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REVIEW ARTICLE

DELIRIUM AND ITS MANAGEMENT IN NURSING INTERVENTIONS

Markéta Čápová, Kateřina Horáčková ✉, Marie Holubová

Department of Nursing, Faculty of Health Studies, University of Pardubice, Průmyslová 395, 532 10 Pardubice, Czech Republic

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Summary

Introduction: Delirium is a transient, etiologically non-specific disorder and a life-threatening condition. It is classified as a reversible qualitative disorder of consciousness with a number of symptomatologically neuropsychiatric abnormalities. The aim of the research is to summarize nursing interventions leading to the prevention or treatment of delirium.
Methods: world scientific databases (Proquest, Scopus, PubMed, etc.) were searched using the EBN method. The question of efficacy, which predicts nursing interventions in the context of treatment and prevention, was chosen to compile the literature search. Fifteen studies were selected that aimed to reduce the incidence and prevalence of delirium in ICU patients, using nursing interventions.
Results: Multicomponent interventions targeting several risk factors simultaneously (lighting modification, noise reduction at the patient's bedside, sleep support, family visits and correction of vision and hearing deficits) have been shown to be the most effective. The intervention of transcutaneous electrical stimulation has also been shown to be effective (statistically significant difference p= 0.039 for patients undergoing this intervention). More than half of the duration of delirium is reduced by regular exercise and mobilisation. Occupational therapy intervention is also beneficial (statistically significant effect p=0.001) and can significantly reduce the incidence of delirium. Studies demonstrate the positive impact of these interventions not only in delirium, but also in pain management and overall recovery.

Key words: delirium; patient; non-pharmacological; intervention; prevention

Introduction

Delirium is said to be one of the oldest disorders known to medicine, having been well described 2500 years ago in the medical writings of Hippocrates. Hippocrates referred to delirium using the terms *pherenitis*, which can be explained as a disorder of consciousness accompanied by fever and restlessness, and *lethargos*, as a disorder of consciousness with somnolence. He also theorised that the two conditions may be intertwined, have a sudden onset and are associated with confusion and reduced cognitive function. In other Greek cultures, delirium was referred to by the term *kordiakos* (1).

✉ University of Pardubice, Faculty of Health Studies, Department of Nursing, Průmyslová 395, 532 10 Pardubice, Czech Republic
katerina.horackova@upce.cz

Delirium is a qualitative disorder of consciousness that is reversible with a wide range of symptomatologically neuropsychiatric abnormalities. It is an etiologically nonspecific disorder, usually transient, but is also a life-threatening condition. The most common disorders are disturbances of attention, memory, psychomotor abilities, emotion, perception and thinking. A delirious patient has considerable difficulty with abstraction. Therefore, the thinking is very disjointed and chaotic; orientation problems and hallucinations also occur. The hallucinations are predominantly visual, but can affect all of the senses. Common manifestations of delirium also include significant sleep disturbances where sleep/wake cycles are disrupted with typical inversion, i.e. daytime sleepiness and nocturnal hypervigilance with restlessness (2, 3).

Despite the rich history of this life-threatening condition, delirium is still underestimated and, in many cases, unaddressed. Delirium occurs with a high prevalence and is associated with increased morbidity and mortality, poorer long-term clinical outcome and higher economic costs of care. In regular inpatient wards, delirium occurs in 10-15% of patients, in psychiatric wards in 15-50% of patients and in intensive care units in 40-60% of cases. The mortality rate is considerably high, up to 20-70% of all hospitalised patients (4). Delirium is common in military trauma patients, despite their young age and premorbid fitness. A review of longer-term psychological outcomes should be considered (5).

In the hospital setting, delirium often develops in a combination of somatic morbidity and postoperative conditions, and in the elderly in combination with dementia. Furthermore, delirium is very often observed in alcohol intoxication, hypnotics and sedatives. Hypoglycaemia and dehydration can be other important causes of delirium (6).

Aim of the study

The aim of the study is to produce a literature review that will discuss the possibilities of non-pharmacological interventions in the prevention or treatment of delirious patients. For effective results, the literature review focuses on critically ill patients. These patients admitted to the ICU represent one of the highest-risk groups of patients at risk of developing delirium. At the same time, this is a very wide age group, so all types of delirium can be encountered. Delirium has been proven to be associated with increased hospital stays, where, especially in the ICU, patients with delirium spend an average of 10 days longer than patients without delirium, which also entails significantly higher costs of care (7).

Delirium has a multifactorial aetiology, so it is necessary to incorporate multi-component interventions into nursing care to address the different risk factors for delirium. Non-pharmacological multicomponent interventions include, in particular, sleep support, cognitive stimulation, early mobilisation, adequate hydration, and effective pain management. Also, another important intervention is communication with the patient's family (8).

Methods

Clinical question

The type of question of efficiency was chosen for the selected literature search. It aims to find out which intervention is the most effective given the patient and their health problem (9).

Which nursing interventions (I) are most effective in preventing the onset and development of delirium (O) in hospitalized patients (P)?

Search strategy

A key step in the search for relevant studies was the identification of keywords, see Table 1. These keywords were then supplemented with synonyms to ensure a more thorough search for all relevant studies. It was also necessary to keep in mind the differences between American, British and Australian English, using wildcards which enable search for different forms of keywords without having to type them out (9). In the search strategy, the "*" symbol at the end of a word was used to search for words with different endings. Another wildcard used is quotation marks, which ensured that only the keyword or phrase was searched without any other variations. Advanced

database searches were performed using Boolean operators. Three basic operators were used in the search: OR, NOT and AND. In the advanced search, which allows the query to be specified in different ways, either *Title/abstract* area or only *Title* area was searched.

Table 1. PICO criteria for the research question.

Population	Patient admitted to ICU, age over 18 years,
Intervention	Non-pharmacological preventive measures for which the general nurse is competent (in the context of nursing care),
Comparison	Routinely performed pharmacological care
Outcome	Prevention of the onset and development of delirium

Source: Author's work.

In total, 7 databases were searched: Cohrane, Proquest, Scopus, Web of Science, Ovid, Medvik and PubMed. Table 2 lists the specific numbers of publications retrieved in particular databases.

Table 2. List of searched databases with the number of studies found.

Database	Number of studies retrieved
Cochrane	0
Medvik	3
Proquest	151
PubMed	261
Scopus	525
Web of Science	5
Ovid	1

Source: Author's work.

The next important step in the search strategy was the establishment of inclusion (IC) and exclusion (EC) criteria, see Tables 3 and 4, respectively.

Table 3. Inclusion criteria.

Label	Area	Inclusion criterion
IC1	Period	Publication date 10 years ago or newer
IC2	Language	Czech, English
IC3	Study type	Systematic review, meta-analysis, randomized controlled trial, prospective, retrospective study
IC4	Study type	Full text only
IC5	Topic/Abstract	Relevant to review question

Source: Author's work.

Table 4. Exclusion criteria.

Label	Area	Exclusion criterion
EC1	Period	Publication date older than 10 years ago
EC2	Language	Other than Czech or English
EC3	Study type	Abstracts without full texts, letters, reviews, editorials
EC4	Context	Palliative care, long-term care, assisted living facility, child, animal subject, use of pharmacological interventions

Source: Author's work.

Selection and analysis of studies

The retrieved studies were evaluated based on Fineout - Overholt and Johnston's hierarchy of evidence (10), which grouped them into seven specific categories (Table 5). This review used evidence of Levels I, II, and III. The next step was to classify the identified studies according to the above specifications. A PRISMA diagram was created to better illustrate the process of how the inclusion of relevant studies was performed, see Figure 1. The final step for the inclusion of relevant studies was to read and review 41 publications, of which 26 were excluded based on the contextual appropriateness of the studies' use. A total of 15 studies were included in the literature review.

Table 5. Hierarchy of evidence for intervention studies.

Quality of evidence	Evidence type
I.	Systematic reviews and meta-analysis
II.	Randomized controlled study
III.	Non-randomized controlled study
IV.	Case studies, case-controlled studies, cohort studies
V.	Systematic review of descriptive/qualitative studies
VI.	Single qualitative/descriptive study
VII.	Opinions of authorities/expert committees

Source: (10).

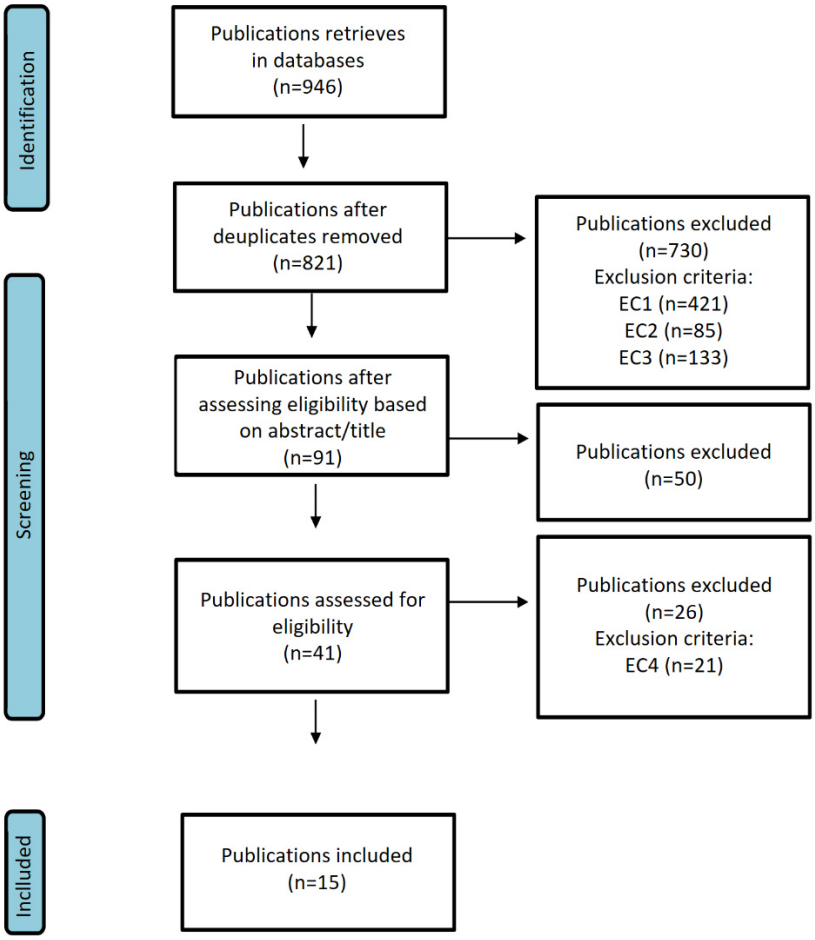

Figure 1. PRISMA flow diagram.
Source: Author's work.

Table 6. Summary table of 15 studies.

Author	Study type/Research Objectives	Respondent group	Interventions used and the duration of their use	Observation methods	Results
Johnson K., Fleury J., McClain D. (2018)	Randomized controlled trial/ To find out the effect of listening to usic in the prevention of delirium in a Trauma ICU.	Patients admitted to a Trauma Intensive Care Unit, aged ≥ 55 years. Intervention group - n = 20 Control group - n = 2	The intervention group was exposed to music using headsets twice a day for 60 minutes at 2pm and 8 pm for a total of 3 days after admission. The control group received standard care without listening to music.	CAM-ICU screening once a day for 3 days, monitoring heart rate (HR), respiratory rate (RR) and blood pressure (BP).	In both groups, CAM-ICU screening was negative before and after the end of the study. In the intervention group, there was a difference in HR pre/post music listening F(4, 134) = 4.75, p = 0.001 and statistically significant difference in BP pre/post music listening F(1, 37) = 10.44, p = 0.003. No significant difference was found for RR in either group of participants.
Khan S. et al. (2020)	Randomized controlled trial/ To find out the effect of listening to music in the prevention of delirium in patients receiving mechanical ventilation in ICU.	Patients aged ≥ 18 , admitted to ICU receiving mechanical ventilation for the period 24 to 48 hours. Intervention group - n = 52	The intervention group: two 1-hour sessions each day of listening to music using headsets 1. personalized music (n = 17) 2. relaxing slow tempo music (n = 17) 3. audiobooks (n = 18)	CAM-ICU screening twice a day.	The median number of delirium-free days for group 1 (personalized music) was 2. The median number of delirium-free days for group 2 (relaxing music) was 3. The median number of delirium-free days for group 3 (audiobooks) was 2. The difference among the groups was not statistically significant (p = 0.78).
Rosa R. G., et al. (2019)	Randomized clinical trial/ Primary research: To find out the effect of flexible family visitation on delirium in patients in ICU. Secondary research: 1. Find out the incidence of ICU-acquired infections caused by visitations. 2. To assess anxiety and depression for family members caused by the length of the visitations. 3. To assess burnout for ICU staff caused by the length of the visitations.	Patients aged ≥ 18 admitted to ICU. Intervention group - n = 837 Control group - n= 848	The intervention group - Flexible visitation by one or two family members (up to 12 hours per day), median duration of intervention - 3.2 months. The control group - usual restricted visitations (one or two family members) up to 1.5 hours daily, median duration of intervention - 3.0 months.	CAM-ICU screening twice a day.	The intervention group - incidence of delirium in 157 (18,9%) patients (n = 831) The control group - incidence of delirium in 170 (20.1%) patients (n = 845) The incidence of delirium during ICU stay was not significantly different between flexible and restricted visitation.
		1. ICU patients - intervention group (n = 837), Control group (n = 848) 2. Family members - intervention group (n = 652), Control group (n = 643) 3. Clinicians - intervention group (n = 435), Control group (n = 391)		1. Monitoring symptoms of pneumonia, bloodstream infections and urinary tract infections. 2. Hospital Anxiety and Depression Scale 3. Maslach Burnout Inventory	1. Nosocomial infection acquired in ICU - incidence of infections was 3.7% in the intervention group and 4.5% in the control group. 2. For family members, anxiety and depression scores were significantly better with flexible visitation. 13.4% in the intervention group compared to 28.2% in the control group. 3. Staff burnout prevalence did not differ significantly (22.0% in flexible visitations and 24.8% in usual restricted visitations).
Rompaey B. et al. (2012)	Randomized controlled trial/Primary research: To find out the effect of earplugs during the night on the onset of delirium. Secondary research: To find out the effect of earplugs on the sleep perception.	Patients aged ≥ 18 admitted to ICU. Intervention group - n = 69 Control group - n = 67	The intervention group: patients sleeping with earplugs during the night (five nights in total). The control group: patients sleeping without earplugs during the night (five nights in total).	Primary research: NEECHAM scale 3 times a day.	Primary research: The intervention group: The incidence of delirium in 12 (19%) patients. The control group: The incidence of delirium in 13 (20%) patients.
				Secondary research: a questionnaire.	Secondary research: Patients sleeping with earplugs reported a better sleep perception (p = 0.042).
Fang Gao et al. (2019)	Randomized controlled trial / To find out the effect of transcutaneous electrical acupoint stimulation for prevention of postoperative delirium.	Patients aged ≥ 65 after cerebral vascular accident (CVA). Intervention group - n = 32 Control group - n = 32	The intervention group: Electrodes were placed between the first and the second metacarpal bone on the both sides of the hand. The electrical stimulation started 30 minutes before induction of anaesthesia, and the intensity was the maximum current that could be tolerated by the patient. The control group: electrodes were placed on the same points but no current was applied.	CAM- ICU screening twice a day in the first 3 postoperative days.	The intervention group: The incidence of delirium in 2 (6.3%) patients. The control group: The incidence of delirium was in 8 (25%) patients. The difference was statistically significant (p = 0.039).
Karadas C., OZdemir L. (2016)	Randomized controlled trial/ To find out the effect of early mobility and motion exercises on delirium prevention.	Patients aged ≥ 65 admitted to ICU. Intervention group - n = 47 Control group - n = 47	The intervention group: Passive, assisted-active or active ROM exercises were performed based on the patient's ability once a day. The control group: routine clinical practice.	CAM- ICU screening.	The intervention group: The incidence of delirium was in 4 (8.5%) and the mean duration of delirium was 15 hours. The control group: The incidence of delirium was in 10 (21.3%) and the mean duration of delirium was 38 hours. The difference between the intervention ad control group was not statistically significant (p > 0.05).
Humeidan M. et al. (2020)	Randomized clinical trial/ To find out the effect of cognitive prehabiliation on the incidence of postoperative delirium.	Patients aged ≥ 60 undergoing major, noncardiac, nonneurological surgery under general anaesthesia. Intervention group - n = 125 Control group - n = 126	The intervention group: The patients were given a tablet with a programme focused on cognitive exercise of their memory, speed, attention, flexibility, and problem-solving. The patients were instructed to complete the brain exercise minimally 10 hours before the operation. The control group: the patients were instructed to continue with their normal daily activities.	Memorial Delirium Assessment Scale.	The intervention group: The incidence of delirium was in 18 (14.4%) patients, p = 0.08. The control group: The incidence of delirium was in 29 (23.0%) patients. The cognitive intervention lowered delirium risk in patients who were at least minimally compliant.
Fazlollah A. et al. (2021)	Randomized clinical trial/ Primary research: To find out the effect of foot reflexology massage on delirium following cardiac surgery. Secondary research: To find out the effect of foot reflexology massage on sleep quality and pain following cardiac surgery.	Patients aged 35-70, candidates for CABD surgery. Intervention group - n = 30 Control group - n = 30	The intervention group - foot reflexology was done for 20 minutes, first within one hour after the extubation, once a day, for two consecutive days. The control group - standard postoperative care.	Delirium observation screening scale 3 times a day, the Richard Campbell sleep questionnaire (RSCQ) once a day, and pain intensity using VAS before the intervention, immediately after the intervention, and two hours after the intervention.	Primary research: The difference in the incidence of delirium was not statistically significant (p = 0.76). The intervention group - The incidence of delirium was in 8 (26.7%) patients two days after the operation. The control group - The incidence of delirium was in 7 (23.3%) patients.
					Secondary research: the pain level in the intervention group was lower than in the control group (p = 0.001). The difference in sleep quality was not statistically significant, increasing similarly in both groups (p = 0.06).

Author	Study type/Research Objectives	Respondent group	Interventions used and the duration of their use	Observation methods	Results
Alvarez E. A. et al. (2017)	Randomized clinical trial/ Primary research: To find out the effect of occupational therapy on duration and incidence of delirium in ICU. Secondary research: To find out the effect of occupational therapy on functionality at hospital discharge.	Patients aged ≥ 60, admitted to ICU. Intervention group - n = 70 Control group - n = 70	The intervention group: Standard ICU care + occupational therapy twice a day for five consecutive days. Occupational therapy included: intensive external stimulation of the patient, positioning, cognitive stimulation (games, cards, a laptop with tasks, visual aids), normal daily activities (independence in hygiene, eating, dressing), motor exercises, daily family visitations. The control group: Standard ICU care only.	Primary research: CAM-ICU screening twice a day for 5 consecutive days. Secondary research: Mini-Mental State Examination (MMSE)	Primary research: The intervention group: The incidence of delirium was in 2 (3%) patients. The control group: The incidence of delirium was in 14 (20%) patients. The difference between intervention and control groups was statistically significant (p = 0.001). Secondary research: Patients without delirium showed better cognitive function scores at discharge, the median MMSE for the intervention group was 28 points and for the control group 26 points.
Larsen L. K., et al.(2020)	Prospective study/ To find out whether intervention bundle targeting sedation, sleep, pain, and early mobility reduces delirium in patients with acute brain injury.	Patients with acute brain injury aged ≥ 18 admitted to ICU. Intervention group - n = 50 Control group - n = 44	Controlled sedation - assessed by RASS score Sleep: noisy night-time procedures shifted to the daytime. Pain: pain assessment using NRS. Mobility: Early mobilisation support at 5 levels - head elevation to less than 30 degrees, head elevation to more than 30 degrees, moving to a chair, sitting on the edge of the bed, walking or standing.	Care Delirium Screening Checklist (ICDSC) twice a day.	The intervention group - the incidence of delirium was in 88% patients, p = 1.0, the mean duration of delirium was 3.5 days (p = 0.26) and ICU length of stay was 10.5 days (p = 0.4) The control group - the incidence of delirium was in 90% patients, the mean duration of delirium was 4 days and ICU length of stay was 13 days. The implementation of the intervention bundle did not have a significant effect on the prevalence or the duration of delirium.
Guan-Hua Huang et al. (20 1 7)	Randomized clinical trial/ To find out the effect of a modified hospital elder life program (HELP) on the incidence of delirium and length of hospital stay in patients undergoing abdominal surgery.	Patients aged ≥ 65, undergoing abdominal surgery whose expected length of stay is longer than 6 days. Intervention group - n = 197 Control group - n= 180	The intervention group: Daily implementation of HELP programme for 7 days, focused om orienting communication, nutritional assistance and early mobilization. The control group received standard postoperative care.	CAM-ICU screening.	The intervention group: the incidence of delirium was in 13 (6.6%) patients. The control group: the incidence of delirium was in 27 (15.1%) patients. The difference between groups were statistically significant (p = 0.008). The incidence of delirium in the intervention group was reduced by 56% in comparison to the control group. Also, the length of stay was reduced by 2 days.
Tehranineshat et al. (2020)	Quasi-experimental study/ To find out the effect of multi-component interventions on the incidence rate of post open heart surgery delirium among hospitalized patients.	Patients aged < 65, admitted to ICU after open heart surgery. Intervention group - n= 48 Control group - n= 48	The intervention group: multi-component interventions (light adjustment, using calendar and clock, and enabling family visitations) The control group: standard care	DOS scale three times a day for 4 consecutive days.	The intervention group: the incidence of delirium was in 3 (6.2%) patients and the mean duration of delirium was 3.25 hours. The control group: the incidence of delirium was in 7 (14.6%) and the mean duration of delirium was 4.5 hours. The difference between the intervention group and the control group was not statistically significant (p = 0.31).
Faustino T. N. et al. (2022)	Randomized controlled trial/ To find out the effect of combined non-pharmacological interventions in the prevention of delirium.	Patients aged ≥ 18, admitted to ICU. Intervention group - n = 72 Control group - n = 72	The intervention group: multicomponent interventions (periodic reorientation, cognitive stimulation, correction of sensory deficits (visual or hearing impairment), and sleep promotion). The control group: standard care.	CAM- ICU screening twice a day.	The intervention group: the incidence of delirium was in 9 (12.5%) patients. The control group: the incidence of delirium was in 16 (22.2%) patients. The difference between the intervention group and the control group was statistically significant (p = 0.03).
Mansoori et al. (2018)	Controlled clinical trial/ To find out the effect of modification of sensory stimulations on the reduction of delirium occurrence rate in patients admitted to CCU.	Patients aged ≥ 18 , admitted to CCU. Intervention group - n = 40 Control group - n = 40	The intervention group: multicomponent interventions (light adjustment, noise reduction, sleep promotion, family visitations, correction of sensory deficits (visual or hearing impairment)). The control group: standard care.	NeeCham screening twice a day.	The intervention group: the incidence of delirium was in 3 (7.5%) patients. The control group: the incidence of delirium was in 14 (35%) patients. The difference between the intervention group and the control group was statistically significant (p = 0.005).
Patel J. et al. (2014)	Randomized controlled trial/Primary research: To find out the effect of non-pharmacological interventions consisting of environmental noise and light reduction on the occurrence of delirium. Secondary research: To find out the effect of these interventions on sleep quality.	Patients aged ≥ 18, admitted to ICU. Primary research: Intervention group - n = 171 Control group - n = 167 Secondary research: Intervention group - n = 29 Control group - n = 30	The intervention group: Noise reduction (including closing doors and decreasing the alarm noise levels on bedside monitors), light reduction (dimming/switching off any monitor screens not in use, turning off ceiling lights and using bedside lighting). The control group: standard care.	Primary research: CAM-ICU screening three times a day. Secondary research: Richards Campbell Sleep Questionnaire each morning.	Primary research: The intervention group: the incidence of delirium was in 24 (33%) patients and the mean duration of delirium was 1.2 days. The control group: the incidence of delirium was in 55 (35%) patients and the mean duration of delirium was 3.4 days. The difference between the intervention group and the control group was statistically significant (p = 0.005). Secondary research: The implementation of intervention bundle significantly reduced daytime sleepiness (p = 0.042), night-time nursing interventions (p = 0.045) and more patient nights contained a 3-h window of uninterrupted sleep (p = 0.029).

Source: Author's work.

Results and discussion

After carefully selecting the 15 studies that were included in the literature review, a summary table (Table 6) was created where the data identifying each selected study is compiled. All selected studies address the possibility of reducing the incidence and prevalence of delirium in ICU patients, using non-pharmacological interventions. The oldest study was published in 2012, whilst the most recent study was published in January 2022.

Single-component interventions

1) Music. In studies comparing the effects of musical stimulation on critically ill patients, the authors reached almost identical results. The study by Johnson *et al.* (11) focused on listening to music through headphones in elderly patients (n=40). The study assessed how patients responded to music, which was observed in patient physiological functions, specifically breathing rate, heart rate and blood pressure. According to the results of the study, it is evident that patients respond to music mainly by a decrease in heart rate and systolic blood pressure, thus the intervention

can be evaluated as beneficial. A three-arm randomized trial by Khan *et al* (12). investigated the effect of music on a group of patients (n=52) who were hospitalized in the ICU and connected to mechanical ventilation. The patients were divided into 3 groups where each group was played a different type of music (personal music, relaxation music and audiobooks) through headphones. Relaxation music achieved the best results.

Overall, it can be assumed that music intervention has an essential place in nursing non-pharmacological interventions to calm and relax the patient, which contributes to the prevention of delirium. It is a time and cost-effective intervention with an easy application by nursing staff. In addition to its positive impact on the prevention of delirium, music therapy can be positively evaluated in the areas of treatment of psychological problems, pain therapy and neurology.

2) Family. Another non-pharmacological intervention identified concerns flexible family visits. In general, they are significant for their positive impact on the psyche not only of the patient but also for their loved ones. They have a positive effect in terms of reorientation of the patient and, in addition, the family can actively participate in the care and thus get ready for the subsequent home care for the patient. However, unrestricted visits also place a certain burden on staff when they require increased attention. Rosa *et al.* (13) are the authors of a very large study looking at whether unrestricted versus restricted visits have an effect on patients and their delirium. According to the results of the study, flexible visits were shown to have no significant effect on the development of delirium. Unfortunately, the differences between the groups were negligible. At the same time, it was investigated how unrestricted visits affect the psychological well-being of family members. Statistically significant differences in favour of unrestricted visits were found. It is therefore safe to say that family members of hospitalised patients felt significantly better psychologically when they had the option of flexible visits. Secondary research in the study investigated the proportion of nosocomial infections associated with unrestricted visits and the effect of visits on ICU staff burnout. Here, no significant differences between groups were found.

3) Reflexology. A clinical study by Fazlollah *et al*. (14) focused on foot reflex massage as a non-pharmacological interventional component in the prevention of postoperative delirium. A specially trained staff member performed foot reflex point massage on an exposed group of patients up to 1 hour after surgery, and then once a day for 2 days. The control group of patients received routine postoperative care. However, the results showed no significant difference between the groups; delirium occurred in almost the same number of patients. A secondary research question in this study was to find out how foot massage improves sleep quality and reduces pain in patients. This massage has proven to be effective in reducing postoperative pain (p=0.001), while in the area of sleep the differences between the groups were insignificant. This intervention is quite demanding in terms of the need for specialised personnel and the time required, but worth considering in the context of effective non-pharmacological pain management. While no effect of this intervention on delirium was found, the research was conducted over a relatively short period of time and the effect may not have been immediately apparent. The foot massage has also been shown to be effective for conditions that are closely related to stress, such as various allergies, asthma, insomnia, depression, anxiety and migraine. It is also used for problems caused by increased muscle tension, such as back pain. In women, reflexology is often used to relieve premenstrual tension, difficulties in pregnancy, childbirth and also in menopause (15).

4) Cognitive stimulation. In their study, Humeidan *et al.* (16) prepared a tablet-based cognitive training application for patients with elective surgery that focused on memory, speed, attention, flexibility, and problem solving. Patients had to complete the program at least 10 hours before the scheduled surgery. After surgery, delirium was detected by periodic assessment of confusion using the Memorial Delirium Assessment Scale. The results of the survey showed a positive effect of cognitive stimulation on the patient, but the difference between the groups was not statistically significant. Alvarez *et al*. (17) in their research used intensive external stimulation of the patient, positioning, cognitive stimulation (using games, cards, etc.), normal daily activities, motor exercises of upper limbs, and daily family visits as non-pharmacological interventions. He demonstrated a statistically significant effect (p=0.001) of these interventions, as delirium developed in only 2 (3%) patients (n=70) when these interventions were used. The control group had a higher incidence of delirium, with 14 (20%) patients (n=70).

5) Mobilization. Early mobilization and physical exercise have a positive effect on the incidence of delirium, especially in elderly patients, as shown in a study by Karadas C., Ozdemir L. (18) The selected research group (n= 47) were patients over 65 years old in the ICU, where a trained staff member performed passive, assisted active

or active exercise with the patients once a day according to the patients' conditions. The control group (n=47) received standard care according to the ward standard. Although the difference between the groups was not statistically significant, exercise appeared to have a positive effect on the incidence of delirium, as it was identified in only 4 (8.5%) patients in the experimental group. The median duration of delirium was also lower, 15 h vs. 38 h in the control group, where delirium was recorded in 10 (21.3%) patients. Early rehabilitation and occupational therapy interventions have an irreplaceable role not only in the prevention of delirium but also in the comprehensive care of patients in the context of other diagnoses.

6) Transcutaneous electrical stimulation. A clinical study by Zhang, Gao *et al*. (19), investigates a non-traditional non-pharmacological intervention, namely the effect of transcutaneous electrical stimulation of acupuncture points for the prevention of postoperative delirium. The study in the experimental group consisted of placing electrodes on the upper extremity between the first and second metacarpal bones, applying the maximum current tolerated by the patient 30 min before the introduction of anaesthesia and throughout the operation. In the control group, patients also had electrodes applied but no current was applied. As a result, there was a statistically significant difference (p= 0.039) between the patient groups, with the experimental group (n=32) having a significantly lower incidence of delirium (6.3% vs. 25%) than the control group (n= 32). This intervention has been shown to be beneficial in reducing the incidence of postoperative delirium, which is, unfortunately, very common especially in elderly patients. Transcutaneous electrical stimulation is also widely used in pain therapy for its analgesic effects and is performed in pain clinics, rehabilitation or spa facilities, for example. It can therefore be used, for example, in cancer patients or in palliative care, as well as in the treatment of acute and chronic pain. It can also affect the cardiovascular system, as it leads to an increase in heart rate and a decrease in blood pressure (19).

7) Earplugs. The last and, coincidentally, the oldest study included in this literature review was a randomized study by Rompaey *et al*. (20), who focused on the effect of earplugs at night in critically ill patients. Here they investigated their effect on the incidence of delirium and sleep quality. Sleep was significantly better in patients using earplugs (p=0.042), but this intervention had almost no effect on delirium. At least in the area of sleep, this inexpensive and low-cost intervention could be used more often, as quality sleep generally has a positive effect on the whole person. This is confirmed by a leading expert in sleep research (21), who describes in his book how lack of and poor quality sleep directly compromises a person's cardiovascular, metabolic, immune and reproductive systems.

8) Multicomponent interventions. Most studies have focused on multicomponent intervention packages, which have proven to be the most effective. The studies included in the literature review were mostly focused on restful sleep, pain management, cognitive stimulation, reorientation, noise reduction, a lower level of ward illumination, more frequent visits, etc. Larsen *et al.* (22) are the authors of a prospective study focusing on sedation, sleep, pain, and early mobilization in patients with acute brain injury. Non-medical medical staff on the ward monitored the level of consciousness according to the RASS scale and tried to promote sleep by running the ward quietly (reducing lighting at night, sound level at monitors, performing only necessary nursing tasks). According to the findings, there was no significant effect on the prevalence or duration of delirium following the introduction of this delirium prevention package. However, the length of hospitalization was on average 3 days less in the experimental group, which not only has a positive effect on the patient but also on the costs of the hospital. Compared with the study by Chen *et al*. (23), which included the HELP intervention package, the benefits of this package were confirmed based on research. In the group where the intervention package was applied, delirium was reduced by a full 56% compared to the control group, while there was also a reduction in the length of hospital stay by 2 days. These results are therefore very satisfactory and demonstrate that non-pharmacological interventions are a way to influence delirium. Other multicomponent interventions were used and followed in a quasi-experimental study by Tehranineshat *et al.* (24). These included interventions such as a lower level of ward illumination, regular patient reorientation, visible calendars along with clocks, and family visits. The experimental group showed a lower incidence and duration of delirium than the control group, so it can be said that this study also showed a positive effect in the implementation of these non-pharmacological interventions. Faustino and colleagues (25), in their most recent study focusing on similar multicomponent interventions as Tehranineshat *et al*. (24), even demonstrated a statistically significant difference (p=0.03) between groups. Also Mansoori *et al*. (26) investigated the effect of sensory stimulation on reducing the incidence of delirium. He used interventions such as a lower level

and hearing deficits. The use of these interventions resulted in a statistically significant difference (p=0.005), as delirium was detected in only 7.5% of the patients in the experimental group, while in contrast, delirium was detected in as many as 35% of the patients in the control group. In the last study focusing on the whole multicomponent intervention package, the study by Patel *et al*. (27) also demonstrated a positive effect of these interventions, as delirium in the exposed group out of a total of n= 171 participants occurred in only 24 (14%) of them, in contrast to the control group (n= 167) where delirium developed in 55 (33%) patients. There was also a significant difference in the duration of delirium of 1.2 days vs. 3.4 days. Even here, the authors examined the effect of the same interventions on sleep quality, and again there were significant differences between groups in favour of reduced daytime sleepiness of patients and longer continuous sleep.

Conclusion

The sensitivity for detecting delirium in all types of wards is very low without the use of appropriate screening tools, and early recognition of the condition is essential. Educating the healthcare team, and especially the general nurses on this topic is key to appropriate management. It is important to carry out training and ongoing educational activities so that the entire team is aware of what care is most effective in preventing and managing delirium.

The aim was to produce a literature review that discusses the options for non-pharmacological interventions in the areas of prevention or treatment for the delirious patient. To make it effective, the research focused on retrieving valid studies targeting critically ill patients. According to the findings from valid studies, the use of non-pharmacological interventions is shown to be a way to alleviate episodes of delirium. They lead to improved treatment outcomes and subsequent patient prognosis, reduced health care costs and improved quality of nursing care. Multicomponent packages have been shown to be the most effective and are highly practical and efficient, containing interventions such as early mobilisation, sleep support, pain management, noise and a lower level of illumination, etc. Multi-component interventions targeting several risk factors simultaneously are more effective as opposed to implementing single interventions. However, any use of non-pharmacological interventions is essential in the prevention of delirium. For example, the intervention of transcutaneous electrical stimulation has been shown to be very effective, not only for delirium but also for many other health problems. Regular physical exercise and mobilisation can reduce the duration of delirium by more than half. Occupational therapy intervention has also proven to be very beneficial and can significantly reduce the incidence of delirium. These non-pharmacological interventions, whether single or multi-component, do not pose any risks to patients and have low healthcare costs. All interventions have been shown to be effective not only for delirium, but also have positive effects, such as on pain management, patient psychological state and overall recovery. This is indicated by the positive results in most of the research studies reviewed.

All of the studies included in the literature review were of foreign origin, which indicates that there is a lack of closer research in our hospitals in the Czech Republic and the problem of delirium is probably not addressed sufficiently and effectively. Especially the general nurse who is in constant contact with patients should have a high level of knowledge about delirium and thus contribute to the whole community.

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