043	0.307
Pressure sore	2 (4.08)	4 (8.16)	0.710	0.399
Constipation	2 (4.08)	5 (10.20)	1.385	0.239
Total incidence	5 (10.20)	13 (26.53)	4.356	0.037

**Table 3.** Comparison between the two groups in nursing satisfaction

Item	The research group (n = 49)	The control group (n = 49)	X <sup>2</sup>	P
Extremely satisfied	33 (67.35)	22 (44.90)	7.012	0.008
Satisfied	14 (28.57)	14 (28.57)	-	-
Unsatisfied	2 (4.08)	13 (26.53)	9.524	0.002
Nursing satisfaction	47 (95.92)	36 (73.47)	9.524	0.002

**Table 4.** Comparison between the two groups in quality of life after 1 month of surgery

Item	The research group (n = 49)	The control group (n = 49)	t	P
Role function	77.31 ± 3.22	62.63 ± 2.61	24.79	< 0.001
Body function	76.91 ± 3.10	62.91 ± 2.41	24.96	< 0.001
Emotion function	77.67 ± 3.18	63.03 ± 2.53	25.22	< 0.001
Cognitive function	78.19 ± 3.17	62.19 ± 2.38	28.25	< 0.001
Social function	77.04 ± 2.94	61.79 ± 2.18	29.17	< 0.001

### Comparison between the two groups in nursing satisfaction

After nursing intervention, the nursing satisfaction of the research group was significantly higher than that of the control group ( $P < 0.05$ ). More details are shown in **Table 3**.

### Comparison between the two groups in quality of life after 1 month of surgery

The research group showed significantly higher scores in role function, body function, emotion function, cognitive function and social function than the control group (all  $P < 0.05$ ). More details are shown in **Table 4**.

### Discussion

As a common orthopedic disease mainly occurring in elderly patients, hip fracture shows an increasing incidence for the advancement of

the aging society [17]. It not only causes great pain to the elderly, but also leads to a decline in the quality of life or even death [16]. Hip fracture mainly occurs in the elderly who are in low metabolism condition and valetudinarianism and usually are oversensitive, so it is required to give appropriate and effective nursing to patients to ensure the operative effect besides necessary surgery and other treatments, [17, 18]. Therefore, this paper explored the application effect of rapid rehabilitation nursing commonly adopted in orthopedics in patients with hip fracture.

First, the two groups were compared in Harris hip score and Barthel index before and after surgery, which showed that there was no significant difference between the two groups in the two aspects before nursing, and the research group showed significantly better Harris hip score and Barthel index than the control group after 1 month of nursing, indicating that rapid rehabilitation nursing can effectively promote postoperative recovery and improve life self-care ability for patients with hip fracture. There was a study indicating that rapid rehabilitation nursing can effectively promote postoperative recovery in total knee arthroplasty [19]. Although there are few studies on application of rapid rehabilitation nursing in hip fracture, the application of rapid rehabilitation nursing in related orthopedic can also support our conclusions. Surgical treatment is currently the most effective treatment for patients with hip fracture and it may cause pain symptoms as a traumatic treatment. Pain, a stress response, is likely to cause psychological anxiety, even shock and syncope, which is not conducive to the prognosis of patients, so it is of great significance to effectively relieve postoperative pain for patients with hip fracture [20]. Therefore, the two groups were also compared in VAS score at different time points

## Effect of rapid rehabilitation nursing on patients with hip fracture

after surgery and it showed that both the two groups experienced relieved pain over time after surgery, but the research group experienced more obviously relieved pain than the control group, indicating that rapid rehabilitation nursing can effectively relieve postoperative pain for patients with hip fracture. A previous study found that rapid rehabilitation nursing can effectively alleviate pain for patients having undergone hernia of lumbar intervertebral disks, which is similar to our study results [21]. In addition, our study also found that the research group showed significantly lower complication rate than the control group within 1 month after surgery, which may be due to the fact that rapid rehabilitation nursing can effectively relieve pain and it includes a series of preventive measures for possible complications. A previous study indicated that evidence-based nursing can significantly lower the incidence of complication rate for patients with hip fracture, and promote postoperative rehabilitation [22]. And rapid rehabilitation nursing is a nursing mode based on evidence-based nursing, so it further justifies the conclusion. Then the two groups were compared in negative emotion, getting out-of-bed time, hospitalization time, nursing satisfaction and quality of life, which showed that the research group had more obviously improved SAS score and SDS score, experienced earlier getting out-of-bed time and shorter hospitalization time, and showed significantly higher nursing satisfaction and quality of life after 1 month of surgery than the control group. A previous study found that rapid rehabilitation nursing can effectively alleviate negative emotions of patients and promote the recovery for patients having undergoing colorectal resection [23]. Early rehabilitation nursing mode, similar to rapid rehabilitation nursing, is also adopted in clinic. A great number of studies indicated that early rehabilitation nursing can effectively promote postoperative recovery and improve patients' quality of life, which is similar to our findings, but our findings for hip fracture are more specific [24, 25].

In summary, rapid rehabilitation nursing can effectively promote postoperative recovery, relieve pain and improve life self-care ability, negative emotion and nursing satisfaction for patients with hip fracture, so it is worthy of promotion. However, this study also has certain deficiencies, such as small sample size and inability to nurse patients in all levels due to the lim-

ited number of nursing staff, which requires us to constantly improve it in future research. In addition, the rapid rehabilitation nursing was not compared with other nursing modes, which made our conclusions still somewhat arguable.

### Disclosure of conflict of interest

None.

**Address correspondence to:** Xing Long, Department of Traumatology, Nanhua Hospital, Nanhua University, No. 336, Dongfeng South Road, Zhuhui District, Hengyang 421002, Hunan, China. Tel: +86-13873481814; E-mail: longdrx@163.com

### References

- [1] Cheung CL, Ang SB, Chadha M, Chow ES, Chung YS, Hew FL, Jaisamrarn U, Ng H, Takeuchi Y, Wu CH, Xia W, Yu J and Fujiwara S. An updated hip fracture projection in Asia: the Asian Federation of Osteoporosis Societies study. *Osteoporos Sarcopenia* 2018; 4: 16-21.
- [2] Mohd-Tahir NA and Li SC. Economic burden of osteoporosis-related hip fracture in Asia: a systematic review. *Osteoporos Int* 2017; 28: 2035-2044.
- [3] Haywood KL, Brett J, Tutton E and Staniszewska S. Patient-reported outcome measures in older people with hip fracture: a systematic review of quality and acceptability. *Qual Life Res* 2017; 26: 799-812.
- [4] Laiz A, Malouf J, Marin A, Longobardi V, de Caso J, Farrerons J and Casademont J. Impact of 3-monthly vitamin D supplementation plus exercise on survival after surgery for osteoporotic hip fracture in adult patients over 50 years: a pragmatic randomized, partially blinded, controlled trial. *J Nutr Health Aging* 2017; 21: 413-420.
- [5] Mazzola P, Ward L, Zazzetta S, Brogгинi V, Anzuini A, Valcarcel B, Brathwaite JS, Pasinetti GM, Bellelli G and Annoni G. Association between preoperative malnutrition and postoperative delirium after hip fracture surgery in older adults. *J Am Geriatr Soc* 2017; 65: 1222-1228.
- [6] Sayers A, Whitehouse MR, Berstock JR, Harding KA, Kelly MB and Chesser TJ. The association between the day of the week of milestones in the care pathway of patients with hip fracture and 30-day mortality: findings from a prospective national registry - The National Hip Fracture Database of England and Wales. *BMC Med* 2017; 15: 62.
- [7] Wei Z. Application of rapid rehabilitation nursing mode in perioperative nursing care of cervical cancer. *Chinese & Foreign Medical Research* 2017.

## Effect of rapid rehabilitation nursing on patients with hip fracture

- [8] Jawa RS, Singer AJ, Rutigliano DN, McCormack JE, Huang EC, Shapiro MJ, Fields SD, Morelli BN and Vosswinkel JA. Spinal fractures in older adult patients admitted after low-level falls: 10-year incidence and outcomes. *J Am Geriatr Soc* 2017; 65: 909-915.
- [9] den Hertog A, Gliesche K, Timm J, Mühlbauer B and Zebrowski S. Pathway-controlled fast-track rehabilitation after total knee arthroplasty: a randomized prospective clinical study evaluating the recovery pattern, drug consumption, and length of stay. *Arch Orthop Trauma Surg* 2012; 132: 1153-63.
- [10] Shenouda M, Silk Z, Radha S, Bouanem E and Radford W. The introduction of a multidisciplinary hip fracture pathway to optimise patient care and reduce mortality: a prospective audit of 161 patients. *Open Orthop J* 2017; 11: 309-315.
- [11] Weel H, Lindeboom R, Kuipers SE and Vervest TMJS. Comparison between the Harris- and Oxford Hip Score to evaluate outcomes one-year after total hip arthroplasty. *Acta Orthop Belg* 2007; 83: 98-109.
- [12] Unnanuntana A, Jarusriwanna A and Nepal S. Validity and responsiveness of Barthel index for measuring functional recovery after hemiarthroplasty for femoral neck fracture. *Arch Orthop Trauma Surg* 2018; 138: 1671-1677.
- [13] Li W, Ye Z, Wang W, Wang K, Li L and Zhao D. Clinical effect of hyperbaric oxygen therapy in the treatment of femoral head necrosis: a systematic review and meta-analysis. *Orthopade* 2017; 46: 440-446.
- [14] Knop C, Oeser M, Bastian L, Lange U, Zdichavsky M and Blauth M. Development and validation of the Visual Analogue Scale (VAS) spine score. *Unfallchirurg* 2001; 104: 488-497.
- [15] Turunen K, Salpakoski A, Edgren J, Tormakangas T, Arkela M, Kallinen M, Pesola M, Hartikainen S, Nikander R and Sipila S. Physical activity after a hip fracture: effect of a multi-component home-based rehabilitation program—a secondary analysis of a randomized controlled trial. *Arch Phys Med Rehabil* 2017; 98: 981-988.
- [16] Zusman EZ, Dawes MG, Edwards N and Ashe MC. A systematic review of evidence for older adults' sedentary behavior and physical activity after hip fracture. *Clin Rehabil* 2018; 32: 679-691.
- [17] Landi F, Calvani R, Ortolani E, Salini S, Martone AM, Santoro L, Santoliquido A, Sisto A, Picca A and Marzetti E. The association between sarcopenia and functional outcomes among older patients with hip fracture undergoing in-hospital rehabilitation. *Osteoporos Int* 2017; 28: 1-8.
- [18] Freter S, Koller K, Dunbar M, MacKnight C and Rockwood K. Translating delirium prevention strategies for elderly adults with hip fracture into routine clinical care: a pragmatic clinical trial. *J Am Geriatr Soc* 2017; 65: 567-573.
- [19] Quack V, Ippendorf AV, Betsch M, Schenker H, Nebelung S, Rath B, Tingart M and Luring C. Multidisciplinary rehabilitation and fast-track rehabilitation after knee replacement: faster, better, cheaper? a survey and systematic review of literature. *Rehabilitation (Stuttg)* 2015; 54: 245-251.
- [20] Cowan R, Lim JH, Ong T, Kumar A and Sahota O. The challenges of anaesthesia and pain relief in hip fracture care. *Drugs Aging* 2017; 34: 1-11.
- [21] Lurie JD, Berven SH, Gibson-Chambers J, Tosteson T, Tosteson A, Hu SS and Weinstein JN. Patient preferences and expectations for care: determinants in patients with lumbar intervertebral disc herniation. *Spine (Phila Pa 1976)* 2008; 33: 2663-2668.
- [22] Mittal C, Lee HCD, Goh KS, Lau CKA, Tay L, Siau C, Loh YH, Goh TKE, Sandi CL and Lee CE. ValuedCare program: a population health model for the delivery of evidence-based care across care continuum for hip fracture patients in Eastern Singapore. *J Orthop Surg Res* 2018; 13: 129.
- [23] Wang Q, Suo J, Jiang J, Wang C, Zhao YQ and Cao X. Effectiveness of fast-track rehabilitation vs conventional care in laparoscopic colorectal resection for elderly patients: a randomized trial. *Colorectal Dis* 2012; 14: 1009-1013.
- [24] Iordens GI, Den Hartog D, Van Lieshout EM, Tuinebreijer WE, De Haan J, Patka P, Verhofs-tad MH and Schep NW; Dutch Elbow Collaborative. Good functional recovery of complex elbow dislocations treated with hinged external fixation: a multicenter prospective study. *Clin Orthop Relat Res* 2015; 473: 1451-1461.
- [25] Chen L, Fang J, Ma R, Gu X, Chen L, Li J and Xu S. Additional effects of acupuncture on early comprehensive rehabilitation in patients with mild to moderate acute ischemic stroke: a multicenter randomized controlled trial. *BMC Complement Altern Med* 2016; 16: 226.