RELATIONSHIP BETWEEN SOCIO-DEMOGRAPHIC FACTOR AND FUNCTIONAL OUTCOME OF FEMORAL NECK FRACTURE OSTEOSYNTHESIS BY BIPLANE DOUBLE SUPPORTED SCREW FIXATION METHOD (BDSF)

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Abstract

Objective: The aim of this study was to evaluate the relation between socio-demographic factor and functional outcome of femoral neck fracture osteosynthesis by biplane double supported screw fixation (BDSF) method.

Methodology: This was a single group prospective hospital based clinical trial and was conducted in the Department of Orthopedic Surgery in Chittagong medical college hospital for a period of one and half year from July 2018 to July 2020. Sample size was 30 with (AO /OTA-31B) fracture as per set criteria treated with BDSF enrolled through inclusion and exclusion criteria. Depending on the overall functional outcome patients were grouped as having excellent to good outcome and fair to poor outcome according to Harris hip score. Patients were followed up for 12 months.

Result: Mean 40.61 ± 12.756 years of age, male sex, no delayed union and no non-union patients had greater chance of having excellent functional outcome. Non-union has showed very highly statistical significant significance according to P value.

Conclusion: Middle age and male patients had greater chance of having excellent functional outcome.

Keywords: Functional Outcome, Femoral Neck Fracture, BDSF, Socio-demographic factor

ВЗАИМОСВЯЗЬ МЕЖДУ СОЦИАЛЬНО-ДЕМОГРАФИЧЕСКИМИ ФАКТОРАМИ И ФУНКЦИОНАЛЬНЫМ РЕЗУЛЬТАТОМ ОСТЕОСИНТЕЗА ПЕРЕЛОМА ШЕЙКИ БЕДРЕННОЙ КОСТИ МЕТОДОМ БИПЛАНАРНОЙ ФИКСАЦИИ ДВОЙНЫМИ ВИНТАМИ (BDSF)

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Аннотация
Цель: Целью данного исследования было оценить взаимосвязь между социально-демографическими факторами и функциональным результатом остеосинтеза перелома шейки бедренной кости методом бипланарной фиксации двойными винтами (BDSF).

Методология: Это было проспективное клиническое исследование в одной группе, проведенное на базе больницы медицинского колледжа Читтагонга в течение полутора лет, с июля 2018 года по июль 2020 года. Размер выборки составил 30 пациентов с переломом (AO/OTA-31B) в соответствии с установленными критериями, которым проводилось лечение методом BDSF, отобранных на основе критериев включения и исключения. В зависимости от общего функционального результата пациенты были разделены на группы с отличным и хорошим результатом, а также с удовлетворительным и плохим результатом в соответствии с шкалой Харриса для оценки состояния тазобедренного сустава. Наблюдение за пациентами проводилось в течение 12 месяцев.

Результат: Средний возраст 40,61 ± 12,756 лет, мужской пол, отсутствие замедленного сращения и несращения у пациентов имели более высокую вероятность достижения отличного функционального результата. Несращение показало очень высокую статистическую значимость согласно значению P.

Вывод: Пациенты среднего возраста и мужчины имели более высокую вероятность достижения отличного функционального результата.

Ключевые слова: Функциональный результат, Перелом шейки бедренной кости, BDSF, Социально-демографические факторы

Introduction

Fracture of neck femur is a very common injury in patients more than 50 years of age. The majority occur in the elderly (average age of 72 years) as a result of low-energy falls 1. Risk factors include female sex, white race, increasing age, poor health, tobacco and alcohol use, previous fracture, fall history, and low estrogen level 2,3,4. Low-energy trauma is most common in older patients and can involve either direct or indirect mechanisms. Direct mechanisms include a fall onto the greater trochanter or forced external rotation of the lower extremity, which impinges the femoral neck onto the posterior lip of the acetabulum. Indirect mechanisms result when muscle forces overwhelm the strength of the femoral neck. High-energy trauma accounts for most femoral neck fractures in younger individuals, such as motor vehicle accident or fall from a significant height. Cyclical loading-stress fractures are seen in athletes, military recruits, and ballet dancers. Insufficiency fractures occur in patients with osteoporosis and osteopenia 5. The treatment of choice for most femoral neck fractures is operative to allow early patient mobilization, decrease the risk for complications, and improve patient outcomes. Non-operative management should be considered only in patients who are seriously ill and present excessive surgical risk. In the majority of patients, operative management is indicated; the choice of a specific treatment option is based on the

stability and orientation of the fracture and patient factors such as age, function, and bone quality. In general, surgery should be performed on an urgent or emergent basis to minimize the risk for perioperative complications, improve patient comfort, and decrease the length of hospitalization 6,7,8. Operative options for displaced (unstable) femoral neck fractures (Garden III and IV) include closed reduction and internal fixation (CRIF), open reduction and internal fixation (ORIF), HA, and total hip arthroplasty (THA). Selection of the appropriate implant for a particular patient requires individualized assessment of patient-related (eg, activity level, life expectancy, medical comorbidities) and fracture-related (eg, location, orientation, comminution) factors. It is important to note that the indications for particular treatment modalities are very heterogeneous among orthopaedic surgeons, although there has been a recent push toward establishing algorithms and hospital care pathways 5.

Materials & method

This was a single group prospective hospital based clinical trial and was conducted in the Department of Orthopedic Surgery in Chittagong medical college hospital for a period of one and half year from July 2018 to July 2020. Sample size was 30 with (AO /OTA-31B) fracture as per set criteria treated with BDSF enrolled through inclusion and exclusion criteria. Ethical clearance was obtained from the Institutional Review Board (IRB) of CMCH. Purposive sampling was done according to availability of the patients. The collected data were entered into the computer and analyzed by using SPSS (version 20.1) to evaluate the relation between socio-demographic factor and functional outcome of femoral neck fracture osteosynthesis by biplane double supported screw fixation(BDSF) method.

Results

This present hospital based clinical trial was conducted between the periods of January 2019 to July 2020 for duration of eighteen months in the Department of Orthopaedic Surgery, Chittagong Medical College Hospital. In this study, adult patient undergoing surgery for fracture neck of femur was the study sample. Total 30 samples were included in the study. In this study, total four follow up were done after 1 month, 2 months, 6 months and 12 months and there was one drop out of patient at 3rd follow-up and another one drop out of patient at 4th follow-up during the study period. The overall functional outcomes were categorized according to Harris Hip Score (1969) as excellent, good, fair and poor.

Most of the study population (36.7%) was in 18-35 years and 36-50 years of age group both. The mean age of the patients was 41.87 ± 13.950 years (range: 18-65 years) (Table 1).

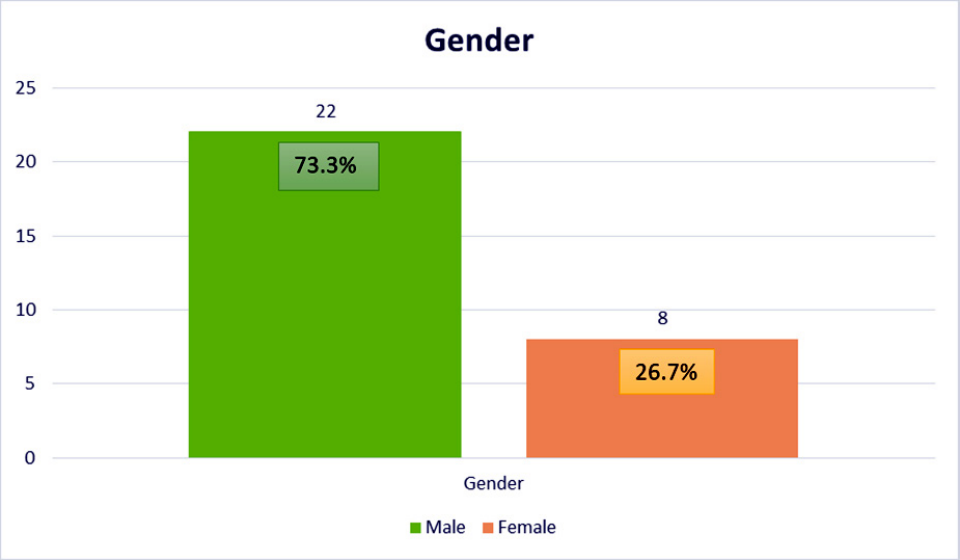
• *Table 1: Distribution of the study population by their age (n=30)*

Age (years)	Frequency	Percentage
18-35	11	36.7%
36-50	11	36.7%
51-65	08	26.7%
Total	30	100%
Mean ± SD	41.87 ± 13.950	

Range	18-65 years

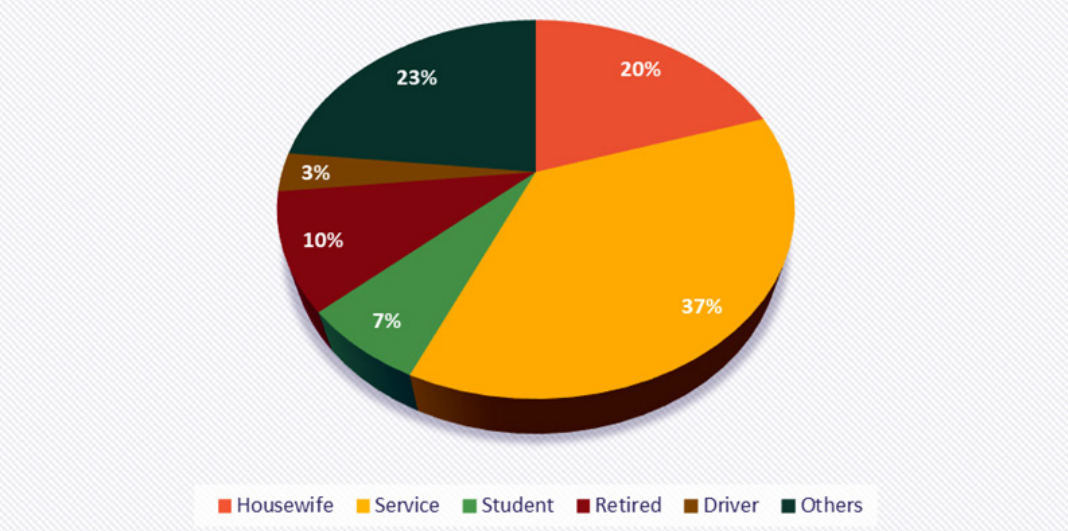
Bar diagram shows the gender distribution of the study patients and it depicts that, there was male predominance with male to female ratio about 3:1. (Figure 1)

• *Figure 1: Gender distribution of the patients (n=30)*



Pie chart shows that service was the mostly occurring occupation among the patients (37%) and housewife were 20% (Figure-2).

• *Figure-2: Occupation of the patients (n= 30)*



Two patients were dropped out during final follow up. Out of 28 patients only 01 (3.6%) patients had delayed-union and 02 (7.1%) patients had non-union. (Table 2)

• *Table 2: Fracture union status of the study population (n=28)*

Parameter	Frequency	Percentage
Delayed- union		
Yes	01	3.6%
No	27	96.4%
Non-union		
Yes	02	7.1%
No	26	92.9%

Pie chart shows, at the final follow-up, most of the patients (n=23 82.1%) had excellent outcome. Both good and poor outcome were in 02 (7.1%) and fair outcome was in only 01 (3.6%) patients respectively (Figure 3).

• *Figure 3: Functional outcome at 12 months (n= 28)*

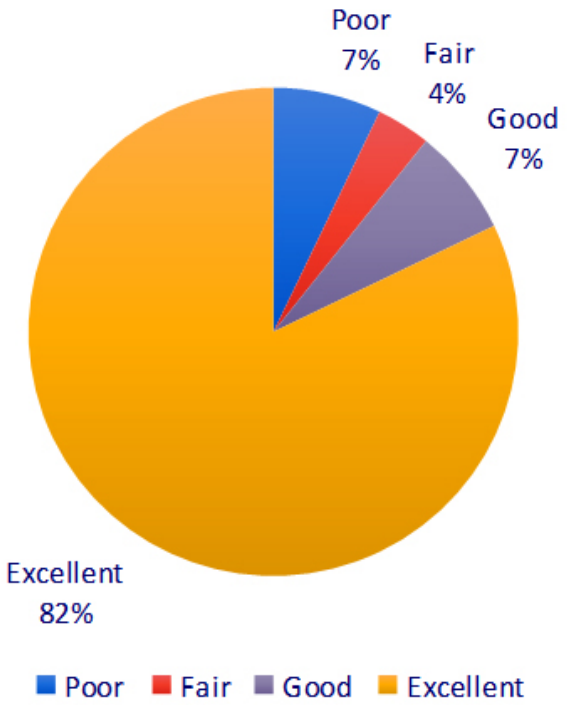


Table 3 shows the association of age, gender, delayed union and non-union to final outcome status. It showed that, mean 40.61 ± 12.756 years of age, male sex, no delayed union and no non-union had greater chance of having excellent functional outcome. Non-union has showed very highly statistical significant significance according to P value. (Table 3)

• *Table 3: Analysis of factors associated with outcome*

Variables	Functional outcome				P value
	Poor	Fair	Good	Excellent	
Age (in years)	52.50 ± 3.536	39.00 ± 0.000	24.0 ± 8.485	40.61 ± 12.756	0.171 (ns)
Gender					0.641* (ns)
Female	01 (50%)	----	----	06 (26.1%)	
Male	01 (50%)	01 (100%)	02 (100%)	17 (73.9%)	
Total	02 (100%)	01 (100%)	02 (100%)	23 (100%)	
Delayed union					0.973* (ns)
No	02 (100%)	01 (100%)	02 (100%)	22 (95.7%)	
Yes	----	----	----	01 (4.3%)	
Total	02 (100%)	01 (100%)	02 (100%)	23 (100%)	
Non-union					<0.001* (vhs)
No	----	01 (100%)	02 (100%)	23 (100%)	
Yes	02 (100%)	----	----	----	
Total	02 (100%)	01 (100%)	02 (100%)	23 (100%)	

** P value derived from Chi-square test- * and ANOVA test- #*
** ns= non-significant; vhs= very highly significant*

Discussion

In this present study, mean age of the patients was 41.87 ± 13.950 years (range: 18-65 years). A study by Filipov (2011) described the age distribution of the patients, the average age is 76.9 (with the youngest patient aged 38 and the oldest aged 99) 9. In our study, out of 30 patients, 22(73.3%) were male and 8(26.7%) were female. Filipov (2011) found the subjected patients comprised 88 studied patients, 27 (30.68%) are men and 61 (69.31%) women 9. According to occupation, among the 22 patients, service was the mostly occurring occupation (36.7%) and housewife were 20%. In our study, only 01 (3.6%) patients had delayed-union, and 02 (7.1%) patients had non-union. Filipov et al. (2017) showed that, rate of nonunion was 3.4%, including fixation failure (2.4%), pseudoarthrosis (0.5%) and nonunion with AVN (0.5%) 10. According to Harris Hip Score (HHS) patients were categorized into four subdivisions- excellent, good, fair and poor. After 12 months final follow-up, excellent outcome was in 23 (82.1%) patients. Similar result was reported by Kalia et al. (2018) study. Out of the 25 patients, 3 (8.57%) had poor HHS, 4 (11.42%) had fair HHS, 9 (28.57%) had good HHS, while excellent HHS was seen in 9 (51.42%) patients 11. In our study mean 40.61 ± 12.756 years of age, male sex, no delayed union and no non-union had greater chance of having excellent functional outcome. Non-union has showed very highly statistical significant significance

Conclusion

This study showed that, mean 40.61 ± 12.756 years of age, male sex, no delayed union and no non-union had greater chance of having excellent functional outcome. Non-union has showed very highly statistical significant significance according to P value.

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Conflict of Interest
Authors declare no conflict of Interest.

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