MORTALITY RATES FOR DELIRIUM AMONG ELDERLY EMERGENCY DEPARTMENT PATIENTS

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Litteraturstudie, Kandidatspeciale, Lægevidenskab, SDU. Afleveret januar 2018.

Udformet efter manuskriptretningslinjer gældende for Ugeskrift for Læger. 4595 ord i tekst, 2 tabeller, 1 figur, 224 ord i det engelske resumé.

Index

Abstract

Background: Delirium is a common condition among elderly emergency department patients, with prevalence rates around 11-25%. Our study aimed to examine the mortality rates of delirium among older patients presenting in the emergency department, identifying methods for early detection of delirium, and raising awareness about the seriousness of delirium and the importance of early detection.

Methods: A critical and analytical literature review of available publications in PubMed, Embase, Medline, PsychInfo. Articles were selected according to inclusion and exclusion criteria, and reviewed independently by the two coauthors. A total of 10 articles were included. The quality of all included articles was critically reviewed.

Results: Length of follow-up varied between the included studies, giving the following mortality rates for delirious ED patients: in-hospital mortality 16-28.6%, 1-month mortality 6-15.8%, 3-month mortality 14%, 6-month mortality 11-31% and 12-month mortality 36.2-41.6%. Delirium was not detected by the emergency department physician in 43-68% of the cases and that the mortality rates were even higher among patients with undetected delirium. In all studies, structured tools were used to detect delirium.

Conclusion: All included studies showed that the mortality rates of patients diagnosed with delirium in the emergency department were significantly higher, compared to those of patients without delirium. Screening strategies and detection management in the emergency department should be improved, because early detection leads to better treatment which might improve outcome.

Introduction

Delirium is an acute organic neuropsychiatric syndrome characterized by cognitive and behavioral disturbances, disturbances in consciousness and affection of sleep quality. Delirium is a condition which affects hospitalized patients in all wards and elderly patients are especially at risk of becoming delirious.[1]

The etiology behind delirium is often multifactorial. Delirium can be caused by several different somatic diseases, as an adverse effect of medications, or occur as a complication to psychiatric disease. The condition can be misdiagnosed as depression or dementia, especially in elderly.[2]

There are many predisposing factors for delirium, in which dementia, advanced age, serious underlying somatic illness, sleep deprivation, infections, immobilization, fever, post-operative state, medications, fluid and electrolyte disturbances, and hypoglycemia play a major role. Whether delirium itself contributes to the poor prognosis, or whether delirium simply serves as a marker for poor prognosis, is a question that remains unanswered.[3]

Delirium can be divided into hypoactive, hyperactive and mixed form. The hyperactive form is identified by agitation and hallucinations. The hypoactive form is identified by reduced psychomotor functioning, which can be hard for caregivers to detect and result in necessary treatment not being given.[4] The mixed form has manifestations from both hyper- and hypoactive forms.[5]

Delirium develops abruptly and has symptoms that fluctuates in intensity. The clinical manifestation is highly variable, so elderly with altered mental status should be considered to have delirium, until the opposite is proved. Thorough cognitive testing should be performed when delirium is suspected.[6]

Delirium is a common condition and should receive increased attention due to the increasing elderly population especially in the Western world. About 11-25% of elderly patients admitted to the hospital already have delirium at the time of admission. In addition, about 29-31% of elderly patients will develop delirium during the time of hospitalization.[7]

It must be assumed that early detection and treatment of the underlying cause of delirium will decrease the rates of mortality. It is therefore highly relevant to look at the mortality rates of patients presenting in the emergency departments, since this is where acutely ill patients are assessed first.

Aim of the study

Delirium is a common condition among elderly patients admitted to the hospital through the emergency department (ED). Based on a review of existing literature, our goals are to:

- examine the mortality rates of delirium among patients presenting in the ED
- identify methods for early detection of delirium
- raise awareness about the seriousness of delirium and the importance of early detection

Method

This study is a critically and analytical review of existing literature available in the PubMed, Embase, Medline and PsychINFO databases and references included in the published studies. Our initial search was performed 22nd of November 2017. The search was repeated 8th January 2018, to identify newly published articles.

Search criteria

We included articles according to the following criteria: 1) researching mortality rates for delirium, 2) age of study population 65 years or older, 3) being emergency department studies, 4) being available in full text, 5) present in PubMed, Embase, Medline or PsychINFO databases, and 6) language being English, Danish, Norwegian or Swedish. We excluded all articles concerning delirium tremens, as this is a separate condition related to alcohol withdrawal.

Search terms

- Delirium OR delirious OR incident delirium OR prevalent delirium
- Emergency department OR emergency ward OR emergency room OR ED
- Cohort OR prospective OR retrospective
- Mortality OR survival OR outcome

All phrases were combined with AND.

Study selection

Our initial searches gave a total of 414 articles. In addition, 9 articles were identified through review of citations. 109 duplicates were manually identified and removed. Irrelevant articles were excluded through review of title and abstract. The two coauthors independently reviewed the remaining 46 articles to identify those meeting the inclusion criteria. Of the 46 articles initially selected, 10 were not available in full text, 8 used broader delirium definitions, 7 did not focus on delirium as the main exposure for mortality, 5 did not include mortality as an outcome, 3 were not emergency department studies, 2 had a population age below 65 years, and 1 had a control group with dementia patients. Articles focusing solely on groups of subjects with a specific disease or condition were considered irrelevant. Consequently, 10 articles complied with our inclusion criteria, of which one article was found through citation (McCusker et al 2002)[16].

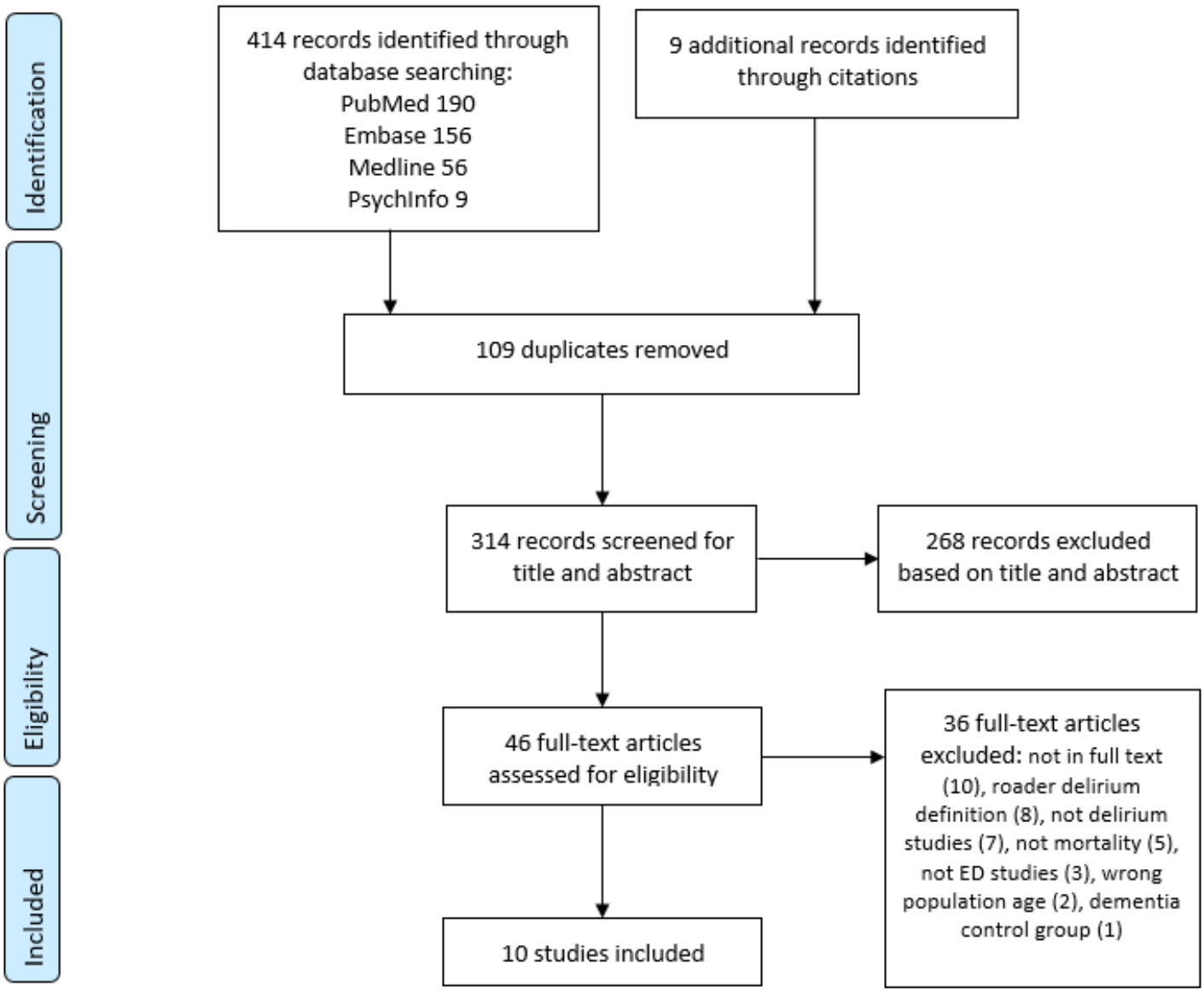

Figure 1 – Flow chart for selection of studies.

Quality review

The quality of the selected articles was critically reviewed and assessed independently by the two coauthors. All articles were reviewed using the same checklist composed of questions regarding population selection, inclusion and exclusion criteria, validity and reliability of exposure measurements, identification of confounding factors and adjustment for them, validity and reliability of outcome measurements, length of follow-up and strategies for handling incomplete follow-up.

Results

Method and quality of the studies for delirium rates

Hsieh SJ et al[8] (2015). The study aimed to characterize prevalence, incidence and duration of delirium during the first 3 days of hospitalization, and to determine the short-term clinical deterioration associated with delirium. Clinical deterioration was defined as unanticipated intensive care unit (ICU) admission or in-hospital death. Patients aged 65 years or above admitted from the ED to all other departments than the ICU were included. Exclusion criteria were admission directly to the ICU, non-English speaking and unavailability for delirium assessment. Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) performed by trained research assistants was used to detect delirium. All included patients were assessed for delirium once daily for the first 3 days of hospitalization. After this there were no follow-up. Confounders were prospectively measured, but not adjusted for in the statistical analysis due to the low number of outcome events.

Duman AO et al[9] (2014). Prospective cross-sectional study examining in-hospital mortality of delirious ED patients by comparing in-hospital mortality and hospital length of stay in elderly ED patients with or without delirium at the time of admission. The study included patients above age 65 admitted to the hospital through the ED. Patients were excluded if consent was not obtained, they were discharged directly from ED or transferred to other institution, had severe mental retardation, Alzheimer's disease, dementia, aphasia, deafness or blindness, were unable to speak the native language, comatose, under cardiac arrest or died in the ED. Trained ED physicians performed the Confusion Assessment Method (CAM) to patients who met the inclusion criteria as soon as admission decision was made. Outcomes were examined through electronic hospital records. Follow-up was not conducted due to the study design. Confounding factors were adjusted for in the study design.

O'Keeffe S et al[10] (1997). The study aimed to determine if delirium was an independent predictor of adverse outcomes of hospitalization. Patients were recruited over a period of 18 months. Acutely ill elderly admitted to the acute geriatric ward were included. Patients who were not admitted to geriatric unit within the day of hospital admission, elective patients, rehabilitation patients, aphasic or deaf patients, expected hospitalization < 48 hours, or not assessed within 48 hours, were excluded. Patients were interviewed by the study physician using the Delirium Assessment Scale (DAS) to detect delirium, performed every 48 hours or sooner in the case of changes in cognitive status or behavior. Cognitive assessment was performed daily in patients with delirium and patients with delirium symptoms. Patient status was determined at 6 months after discharge by contacting the patient, a family member or caregiver. Results were adjusted for predetermined confounding factors. Loss to follow-up was not described.

Singler K et al[11] (2014). A single center observational study conducted in Germany. Patients of age 75 years or older presenting in the ED were screened for eligibility during a 2-month period. Patients were excluded if they refused consent, was unable to communicate, did not speak German, or was in an unsuitable cardiorespiratory condition. Patients were assessed for delirium with CAM within the first hour of presentation to the ED, performed by an experienced and trained investigator. Confounders were identified and adjusted for in the

statistical analysis. Death and current living arrangements were assessed through a structured telephone interview performed 28 days after the ED visits. Loss to follow-up or methods for handling lost patients were not described.

Kennedy M et al[12] (2014). The aim of the study was to identify patient risk factors associated with delirium, to develop a risk prediction rule for identifying those at low, moderate and high risk of ED delirium, and to report mortality rates and resource utilization of delirious elderly ED patients. Inclusion criteria were age 65 or older, informed consent from patient or surrogate, and ability to complete a structured delirium assessment tool in English. Exclusion criteria were study participation adversely interfering with timely medical care, presence in ED > 4 hours prior to enrollment, and non-English speaking. A single trained research assistant conducted a structured interviewed after obtaining consent, and using the CAM to assess delirium. Using logistic regression, a delirium prediction rule consisting of older age, prior stroke or TIA, dementia, suspected infection and acute intracranial hemorrhage was found to have a good predictive accuracy. Confounding factors were identified, but not adjusted for in the statistical analysis. Patients were followed throughout the ED- and hospital stay and by telephone at 30 days, completed by 94% of all subjects.

Lewis LM et al[13] (1995). Examined the sensitivity of ED physicians' identification of delirium, and compared the survival and outcomes for delirious and non-delirious patients. Conducted in a single ED in the United States over a period of 11 months. Patients of age 65 years and above presenting in the ED were included. Patients who were unconscious, critically ill or unable to communicate were excluded. Delirium was assessed with CAM, performed by a trained nurse and a geriatrician. The ED records for all patients with delirium or "probable" delirium were reviewed by a blinded physician for diagnosis and disposition, to determine how often delirium had been recognized in the ED. Patients were followed for 3 months by reviewing hospital records and by telephone interview. Results were not adjusted for confounders.

Kakuma R et al[14] (2003). Investigated the effect of prevalent and non-detected delirium on survival among patients discharged home directly form the ED. Conducted in two Canadian hospitals. Included patients were aged 66 or older, triaged as acute in the ED, and residents of Qubec. Exclusion criteria were blindness, deafness, muteness or aphasia, not speaking English or French, residing in nursing home before ED admission, hospitalization or ED-visit longer than 24 hours during the past month, and being too sick to participate. CAM was performed by a research assistant within 6 hours of arrival in the ED. Statistical results were adjusted for possible confounders. Patient status was determined after 18 months by contacting the patients or their proxy and data extraction from a death registry.

Han JH et al[15] (2010). Aimed to determine if delirium is an independent predictor of 6-month mortality in elderly. Conducted at an ED in the United States over a period of 15 months. Patients aged 65 or older present in the ED for less than 12 hours before enrollment were included. Patients refusing consent, non-English speakers, previously enrolled, comatose, or patients with incomplete delirium assessment were excluded. CAM-ICU was used to detect and diagnose delirium and it was performed by trained research assistants. Results were adjusted for confounders in the statistical analysis. Outcomes were determined after 6 months through review of medical records or searching in death registers. Number of patients lost to follow-up was 106 (16.6%).

McCusker J et al[16] (2002). Examined the prognostic effect of delirium on the outcome of older medical inpatients during the 12 months after admission. The study was conducted as 2 cohorts, one cohort for patients with prevalent or incident delirium and one cohort for patients without delirium, set in a primary acute hospital in Canada. Inclusion criteria were age 65 years or older and admitted from the ED to medical services. Exclusion criteria were stroke, admission to oncology unit, speaking neither English nor French, and admission to ICU or cardiac monitoring. Eligible patients were screened by a nurse at enrollment and during the first week of hospitalization, using Short Portable Mental Status Questionnaire (SPMSQ). Patients who had 3 or more errors in the initial SPMSQ, a score increased by at least 1 error and patients with possible symptoms of delirium, were screened with CAM. Patients were observed at least once weekly during the hospital stay, at 8 weeks after discharge, and at 6 and 12 months after enrollment. Confounding variables were identified and controlled for.

Reynish EL et al[17] (2017). Investigated the outcomes of cognitive spectrum disorders (CSD) among older people admitted as acute medical emergencies. CSD was defined as dementia, delirium or cognitive impairment. Conducted in a district general hospital in Scotland over a period of 18 months. Patients aged 65 years and above with admission to the acute medical unit were included. Patients was assessed by trained specialist nurses during the first 24 hours of admission, using Abbreviated Mental Test and CAM. Follow-up for length of stay, re-admission and death was performed after 12 months through review of medical records. Confounding factors were not identified.

Author, year, country	Strengths	Limitations
Hsieh SJ et al, 2015, USA	CAM-ICU performed once daily.	Small study population, large number excluded due to language, unmeasured confounders, patients enrolled only during daytime, single site study, short follow-up
Duman AO et al, 2014, Turkey	Large study population.	Patients with dementia, Alzheimer's disease and psychosis, and critically ill patients were excluded. CAM was only performed once. Patients whom died in the ED were not assessed. Single site study.
O'Keeffe S et al, 1997, England	Prospective design, performed multiple assessments, adjusted for confounding variables.	Conducted in a specialized geriatric unit, so that the results may not apply to a less frail population. Small study population.
Singler K et al 2014, Germany	CAM performed within 1 hour of arrival in ED, complete follow-up data.	Enrollment only during daytime on weekdays, small study sample, CAM performed only once.
Kennedy M et al, 2014, USA	Large study population.	Delirium only assessed once. Single study site, selections bias introduced by inclusion criteria, enrollment predominantly during afternoon, excluded individuals more likely to be of non-white race.
Lewis LM et al, 1995, USA	Included dementia patients.	Excluded critically ill, but the mortality of the delirium group was still twice those of patients that were non-delirious.
Kakuma R et al, 2003, Canada	Large study population, study design controlled for dementia to minimize confounding effect, included subjects untreated for delirium, long follow-up period, double site study.	Focused on non-admitted patients with higher expected baseline survival rate.
Han JH et al, 2010, USA	Large population sample.	ICU-CAM only performed once at enrollment, possible selection bias, high proportion of patients were nursing home residents; might explain the high number of delirious patients.
McCusker J et al, 2002, Canada	Large study population, 12-month follow-up, adjusted for confounders, used 3 measures for disease burden.	Delirium can be harder to detect in patients with dementia and therefore lead to misclassification.
Reynish EL et al, 2017, Scotland	Large study population, examines an unselected population cohort of older patients admitted to the ED.	Excluded critically ill patients. Only 31 % of people diagnosed with delirium were CAM positive.

Chart 1 – Quality evaluation of the included articles.

Methods for assessment of delirium

Eight of the reviewed studies used the Confusion Assessment Method (CAM) for detection of delirium. This is the most widely used standardized method for delirium assessment. The rating is based on answers to a cognitive scale, traditionally the MMSE and the observation of patient's behavior. The CAM instrument assesses the presence, severity, and fluctuation of nine delirium features which is derived from the Diagnostic and Statistical Manual of Mental Disorders 3rd Edition Revised (DSM III-R): acute onset, inattention, disorganized thinking, altered level of consciousness, disorientation, memory impairment, perceptual disturbances, psychomotor agitation or retardation, and altered sleep-wake cycle. The method has a sensitivity of 94-100% and a specificity of 90-95%. The CAM differentiates between delirium and dementia, and it is quick to conduct.[18]

Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) was used in two of the included studies. This is a shortened and faster version of the original CAM, specifically designed for assessment of delirium in critically ill patients, with a sensitivity of 93-100% and a specificity of 89-100%. [19] The CAM-ICU has recently also been validated for elderly ED patients, with a sensitivity of 100% and a specificity of 98%.[20]

McCusker et al (2002)[16] used a combination of Short Portable Mental Status Questionnaire (SPSMQ) and CAM. The SPMSQ evaluates orientation, memory and concentration. Lastly, O'Keeffe S et al (1997)[10] used the Delirium Assessment Scale (DAS), based on the Diagnostic and Statistical Manual, 3rd Edition (DSM-III) criteria for delirium. The scale was originally designed to quantify severity of delirium.

Mortality rates of delirium.

Hsieh SJ et al[8] (2015). 260 out of 2,233 screened patients were enrolled in the study. 29 out of 260 patients (11%) were delirious in the ED. Only 15 of 29 of the CAM-ICU positive patients had documented presence of delirium in their hospital chart. In-hospital mortality was 1% for non-delirious patients and 8% for delirious patients. Delirium was not recognized in 52% of ED patients.

Duman AO et al[9] (2014). 693 out of 915 patients met the inclusion criteria for the study. A total of 49 out of 693 (7.1%) patients were diagnosed with delirium using CAM. In-hospital mortality was 10.4% in total; 28.6% for delirium patients and 9% for non-delirium patients.

O'Keeffe S et al[10] (1997). 315 patients were admitted to the acute geriatric unit, of which 225 were included. 94 (42%) were diagnosed with delirium; 41 (18%) were diagnosed at admission and 53 (29%) were diagnosed during the hospital stay. In-hospital mortality was 16% for delirium patients and 5% for non-delirium patients. The 6-month mortality was 31% for delirious patients and 15% for non-delirious patients. Delirium had no influence on in-hospital and 6-month mortality after adjusting for covariates.

Singler K et al[11] (2014). Delirium was identified by a positive CAM assessment in 14.3% of cases (19/133). Of the 19 screening CAM positive, 13 (68.4%) were not identified as being

delirious by the ED physician. The 28-day mortality was higher among patients with delirium; mortality in patients with delirium was 15.8% (3/19), whereas this was 10.5% (12/114) in patients without delirium.

Kennedy M et al[12] **(2014).** 700 patients admitted to the ED was assessed for delirium. The prevalence of delirium was 9% (63/695). In all participants, ED delirium was associated with higher mortality. The 30-day mortality for delirious ED patients was 6% (4/89) versus non-delirious ED patients of 1% (7/388). Delirious ED patients were twice as likely to be readmitted within 30-days (27% vs 13%).

Lewis LM et al[13] **(1995).** A total of 385 patients were assessed. Thirty-eight of the 385 patients screened (10%) met criteria for delirium or "probable" delirium. ED charts were complete for 35 of these, which constituted the study sample. The 3-month mortality rate for patients with delirium or "probable" delirium was 14% versus 8% for the non-delirium group. Almost half of the patients with delirium were discharged from the ED without getting the delirium diagnosis.

Kakuma R et al[14] **(2003)**. 30 delirious and 77 non-delirious patients were selected for follow-up. 6-month mortality was 20% (6/30) for delirious subjects and 3.9 % (3/77) for non-delirious subjects. 12-month mortality was 20 % (6/30) for delirious subjects and 9.1% (7/77) for non-delirious subjects. 18-month mortality was 6 (20 %) for delirious subjects and 11 (14.3%) for non-delirious subjects. Excess mortality for delirious subjects was statistically significant only for the first 6 months. The subjects whose delirium was not detected by the ED physician or nurse had the highest 6-month mortality (30.8 %), compared to detected delirious (11.8 %) and non-delirious (3.9 %). The association between delirium and mortality was statistically significant after adjustments for confounding variables. The presence of delirium was not detected by the ED doctors in 43% of the cases.

Han JH et al[15] **(2010)**. Of 628 enrolled patients, 351 (55.9 %) were admitted to hospital and 108 (17.2%) met the CAM-ICU criteria for delirium. Total 6-month mortality for all subjects was 81 (12.9%). Patients with delirium had a 6-month mortality of 37%, compared to 14.3 % for non-delirious patients. Non-nursing home patients with delirium were more likely to die (33.3% vs 13.5% non-delirious); also for nursing home patients with delirium (45.8% vs 26.5%). No relationship between nursing home, delirium in ED and 6-month mortality after adjustment for covariates. Relationship between delirium in ED and 6-month mortality persisted after adjusting for covariates.

McCusker J et al[16] **(2002)**. Out of 1552 screened patients, 243 (15%) were diagnosed with delirium. The 12-month mortality was 41.6% for delirium patients and 14.4% for the control group without delirium.

Reynish EL et al[17] **(2017).** 10,004 elderly patients were screened for a cognitive impairment in the ED. 16.7% had delirium alone, 7.9% had delirium superimposed on known dementia, 9.4% had known dementia alone and 4.5% had unspecified cognitive impairment. Patients with cognitive spectrum disorder (CSD) had higher mortality than patients without CSD at 30 days (13.6% vs 9.0%) and at 12 months (40.0% vs 26.0%). Delirium superimposed on dementia was associated with significantly higher mortality compared to delirium alone.

Authors, year, country	Number of participants	Study design	Method of detection	Prevalence of delirium alone	Mortality rate (time interval)
Hsieh SJ et al, 2015, USA	n: 260	Prospective cohort study	CAM-ICU	11% (29/260)	8% in-hospital
Duman AO et al, 2014, Turkey	n: 693	Prospective cross-sectional study	CAM	7.1% (49/693)	26.6% in-hospital
O'Keeffe S et al, 1997, England	n: 225	Cohort study	DAS, DSM III	42% (94/225)	16% in-hospital, 31% at 6 months
Singler K et al 2014, Germany	n: 133	prospective single-center observational study	CAM	14.3% (19/133)	15.8% (3/19) at 28 days
Kennedy M et al, 2014, USA	n: 695	Prospective observational cohort study	CAM	9% (63/695)	6% (4/63) at 1 month
Lewis LM et al, 1995, USA	n: 385	Cohort study	CAM	10% (38/385)	14% at 3 months.
Kakuma R et al, 2003, Canada	n: 1268	Prospective study with 18 months follow-up	CAM	8.4% (107/ 1268)	Detected: 11% (2/17) Nondetected: 30.8% (4/13) at 6 months.
Han JH et al, 2010, USA	n: 628	Prospective cohort study	CAM-ICU	17.2% (108/ 628)	37% at 6 months
McCusker J et al, 2002, Canada	n: 1552	Prospective observational cohort study	SPMSQ, CAM	15% (243/1552)	41.6% at 12 months
Reynish EL et al, 2017, Scotland	n: 5569	Prospective cohort study	CAM, OPRAA, AMT	16,70%	40% for CSD and 36.2% for delirium alone at 12 months

Chart 2 – Mortality rates of delirium. Confusion Assessment Method for the Intensive Care Unit (CAM-ICU), Confusion Assessment Method (CAM), Delirium Assessment Scale (DAS), Short Portable Mental Status Questionnaire (SPMSQ), Older Persons Acute Assessment Routine (OPRAA), Abbreviated Mental Test (AMT).

Discussion

Our literature search was performed in four databases to ensure coverage of a high number of sources. Search terms were created to produce a broad but relevant search result. We included the wanted study design in our search, since cohorts are the most appropriate design to examine mortality. This might have limited the search, but at the same time, we wanted the highest evidence possible according to the evidence pyramid.[21] The quality of the articles included was found to be relatively high.

Several studies in our initial search allowed for synonyms for delirium or collective terms like cognitive impairment and altered mental status. These terms are broad and cover other diagnosis than delirium. To get the clearest and most comparable results, we chose to focus on studies with clear definitions of delirium according to either diagnostic criteria like DSM-III and ICD-10, or clinical diagnostic tools like CAM. Reynish et al (2017)[17] were included because the study also focused on delirium as a separate exposure. This study showed that there often is an overlap between dementia, delirium and unspecified cognitive impairment.

Articles focusing solely on specific groups of subjects with a specific disease or condition, like stroke patients or patients with hip fractures, were considered irrelevant as we wanted to focus on all patients presenting in the ED. Inclusion of such articles might have affected our results and probably resulted in higher mortality rates, since many of these studies had patient group that were vulnerable and in high risk of delirium.

We found the degree of external validity to be relatively high because the target population was well described in all the studies, all included patients were above 65 years, and 8 out of 10 articles used the same method for detection of delirium. These factors make the results generalizable. All our included studies were conducted in the Western world, Europe and USA, except one from Turkey[9] , which increases the external validity for the Danish patient population.

A limitation to the external validity was that the enrollment of patients in some studies was conducted only during certain times, predominantly during daytime and weekdays. Therefore, the true prevalence of delirium might be even higher, and the results may not be generalizable to individuals presenting to ED at night or on weekends. Several of the studies excluded patients with dementia and critically ill patients, which likely influenced our results by lowering the prevalence and mortality rates.

In the study by O'Keeffe et al (1997)[10], set in an acute geriatric unit, the prevalence rate of delirium was significantly higher than other studies. The question unanswered remains – is the prevalence higher because geriatricians are better to identify and detect delirium, or is it higher because they are using DAS and DSM-III to detect delirium?

It is clear from our review that delirium is a common condition among elderly in the ED, with prevalence rates from 7.1-42%. Delirium has serious outcomes and high mortality rates. Of those who got delirium diagnosed in the ED: in-hospital mortality was 16-28.6%, 1-month mortality was 6-15.8%, 3-month mortality was 14%, 6-month mortality was 11-31% and 12-month mortality was 36.2-41.6%. Even though the follow-up time of the studies differ, all

studies showed that the patients who were diagnosed with delirium in the ED had significantly higher mortality rates compared to those who did not have delirium. The high mortality observed in elderly with delirium requires further examination, since it is likely a mixture of both unavoidable deaths and inadequate management.[16]

Both the short-term and long-term mortality of delirious patients are likely to be even higher, since we only examined the mortality of the patients who got the delirium diagnosis in the ED, and excluded the studies which were not ED-studies and cases with delirium tremens. The inclusion of incident delirium, which is developed during hospitalization, would give a more accurate model of delirium associated to long-term mortality. Many older patients develop delirium later during the hospital stay, in the ICU, or after discharge to a nursing home, and these were not included in this review.[7]

We found that delirium is not detected in the ED in 43-68% of the cases and that the mortality rates are even higher among patients with undetected delirium. It is a common problem across many countries that the delirium diagnosis in the ED is missed. This might be due to the staff's insufficient knowledge about delirium and the serious reasons behind it, or lacking use or knowledge of screening methods for delirium. As of today, the diagnosis rests only on clinical skills. Especially elderly patients at high risk for delirium, like elderly with infections, severe comorbidities, decreased mobility and polypharmacy, should always be screened with standardized methods.

Delirium screening was only performed at set time points in many of the studies. Due to delirium's fluctuating nature, screening should be performed at a more frequent rate. In future studies, we recommend the researchers to perform screening at a daily basis and in the case of altered mental status or behavior.

Conclusion

Delirium is a serious condition that leads to increased mortality, especially in undetected cases. Early detection of the delirium and the etiology behind it in each patient, reduction of risk factors, and better disease management, could reduce the mortality rate.

All health care professionals should be better trained to detect and be aware of symptoms of delirium. Implementation of strategies for delirium detection in the emergency department must be improved, because early detection leads to faster treatment which might improve the patient's outcome.

Due to the fluctuating nature of delirium, screening should be performed daily, but also in the case of changes in the patient's behavior or cognition. Screening should involve the use of psychometric tools like CAM and CAM-ICU, as recommended in the recent National Clinical Guideline for the Prevention and Treatment of Delirium published by the Danish Health Authority. [4]

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Forfatter/medforfattererklæring – kandidatspeciale i medicin

Studerendes navn(e) og specialets titel

Specialets titel	Mortality rates for delirium among elderly emergency department patients
Studerende A	Frida Zimakoff Børsting
Studerende B	Elisabeth Natalie Johannessen

Ansvarsfordeling for specialets enkelte dele - skal udfyldes ved parspecialer

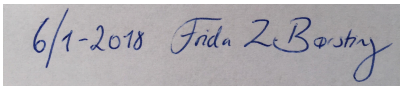
	Studerende A	**Studerende B**	**Total (skal være 100%)**
Indledning og baggrund	70 %	30 %	100 %
Metodebeskrivelse	30 %	70 %	100 %
Resultater	45 %	55%	100 %
Diskussion	55 %	45 %	100 %
Konklusion	50 %	50 %	100 %

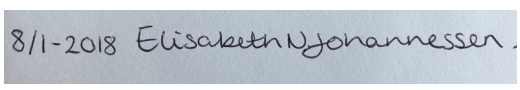
Kort beskrivelse af opgavefordelingen - skal udfyldes ved parspecialer

Arbejdet med søgningen og gennemgang af alle journaler, blev gjort sammen. Elisabeth arbejdet mest med beskrivelse af metodeafsnittet, og Frida med indledningsdelen. Databearbejdning blev gjort sammen. Vi skrev en udkast hver på resultat, diskussion og konklusion delen, og drøftet udkastene sammen.

Tro og love-erklæring

Jeg erklærer herved på tro og love, at jeg egenhændigt og selvstændigt eller sammen med min specialepartner har udformet dette speciale. Alle citater i teksten er markeret som sådanne, og rapporten eller væsentlige dele af den har ikke tidligere været fremlagt i anden bedømmelsessammenhæng.





Dato Underskrift, studerende A

Dato Underskrift, studerende B