ORIGINAL ARTICLE

Prevalence and Risk Factors of Delirium and Subsyndromal Delirium in Older Adults

FAIQA NASIR[1], SHEHRBANO BATOOL[2], ANAM NASIR[3], MUHAMMAD FAISAL BACHA[4], AYSHA MUSHTAQ[5]
[1]MBBS, MCPS Family Medicine, WMO at Millat hospital, Rahim Yar Khan
[2]House Officer, Medical Unit 1, Holy Family Hospital, Rawalpindi
[3]Post Graduate Trainee, Internal Medicine department, LUMHS, Jamshoro Hyderabad
[4]Assistant Professor Internal Medicine, Farooq Hospital/ Akhtar Saeed Medical College, Islamabad
[5]MBBS, MPhil Physiology, Demonstrator Islamic International Medical College, Rawalpindi
Corresponding author: Aysha Mushtaq, Email: aysha.armughan@gmail.com

ABSTRACT

Background and Aim: Delirium is the most prevalent geriatric issue that is independently associated with poor outcomes in terms of discharge, length of hospital stay, and increased mortality. Subsyndromal delirium (SSD) is defined by the presence of delirium symptoms that do not yet meet the definition of full-blown delirium. The present study aimed to determine the incidence and delirium-related risk factors in older adults.

Method: This prospective study was conducted on 420 elderly patients (>60 years) in the Department of Medicine of Benazir Bhutto Hospital Rawalpindi and Liaquat University Medical and Health Sciences, Jamshoro Hyderabad, from April 2021 to December 2021. Study protocol was approved from research and ethical committees of the institutions. The purpose of the study was explained to the participants after taking written informed consent. Patients were classified into three categories are as follows: delirium, subsyndromal delirium, and cases without both delirium and subsyndromal delirium. Detailed history taking, comprehensive geriatric assessment, and clinical examination from each individual were recorded. All the collected data were analyzed using SPSS version 26.

Results: Of the total 420 elderly patients, the incidence of delirium and subsyndromal delirium was 96 (22.9%) and 72 (17.1%) respectively. There were 264 (62.9%) male and 156 (37.1%) females. The overall mean age was 68.4± 4.8 years. Delirium and subsyndromal delirium cases were distributed based on the patient's age were as follows: 62 (64.6%) and 42 (58.3%) in 60-70 years, 24 (25%) and 22 (30.6%) in 71-80 years, and 10 (10.4%) and 8 (11.1%) in >81 year. Of the 96 delirium cases, the incidence of hypoactive type, hyperactive type, and mixed type was 54 (56.3%), 18 (18.8%), and 24 (24.9%) respectively. Based on cognitive assessment, about 36 (8.6%) MMSE score <23, 78 (18.6%) had MMSE score <18, and 54 (12.9%) did not respond to MMSE. The incidence of common comorbidities such as hypertension, chronic liver disease, asthma, ischemic heart disease, cerebrovascular disease, diabetes, and malignancy was 144 (34.3%), 82 (19.5%), 26 (6.2%), 120 (28.6%), 24 (5.7%), 184 (43.8%), and 14 (3.3%) respectively.

Conclusion: The present study found that the incidence of delirium and subsyndromal delirium was 22.9% and 17.1% respectively. Adverse outcomes such as increase in length of hospital stay, mortality, and discharge are independently associated with delirium. Efforts to prevent disease may identify patients who require clinical attention.

Keywords: Delirium, subsyndromal delirium, risk factors

INTRODUCTION

Delirium is the most prevalent geriatric issue found worldwide and independently associated with increased hospital stay, mortality, and discharge [1]. The presence of delirium certain symptoms is characterized by subsyndromal delirium. Risk factors for developing delirium have been investigated in hospitalized patients. Older age, usage of high-risk medication, medical illness severity, dementia, sensory impairment, electrolyte imbalance, immobility, and malnutrition are different risk factors associated with delirium [2-4]. A previous study reported that heart disease was another risk factor for delirium [5]. Numerous studies investigated the different risk factors for delirium and found that stressful event, heart failure, infections, medication usage, surgery, metabolic-endocrine disturbances, and medical illnesses are significantly associated risk factors for most common delirium cases [6, 7].

The incidence of delirium in acute medical patients aged >60 years varies from 18% to 35% on hospitalization [8, 9]. The occurrence of subsyndromal delirium varied from 23% to 37% in older adult's population [10, 11]. A China-based study conducted on delirium in the older population mainly focused on postoperative delirium or subacute medical setting [12]. There have been no previous reports on delirium and SSD in Chinese elderly patients hospitalized with acute illness, which is highly relevant to the prognosis of this elderly patient group [13]. Contributory (predisposing) and triggering (precipitating) are mainly two types of risk actors [14]. This distinction is difficult to apply to community-dwelling elderly delirium patients. Dehydration or poorly controlled diabetes can both be predisposing and precipitating factors, and they occur relatively frequently in older patients. As a result, we prefer to differentiate between non-modifiable and modifiable risk factors.

Metabolic anomalies and sepsis were the most prevalent etiologies of delirium in elderly patients hospitalized [15]. Majority of trigger risk factors were reversible and had clinical presentation with favorable outcome classified into subtypes are as follows: hypoactive, hyperactive, and mixed. Hypervigilance, restlessness, delusion, agitation, and hallucinations were present in hyperactive delirium patients whereas hyperactive consist of sedation, spontaneous motion, lethargy, and slower response. The present study aimed to determine the occurrence of delirium and their associated risk factors among older adults.

METHODOLOGY

This prospective study was conducted on 420 elderly patients (>60 years) in the Department of Medicine, Benazir Bhutto Hospital, Rawalpindi and Liaquat University Medical and Health Sciences, Jamshoro Hyderabad, from April 2021 to December 2021. Study protocol was approved by the research and ethical committees of the hospitals. The purpose of the study was explained to the participants after taking written informed consent. Patients were classified into three categories are as follows: delirium, subsyndromal delirium, and cases without both delirium and subsyndromal delirium. Detailed history taking, comprehensive geriatric assessment, and clinical examination from each individual were recorded. Patients admitted to the acute stroke units, intensive care units, coma patients, chronic neurocognitive disorders, persistent vegetative state, and taking antipsychotic medications were excluded. All the patients were grouped based on their age as follows: young elderly patients (60-70 years), middle elderly patients (71-80 years), and very old patients (>80 years). Patients were divided into delirium, subsyndromal delirium, and without both. Standard mini-mental state examination (MMSE) was used for carrying out the cognitive assessment. SPSS version

26 was used for descriptive statistics. Quantitative variables were described as mean and standard deviation. Categorical variables were expressed as frequency and percentages. Chi-square test was used for comparing the categorical data. All the descriptive analysis was carried out by taking 95% confidence interval and 5% level of confidence.

RESULTS

Of the total 420 elderly patients, the incidence of delirium and subsyndromal delirium was 96 (22.9%) and 72 (17.1%) respectively. There were 264 (62.9%) male and 156 (37.1%) females. The overall mean age was 68.4± 4.8 years. Delirium and subsyndromal delirium cases were distributed based on the patient's age were as follows: 62 (64.6%) and 42 (58.3%) in 60-70 years, 24 (25%) and 22 (30.6%) in 71-80 years, and 10 (10.4%) and 8 (11.1%) in >81 year. Of the 96 delirium cases, the incidence of hypoactive type, hyperactive type, and mixed type was 54 (56.3%), 18 (18.8%), and 24 (24.9%) respectively. Based on cognitive assessment, about 36 (8.6%) MMSE score <23, 78 (18.6%) had MMSE score <18, and 54 (12.9%) did not respond to MMSE.
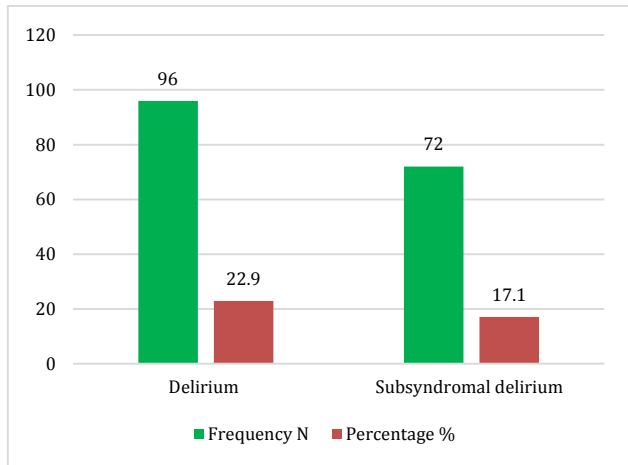

Figure-1: Prevalence of Delirium and subsyndromal delirium

Table-1: Gender's distribution

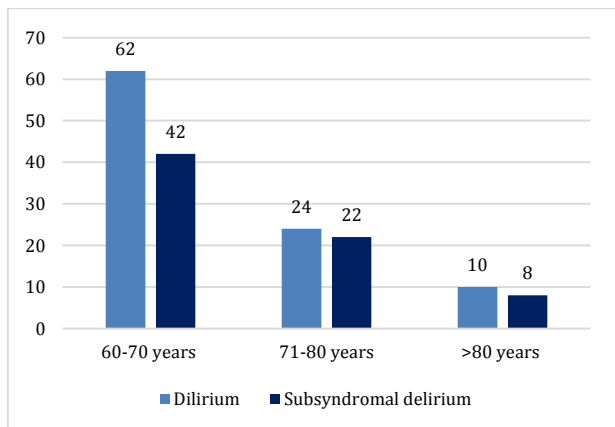| Gender	Delirium N=96 N (%)	Subsyndromal delirium N=72 N (%)	P-value
Male	62 (64.6)	38 (52.8)	0.0832
Female	34 (35.4)	34 (47.2)	
Total	96 (100)	72 (100)	

Figure-2: Delirium and subsyndromal delirium cases were distributed based on the patient's age

The incidence of common comorbidities such as hypertension, chronic liver disease, asthma, ischemic heart disease, cerebrovascular disease, diabetes, and malignancy was 144 (34.3%), 82 (19.5%), 26 (6.2%), 120 (28.6%), 24 (5.7%), 184 (43.8%), and 14 (3.3%) respectively. The prevalence of delirium and subsyndromal delirium is shown in Figure-1. Gender's distribution is shown in Table-I. Delirium and subsyndromal delirium cases were distributed based on the patient's age are depicted in Figure-2. The incidence of hypoactive, hyperactive, and mixed type delirium are demonstrated in Figure-3. Table-II represents the patient's distribution based on MMSE scores. The incidence of prevalent comorbidities are shown in Figure-4.
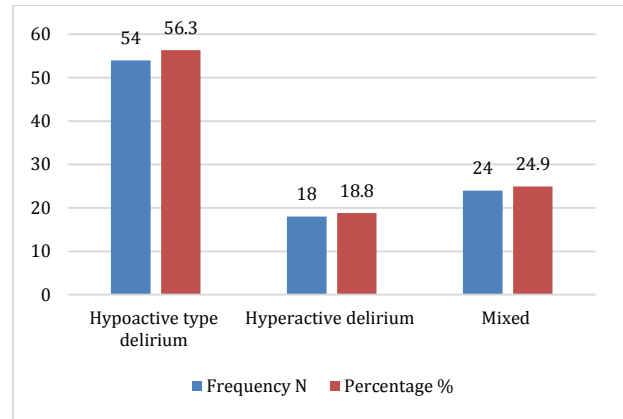

Figure-3: incidence of hypoactive, hyperactive, and mixed type delirium

Table-2: patient's distribution based on MMSE scores

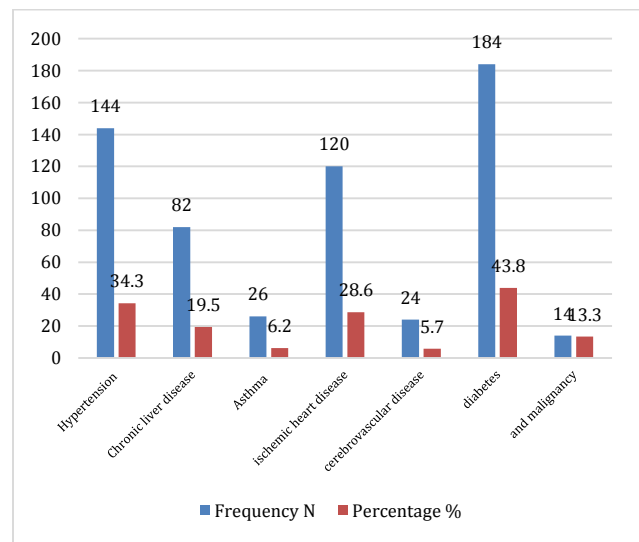| MMSE score	Frequency N	Percentage %
<23	36	8.6
<18	78	18.6
Patients not responded	54	12.9

Figure-4: Incidence of co-morbidities complications

DISCUSSION

The present study mainly focused on the incidence and risk factors of delirium and subsyndromal delirium and found that the incidence of delirium and subsyndromal delirium was 22.9% and 17.1%, respectively. Adverse outcomes such as lengthening of hospital stay, increasing mortality, and discharge are all associated with delirium. Serafim et al [16] reported that the incidence of delirium among patients admitted to general medicine was 18% to 35%.

Yamada et al [17] revealed that the incidence of SSD was from 7.7% to 13.2% which was lower than the one reported in the present study. However, a study conducted by Boettger et al. [18] found that delirium and SSD had prevalence of 53% and 22.3% respectively.

According to a previous study by Azuma et al [19] SDD was defined as the presence of symptoms such as consciousness clouding, perceptual disturbance, and inattention. In the current study, there were significant comorbidities such as hypertension, chronic liver failure, diabetes mellitus, and ischemic heart diseases reported in the older adults. Regardless of the patient's distribution into delirium and SSD, no significant differences in co-morbidities in terms of mean and SD were found. Furthermore, it has been found that delirium predisposing risk factors such as metabolic causes like hepatic encephalopathy was less related to SDD than delirium.

The present study reported the categorization of delirium patients into hypoactive, hyperactive, and mixed types with their prevalence being 56.3%, 18.8%, and 24.9% respectively. Similarly, another study by de Almeida et al [20] reported similar findings and suggested that hypoactive type delirium was the most prevalent type of delirium found in the older population. In contrast, Khan et al [21] reported that hyperactive type was the common type of delirium.

In the current study, hyperactive delirium was mainly caused by hepatic encephalopathy. In contrast, Harnendez et al. [22] found that SDD and delirium are inversely related to MMSE, hepatic encephalopathy, and cognitive assessment. Another study by Sepulveda et al [23] reported that based on short and long severity scores, patients admitted to the hospital had at least one feature of delirium was found in 48.4% and 67.1%. The inverse association of functional disability with cognitive assessment is shown in the present study. Mailhot et al [24] reported similar results regarding significant correlation between different scores (MMSE) for the cognitive impairment severity.

CONCLUSION

The present study found that the incidence of delirium and subsyndromal delirium was 22.9% and 17.1% respectively. Adverse outcomes such as increase in length of hospital stay, mortality, and discharge are independently associated with delirium. Efforts to prevent disease may identify patients who require clinical attention.

REFERENCES

1. Ibrahim MH, Elmasry M, Nagy F, Abdelghani A. Prevalence and risk factors of delirium and subsyndromal delirium in older adults. The Egyptian Journal of Internal Medicine. 2021 Dec;33(1):1-6.
2. Yam KK, Shea YF, Chan TC, Chiu KC, Luk JK, Chu LW, Chan FH. Prevalence and risk factors of delirium and subsyndromal delirium in Chinese older adults. Geriatrics & Gerontology International. 2018 Dec;18(12):1625-8.
3. Creavin ST, Wisniewski S, Noel-Storr AH et al (2016) Mini-mental state examination (MMSE) for the detection of dementia in clinically unevaluated people aged 65 and over in community and primary care populations. Cochrane Database Syst Rev 1:CD011145
4. El-Hayeck R, Baddoura R, Wehbé A, Bassil N, Koussa S, Abou Khaled K, Richa S, Khoury R, Alameddine A, Sellal F (2019) An Arabic version of the minimental state examination for the Lebanese population: reliability, validity, and normative data. J Alzheimers Dis 71(2):525–540. https://doi.org/10.3233/JAD-181232.
5. Khor HM, Ong HC, Tan BK, Low CM, Saedon NI, Tan KM, Chin AV, Kamaruzzaman SB, Tan MP (2019) Assessment of delirium using the confusion assessment method in older adult inpatients in Malaysia. Geriatrics 4(3):52. https://doi.org/10.3390/geriatrics4030052.
6. Jakavonytė-Akstinienė A, Dikčius V, Macijauskienė J (2018) Prognosis of treatment outcomes by cognitive and physical scales. Open Med 13(1):74–82. https://doi.org/10.1515/med-2018-0011.
7. Quispel-Aggenbach DWP, Schep-de Ruiter EPR, van Bergen W, Bolling JR, Zuidema SU, Luijendijk HJ. Prevalence and risk factors of delirium in psychogeriatric outpatients. Int J Geriatr Psychiatry. 2020;1–7. https://doi.org/10.1002/gps.5413.
8. Davis D, Searle SD, Tsui A. The Scottish Intercollegiate Guidelines Network: risk reduction and management of delirium. Age Ageing. 2019;48(4):485-488. https://doi.org/10.1093/ageing/afz036.
9. Quispel-Aggenbach DWP, Holtman GA, Zwartjes HAHT, et al. Attention, arousal and other rapid bedside screening instruments for delirium in older patients: a systematic review of test accuracy studies. Age Ageing. 2018;47(5):644-653. https://doi.org/10.1093/ageing/afy058.
10. Luijendijk HJ, Quispel-Aggenbach DWP, Stroomer-van Wijk AJM, et al. A short delirium caregiver questionnaire for triage of elderly outpatients with cognitive impairment : a development and test accuracy study. Int Psychogeriatr. 2019;47:1-7. https://doi.org/10.1017/S1041610219001595.
11. Serafim, R.B.; Soares, M.; Bozza, F.A.; Lapa e Silva, J.R.; Dal-Pizzol, F.; Paulino, M.C.; Povoa, P.; Salluh, J.I.F. Outcomes of subsyndromal delirium in ICU: A systematic review and meta-analysis. Crit. Care 2017, 21, 179.
12. Gao Y, Gao R, Yang R, Gan X. Prevalence, risk factors, and outcomes of subsyndromal delirium in older adults in hospital or long-term care settings: A systematic review and meta-analysis. Geriatric Nursing. 2022 May 1;45:9-17.
13. Brummel, N.E.; Boehm, L.M.; Girard, T.D.; Pandharipande, P.P.; Jackson, J.C.; Hughes, C.G.; Patel, M.B.; Han, J.H.; Vasilevskis, E.E.; Thompson, J.L.; et al. Subsyndromal Delirium and Institutionalization Among Patients with Critical Illness. Am. J. Crit. Care 2017, 26, 447–455.
14. Sanson, G.; Khlopenyuk, Y.; Milocco, S.; Sartori, M.; Dreas, L.; Fabiani, A. Delirium after cardiac surgery. Incidence, phenotypes, predisposing and precipitating risk factors, and effects. Heart Lung 2018, 47, 408–417.
15. Mailhot T, Cossette S, Maheu-Cadotte MA, Fontaine G, Denault AY. Subsyndromal delirium in cardiac surgery patients: risk factors and outcomes of the different trajectories. Journal of Cardiovascular Nursing. 2022 Jan 1;37(1):41-9.
16. Serafim RB, Dal-Pizzol F, Souza-Dantas V, Soares M, Bozza FA, Póvoa P, Luiz RR, Lapa e Silva JR, Salluh JI. Impact of Subsyndromal Delirium Occurrence and Its Trajectory during ICU Stay. Journal of Clinical Medicine. 2022 Nov 17;11(22):6797.
17. Yamada, C.; Iwawaki, Y.; Harada, K.; Fukui, M.; Morimoto, M.; Yamanaka, R. Frequency and risk factors for subsyndromal delirium in an intensive care unit. Intensive Crit. Care Nurs. 2018, 47, 15–22.
18. Boettger, S.; Nuñez, D.G.; Meyer, R.; Richter, A.; Schubert, M.; Jenewein, J. Subsyndromal delirium in the intensive care setting: Phenomenological characteristics and discrimination of subsyndromal delirium versus no and full-syndromal delirium. Palliat Support Care 2018, 16, 3–13.
19. Azuma, K.; Mishima, S.; Shimoyama, K.; Ishii, Y.; Ueda, Y.; Sakurai, M.; Morinaga, K.; Fujikawa, T.; Oda, J. Validation of the Prediction of Delirium for Intensive Care model to predict subsyndromal delirium. Acute Med. Surg. 2019, 6, 54–59.
20. de Almeida, T.M.L.; de Azevedo, L.C.P.; Nosé, P.M.G.; de Freitas, F.G.R.; Machado, F.R. Risk factors for agitation in critically ill patients. Rev. Bras. Ter. Intensiva 2016, 28, 413–419.
21. Khan, B.A.; Perkins, A.J.; Gao, S.; Hui, S.L.; Campbell, N.L.; Farber, M.O.; Chlan, L.L.; Boustani, M.A. The Confusion Assessment Method for the ICU-7 Delirium Severity Scale: A Novel Delirium Severity Instrument for Use in the ICU. Crit. Care Med. 2017, 45, 851–857.
22. BA Hernandez et al. Post-anaesthesia care unit delirium: incidence, risk factors and associated adverse outcomes Br J Anaesth (2017)
23. E Sepulveda et al. Subsyndromal delirium compared with delirium, dementia, and subjects without delirium or dementia in elderly general hospital admissions and nursing home residents Alzheimers Dement (Amst) (2017)
24. Mailhot, Tanya PhD, RN; Cossette, Sylvie PhD, RN; Maheu-Cadotte, Marc-André RN; Fontaine, Guillaume RN; Denault, André Y. MD, PhD. Subsyndromal Delirium in Cardiac Surgery Patients: Risk Factors and Outcomes of the Different Trajectories. The Journal of Cardiovascular Nursing: 1/2 2022 - Volume 37 - Issue 1 - p 41-49 doi: 10.1097/JCN.0000000000000793.