

# REVIEW

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## Factors affecting health-related quality of life in patients after femoral neck fracture

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**Key words:** femoral neck fracture; quality of life; health-related quality of life; evaluation.

**Summary.** Quality of life in patients with femoral neck fracture is an issue frequently discussed in the literature. There is ongoing research on identifying factors that have an impact on quality of life in this particular group of patients. A great variety of factors affecting quality of life and lack of information on their importance encouraged us to perform a systematic literature review analyzing quality of life of patients who sustained femoral neck fracture.

The search was performed in the PubMed and Medline databases according to the selected key words. In our systematic review, we included clinical and clinical randomized trials investigating patients with femoral neck fracture and their quality of life.

Our analysis showed that treatment of femoral neck fracture with hip replacement was superior to osteosynthesis with regard to patients' quality of life. The data regarding the impact of different rehabilitation programs on quality of life were controversial; a few reports showed that special rehabilitation programs were associated with better health-related quality life. However, other studies did not report any differences in patients' quality of life when different rehabilitation programs were applied. Patient's nutrition may be an important factor affecting the quality of life in patients with femoral neck fractures; however, data supporting this fact are insufficient.

### Introduction

The majority of femoral neck fractures occur due to osteoporosis (1, 2). The cumulative risk to sustain a femoral neck fracture for a person at the age of 80 years reaches 20%, and at the age of 90 years, this risk increases to 90% (3). In 1990, 1.7 million femoral neck fractures occurred worldwide, and it is estimated that this number might increase up to 6.3 million femoral neck fractures per year by 2050 (2).

Femoral neck fracture in the elderly affects patient's daily living after trauma, reduces self-care possibilities, and increases mortality rates (4). The treatment of these patients is associated with increased costs due to complicated inpatient treatment and following rehabilitation and nursing during the first year after trauma.

In general medicine, the studies are focused not only on the improvement of treatment methods, reduction in the number of complications, but also on the improvement of patients' quality of life. Studies suggest that age is recognized as a major factor affecting patients' health-related quality of life

(HRQL) due to its direct relation to patients' general health condition (5). However, HRQL in patients with femoral neck fracture, compared to other medical conditions, has not been thoroughly studied (6, 7). The majority of scientific studies on patients with femoral neck fracture investigate different treatment methods, various treatment options for fracture prevention, and different aspects of costs as well. Investigating available reports analyzing HRQL in patients with femoral neck fracture, we found that HRQL decreases at 1 year after the treatment. Thus, researchers are seeking to investigate and report the factors affecting HRQL in these patients, also find the pathways for improvement.

Although HRQL in general clinical practice is used as one of the main outcome measures for reporting treatment and nursing results (8, 9), for outcome evaluation in femoral neck fracture patients, it should be used more often.

The aim of this literature review was to investigate the factors affecting HRQL in patients with femoral neck fracture.

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### Methodological approach

*Method of literature selection.* For this literature review, we included randomized controlled trials and clinical trials, investigating HRQL in patients with femoral neck fracture.

The search for the reports was performed using the Medline and PubMed databases. The key words, such as “hip fracture\$ OR femoral neck fracture\$ AND quality of life,” were used for the search. Only reports published during the last 10 years and involving patients with femoral neck fractures, older than 50 years, were selected. A total of 46 publications met our requirements. These manuscripts were analyzed by two experts in the field if they were suitable for further analysis. The decision about the inclusion of the manuscript into review analysis was based on the information about HRQL used as an outcome measure.

Fifteen reports were selected and used for further analysis.

*Description of the studies.* Investigating the reports meeting our requirements for this literature review, we analyzed factors affecting HRQL and estimated methods used for HRQL assessment in patients with femoral neck fracture. Thirteen publications selected were controlled randomized trials, while two were classified as clinical trials. There were 2518 patients with femoral neck fracture included in our analysis.

Of the 15 reports selected, 6 studies analyzed the effect of different programs of postoperative care/rehabilitation on HRQL and 5 analyzed the extended rehabilitation and its effect on the outcome (6, 7, 10–13).

Five published reports analyzed the different treatment methods and their associations with HRQL. One of them compared bipolar hip replacement with total hip replacement in respect to HRQL in patients with femoral neck fractures (14). Other report compared unipolar with bipolar hip replacement in patients with femoral neck fractures and impact of treatment method on HRQL (15). The remaining 3 publications analyzed patients with femoral neck fracture treated with osteosynthesis and hip replacement (unipolar [16, 17] and total hip replacement [18]) and compared HRQL between the groups.

One report analyzed the impact of nutritional status on HRQL of patients with femoral neck fracture (19).

Two reports, included in our literature review, investigated the relationship of HRQL with fracture dislocation (20) and pain in the fractured hip (21). The last report included in our review correlated the economic costs with HRQL in the treatment of patients with femoral neck fracture (22).

### Results and discussion

#### *Rehabilitation and health-related quality of life*

Our literature analysis discovered six reports, meeting the requirements to be included in the literature review and studying different rehabilitation programs and their effect on HRQL in patients with femoral neck fracture (6, 7, 10–13).

Shyu et al. investigated HRQL among patients with femoral neck fracture and compared interdisciplinary intervention rehabilitation program with conventional care (10). Routine 7-day hospital care consisted of three consultations of a rehabilitation specialist and following independent rehabilitation at home. The interdisciplinary intervention program had three components: geriatric consultation services, preparation of future rehabilitation program, and discharge planning services. A geriatric specialist evaluated general health status of patients with femoral neck fracture and suggested the best time for the surgery, optimal thromboembolic prophylaxis, and postoperative care. The rehabilitation program included early patient's mobilization in hospital and preparation of future rehabilitation program at home with supervision of a geriatric nurse. During the hospital stay, the geriatric nurse created a discharge plan according the patients' needs and their home conditions. The recommendations regarding environmental modifications at home based on the needs of patients with femoral neck fracture were provided to patient's relatives. The authors compared HRQL of 68 patients with femoral neck fracture, who received interdisciplinary intervention program, with HRQL of 69 patients who received routine postoperative care. HRQL was measured at 1 and 3 months after trauma; the SF-36 questionnaire was employed. There were no significant changes in HRQL between the groups at 1 month. However, at 3 months after the trauma, the patients who received the interdisciplinary intervention program reported improved HRQL ( $P=0.03$ ).

Huang and Liang (12) examined the effect of interventional postoperative care program on HRQL and compared with routine care among hospitalized elderly patients with hip fracture. The groups compared included 63 patients with femoral neck fracture in each. In this study, interventional postoperative care program included the preparation of a discharge plan described in a previous report (10). The SF-36 questionnaire was used to measure HRQL at 3 months after the surgery. The results of this study clearly indicated the benefits of appropriate discharge planning – patients receiving interventional postoperative program showed better HRQL ( $P<0.05$ ).

Binder et al. (6) examined 90 patients with femoral neck fracture, who were randomly divided

into two groups: one group was given supervised physical therapy and exercise training (n=46) and another was given rehabilitation at home (n=44). HRQL of patients was estimated using the SF-36 questionnaire at 6 months after trauma. No significant differences in HRQL between the groups were observed.

A study by Tsauo et al. (11) included 25 patients with femoral neck fracture. Patients were randomized into two groups: one group (n=13) received home-based physical therapy program, which consisted of exercises and consultations of a rehabilitation specialist at home, teaching patients and their relatives, and the control group (n=12) received only one consultation of a rehabilitation specialist at bedside before discharge. HRQL was estimated using the WHOQOL-BREF questionnaire at 1, 3, and 6 months postoperatively. The authors concluded that patients who received rehabilitation coordinated by a rehabilitation specialist at home improved their HRQL at 1 month ( $P<0.05$ ) and 3 months ( $P<0.01$ ) after trauma.

Similarly as in the study by Tsauo et al. (11), Hagsten et al. (7) evaluated the effects of an individualized, postoperative, occupational training program on the patient's HRQL. They randomly allocated 100 patients with femoral neck fracture to either occupational training group or control group. HRQL of control patients (n=50) was compared with HRQL of patients with femoral neck fracture (n=50), who received postoperative conventional rehabilitation at the ward. HRQL was evaluated according to the SWED-QUAL questionnaire at 2 months after trauma. No statistically significant differences were found between the groups with regard to HRQL.

Ryan et al. (13) examined 160 patients with stroke and femoral neck fracture and evaluated the impact of intensive and nonintensive home-based rehabilitation on patients' HRQL. The Euroqol 5D (EQ-5D) questionnaire was used as an outcome measure. No significant differences in quality of life were observed comparing the groups, i.e., a more intensive regime of home-based rehabilitation did

not result in better outcomes for older people recovering from femoral neck fracture.

The above studies suggest that individual interventional rehabilitation programs with an involvement of a geriatric specialist significantly improve HRQL. Rehabilitation at home with an involvement of a rehabilitation specialist only does not have any effect on HRQL in patients with femoral neck fracture as compared with conventional rehabilitation during hospital stay.

#### **Treatment method and health-related quality of life**

Patients with femoral neck fractures are treated operatively with either osteosynthesis or hip replacement. Osteosynthesis is less invasive surgery associated with lower postoperative mortality rates (23, 24). Until now, there are no well-defined indications in the literature with regard to which method of treatment should be used for the treatment of patients with femoral neck fracture. The methods of operative treatment applied in the studies included our literature review are presented in Table.

Hip replacement as compared to osteosynthesis is associated with better HRQL in patients with femoral neck fracture (16, 18). On the contrary, one of the reports included in this review (17) reported that osteosynthesis was associated with better HRQL as compared to prosthetic hip replacement at 1 and 2 years after the surgery. However, this study included patients with severe cognitive dysfunction, and this might interact results. The choice of hip replacement method (bipolar versus total hip replacement) did not have any impact on HRQL (14, 15).

In summary, we found supportive data that hip replacement (independent of the method used) assures better HRQL as compared with osteosynthesis.

#### **Nutritional status and health-related quality of life**

We found only one study evaluating effects of a protein-rich liquid supplementation on HRQL in patients with femoral neck fracture (19). A total of

Table. The results of health-related quality of life (HRQL) and operative method used

Author	Year	Treatment methods, number of patients	Quality of life questionnaire	The difference of HRQL
Blomfeldt et al. (14)	2007	Bipolar hip replacement, n=60 Total hip replacement, n=60	EQ-5D	Difference not significant
Frihagen et al. (16)	2007	Osteosynthesis, n=112 Bipolar hip replacement, n=110	EQ-5D	HRQL improvement after hip replacement, $P=0.03$
Blomfeldt et al. (18)	2005	Osteosynthesis, n=53 Total hip replacement, n=49	EQ-5D	HRQL improvement after hip replacement, $P<0.005$
Blomfeldt et al. (17)	2005	Osteosynthesis, n=30 Unipolar hip replacement, n=30	EQ-5D	HRQL improvement after osteosynthesis, $P<0.001$
Raia et al. (15)	2003	Unipolar hip replacement, n=60 Bipolar hip replacement, n=55	SF-36	Difference not significant

59 patients with femoral neck fracture were enrolled into this study. Twenty patients received protein-enriched diet, 19 patients additionally to protein-enriched diet received an intramuscular injection of nandrolone decanoate 3 times per day, and the control group of 20 patients was given standard nutrition. All the patients additionally received vitamin D and calcium. HRQL was assessed using the EQ-5D questionnaire at 6 and 12 months after trauma. The authors concluded that the patients receiving a combined treatment with a protein-enriched diet and intramuscular injection of nandrolone decanoate showed with better HRQL as other two groups. However, no statistically significant difference in HRQL was observed at 6 and 12 months after the surgery comparing the patients given protein-enriched diet with those receiving standard nutrition.

Summarizing the above-described report, we suggest that nutrition in patients with femoral neck fracture may have an impact on outcome. However, to provide recommendations in respect to the subject, more studies investigating nutrition and its association with HRQL in patients with femoral neck fractures are required.

#### ***Fracture dislocation, hip joint pain, economical costs, and health-related quality of life***

Tidememark et al. (20) reported a significantly better HRQL in the patients with undisplaced femoral neck fracture as compared to those with displaced femoral neck fracture and treated with osteosynthesis. The differences in HRQL were due to higher reoperation rate and remaining pain in the displaced fracture group. However, the major issue in this study was not the displacement of the fracture but the treatment method used. As previous study has confirmed that arthroplasty as compared to osteosynthesis assures better HRQL in patients with displaced femoral neck fractures (16, 18). Similarly, associations between pain in the fractured hip and HRQL were reported by Herrick et al. (21). Treat-

ment costs were found to be an important factor affecting HRQL in patients with hip fracture. Borgström et al. (22) have reported that hip fractures were associated with higher treatment-related costs as compared with vertebra or wrist fractures and it was directly related to better HRQL in the group of patients with hip fractures.

#### ***Sociodemographic factors and health-related quality of life***

There are reports in the literature suggesting that HRQL is affected not only by general patient's health condition, psychological status, independency level, and social relationships but also sociodemographic factors, which may play a role (8, 25–28). The reports selected for this review did not investigate the relationships of patient's age, gender, education with HRQL. Only one report (7) found an association between patient's age and living in a family status, but more detailed analysis was not performed. It has been reported that older age and male gender are associated with increased mortality rates and worse functional status in patients with femoral neck fracture (29), but more studies need to be undertaken to confirm these associations between the above-mentioned factors and HRQL.

#### ***Concluding remarks***

Our literature review suggests that hip replacement is associated with better health-related quality of life in patients with femoral neck fracture as compared with osteosynthesis. There are some data in the literature indicating that postoperative interventional rehabilitation program may improve health-related quality of life in patients with femoral neck fracture. We recognize that there is a lack of studies investigating if additional nutrition could contribute to improvement in health-related quality of life in this vulnerable patients' group. Thus, additional nutrition postoperatively may improve health-related quality of life, but additional studies are required.

## **Veiksniai, turintys poveikį pagyvenusio amžiaus pacientų, patyrusių šlaunikaulio kaklo lūžius, gyvenimo kokybei**

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**Raktažodžiai:** šlaunikaulio kaklo lūžiai, gyvenimo kokybė, su sveikata susijusi gyvenimo kokybė, vertinimas.

**Santrauka.** Pastaraisiais metais nagrinėjami įvairūs veiksniai, turintys poveikį pacientų, patyrusių šlaunikaulio kaklo lūžius, gyvenimo kokybei. Šių veiksnių gausa bei gyvenimo kokybę vertinančių instrumentų įvairovė paskatino mus atlikti sisteminę literatūros apžvalgą šia tematika. Mūsų tyrimo tikslas – atlikti sisteminę literatūros apžvalgą, analizuojančią pacientų, patyrusių šlaunikaulio kaklo lūžius, gyvenimo kokybę.

Paieška atlikta „PubMed“ ir „Medline“ duomenų bazėse pagal pasirinktus raktažodžius. Į apžvalgą įtraukti klinikiniai ir klinikiniai atsitiktinių imčių tyrimai, kuriuose buvo tiriama pacientų, patyrusių šlaunikaulio kaklo lūžius, gyvenimo kokybė.

Chirurginio gydymo metodo pasirinkimas (protezavimas totaliniu ar bipoliu endoprotezu), gydant šlaunikaulio kaklo lūžius, turėjo didžiausią įtaką šios grupės pacientų gyvenimo kokybei. Duomenų apie reabilitacijos skirtingų programų įtaką pacientų gyvenimo kokybei bendros nuomonės šioje literatūros apžvalgoje rasti nepavyko. Mityba yra svarbus veiksnys, lemiantis šių pacientų gyvenimo kokybės pokyčius, tačiau tą įrodančių duomenų nepakanka.

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