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**Review Article**

# Non-pharmacological Treatment of Intensive Care Unit Delirium

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**Abstract:** Objective: To understand whether non-pharmacological treatment can reduce intensive care units. Methods: A review was conducted by searching the literature in the CINAHL, PubMed, PsycINFO, and EMBASE database. The prevalence of sputum in the ICU is 16%-89%. It is characterized by short-term memory loss, disorientation and impaired attention. There are three types of sputum, including hyperactivity, hyperactivity, and mixing. Both pharmacology and non-pharmacology include ABCDE care bundles, sedation, early mobilization, promotion of personal sleep quality, reduced noise and artificial lighting, and patient education. Music therapy as a non-pharmacological intervention has not been fully studied. CONCLUSIONS: Non-pharmacological treatment of sputum in the ICU remains an effective method because it eliminates the use of sedatives. However, this depends on the health of the patient, such as vision and hearing impairment. Exploring the effectiveness of music therapy for this condition will help to further improve the multi-component approach, which requires a combination of non-pharmacological interventions to promote patient health.

**Keywords:** Intensive Care Unit, Non-pharmacological, Delirium

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## 1. Introduction

### 1.1. Background

Delirium is a complex medical issue with unclear pathophysiology. According to Delaney, Hammond, and Litton [1], it affects about one-third of the ICU patients. Various etiologies define Delirium with the main symptom being cognitive alteration [2]. Primary features of the syndrome are impaired attention, short-term memory loss, disorientation, and a dynamic course. Not all features are manifested in a patient and the intensity also varies according to the individual. While confirming the impacts of Delirium such as agitation and cognitive impairment which develop within a short duration, Laske and Stephens [3] note the incidence level as 80% among the critical care unit (CCU)

patients. Significant impacts of Delirium include increased hospitalization and medical cost. A common challenge is the misdiagnosis of Delirium as depression, Delirium, among other psychotic challenges. Laske and Stephens [3] therefore note that the syndrome is not a psychotic illness but a medical condition that should urgently be addressed to foster patient outcome and ensure patient safety.

According to the *Diagnostic and Statistical Manual of Mental Disorders, V Edition (DSM-V)*, there are five criteria for Delirium which include disturbance in attention, development within a short time, additional cognitive disturbance, disturbance in criteria A and C not being considered in severely induced arousal level, and there being evidence from the patient's physical examination, history, and laboratory findings that another medical condition has a direct relationship with the cognitive disturbance [4]. According to

the National Institute for Health and Care Excellence (NICE), Clinical Practice Guideline (CPG) published in July 2010, on the prevention, diagnosis, and management of Delirium, the intervention should be formulated in line with the underpinning cause of the combination of issues. Current non-pharmacological interventions include hydrating the patient, reducing noise and distraction, patient and family education, reducing artificial lighting, developing an effective sleep-wake cycle, and decreasing noise. Notably, these non-pharmacological are diverse and considered effective but are still underexplored. This study, therefore, focuses on the diverse non-pharmacological interventions to establish their effectiveness and explore other approaches that can be used to reduce the high rate of the condition in the ICU.

### 1.2. Rationale

Regardless of the underlying pathophysiology and cause of the condition, Reade and Finfer [5] note that the condition is a vital event among critically ill individuals. These authors further note that there lack imaging tests, electrophysiological, or diagnostic blood for the disorder making it a clinical condition. With an estimated incidence level of between 16% and 89%, Reade and Finfer [5] recommend the implementation of profound intervention measures besides sedation. According to Cavallazzi et al [2], non-pharmacological measures play a core role in preventing and treating Delirium. Key approaches proved to be effective include minimizing artificial lighting, reducing noise, increasing exposure to natural light during the day, and optimizing ambient temperature. The consideration of these measures includes the recommendation to reduce patient exposure to sedatives. Despite the acknowledgment of non-pharmacological interventions, other approaches such as music remain under-explored. This study, therefore, explores the different non-pharmacological interventions in reducing the rate of Delirium in the ICU and the effectiveness of music therapy in managing the condition.

## 2. Search Strategy

The literature sources were obtained from various health-related databases. These included CINAHL, PubMed, PsycINFO, and EMBASE. Further resources included Science Direct, Google Scholar, and Trip Database. For dissertations and theses which also provide quality information, ProQuest was used. Other sources included NICE, CPG, World Health Organization (WHO), and Centers for Disease Control and Prevention (CDC) which provide reliable and accepted data on condition prevalence and management.

Obtaining reliable and quality resources requires inclusion and exclusion criteria. Patino and Ferreira [6] define inclusion criteria as main characteristics that subjects should have for being included in the study while the exclusion criteria are the features that may interfere with the research success. In this search, the inclusion criteria included studies within the last 10 years of publication, peer-reviewed, clinical guidelines,

dissertations, theses, and those with the patient in the ICU. The exclusion criteria feature included studies with only the abstract accessible and those published earlier than 2009. In line with the research topic, objective, question, and hypothesis, the search terms for the sources included causes of Delirium, prevention and management of Delirium, and non-pharmacological management of Delirium. The filtration of the obtained sources was done based on the Research Quality Plus assessment framework (RQ +). Ofir, Schwandt, Duggan, and McLean [7] define the RQ + as a systematic approach for defining and examining the research quality, its positioning for use, and importance. Main dimensions evaluated included the research integrity, legitimacy, positioning for use, and importance in relation to the current study.

## 3. Theoretical Framework

The theoretical underpinning of applying non-pharmacological measures to reduce the rate of Delirium in the ICU is centered on addressing the patient's needs and the importance of nurses in such regard. This introduces the importance of person-centered care which Fazio, Pace, Flinner, and Kallmyer (2018) [8] define as providing quality and safe services in line with the patient's needs and preferences. In addition, this healthcare model involves empowering the patient through awareness to promote their profoundness in decision making. Consistent with addressing the patient's needs, Virginia Henderson's Theory of Need would suffice. Smith and Grami [9] describe this theory based on the nurse's unique functions which mainly entail aiding the patients in performing various activities as they would on a normal basis where they would have the desire, knowledge, and strength. These authors further note that assisting the patients to execute the different actions promotes their recovery rate and reduces the hospitalization duration. It is the role of the nurse to assist the patients to gain independence and controlling their environment.

The importance and application of the Virginia Henderson's Theory of Need in managing Delirium through non-pharmacological measures are based on five main components of promoting sleep, addressing immobility, sensory stimulation, managing pain, and sedation cessation. These aspects relate to Henderson's theory through more rest and sleep for the patient, maintaining and moving to a desirable position, interacting with others to express needs, opinions, and fears, participating in recreation activities and breathing normally [9]. Nurses are therefore required to establish the specific points of needs of the patients and assist them to overcome the issues. For instance, understanding the level of cognitive impairment is achieved through continuous interaction with the patient while the immobility challenge is addressed through formulating physiotherapy for the individual. While pain management entails providing the patient with medication, sleep and sufficient rest are critical in mitigating the distress.

## 4. Delirium in the ICU

Delirium is a critical diagnosis in the ICU since it portends challenging prognosis in the medical facility and is difficult to manage [10]. The prevalence of this disorder in the ICU is high, and it is related to the increased length of stay, longer mechanical ventilation, high medical costs, and rise in mortality rates especially among the aged. To ensure effective management of the condition, it is first essential to understand the epidemiology, pathophysiology, clinical presentation, assessment, and prognosis.

### 4.1. Epidemiology

The prevalence and incidence levels of Delirium in the ICU are high. Smith and Grami [9] note that the condition which presents through acute brain impairment occurs among 60%-80% of the critically ill individuals under mechanical ventilation while those not under mechanical ventilation constitute 20%-50%. These percentages imply that about 40000 individuals under mechanical ventilation and those in the ICU are affected by Delirium daily. Ibrahim et al. [10] confirms the high prevalence of the condition and note that for mechanically ventilated patients, approximately 85% are diagnosed with Delirium. Laske and Stephens [3] estimate the prevalence as high as 80% for CCU patients. These studies concur on the high incidence levels of the condition which therefore prompts for the development and implementation of effective management approaches. According to the Society of Critical Care Medicine CPG, routine monitoring of the condition for ICU patients is imperative to prevent the high morbidity and mortality rates [11]. There are three main types of the disorder among ICU patients which include the hyperactive, hypoactive and mixed. Cavallazzi et al. [2] note that the hypoactive is the most frequently especially among geriatrics and is characterized by the worst prognosis.

### 4.2. Pathophysiology

There lacks a definite description of the disorder's pathophysiology. This is as explained by Arumugam et al. [12] who note that for critically ill patients, there is a poor understanding of the condition's pathophysiology. Most studies, therefore, use the hypothesis that the occurrence of Delirium is contributed by cholinergic deficiency. According to these authors, this hypothesis is based on the recent discoveries that a significant relationship exists between anticholinergic drugs used in the ICU and Delirium. Cavallazzi et al. [2] confirm this hypothesis and add that patients diagnosed with Delirium show high serum anticholinergic activity as compared with those without. The second hypothesis used to explain the pathophysiology of the Delirium is the increased release of dopamine and reducing acetylcholine. As discussed by Arumugam et al. [12], these activities are related to increased Delirium as well as increase and decrease in serotonergic activity. The implication of this knowledge is that alteration in amino acids levels may have a role in the presentation of the condition. The Gamma-aminobutyric acid (GABA) which is described as an

inhibitory neurotransmitter has a significant relationship with Delirium. The medical and environmental factors as they related to Delirium are considered since they trigger the immune system to produce cytokines. These mediate the immune and inflammatory responses to stress. These events increase the risks of Delirium.

The systematic review by Cavallazzi et al. [2] provides a number of relationships which can be used to explain the pathophysiology. In the first relationship, it is based on how inflammation is regulated by acetylcholine. This explains the imbalance between the anti-inflammatory and inflammatory mediator in Delirium. In this reference, the inflammation role and the consequent deranged coagulation among mechanically ventilated ICU patients has been explored were five inflammation and four coagulation markers were measured in these patients' plasma. Once the potential confounders were adjusted such as the condition severity, the increased risk of Delirium was associated with low concentration of plasma of protein C as the coagulation marker and high concentration of plasma of the soluble tumor necrosis factor receptor-1 as the inflammatory marker. In an unexpected finding, low matrix metalloproteinase-9 plasma concentrations were related to high Delirium risk. In another explanation of the condition pathophysiology, it is based on the dopaminergic system overactivity. In addition, relative serotonin deficiency and high serotonergic activity are related to Delirium among patients in the ICU. To further enhance understanding of the condition, Arumugam et al. [12] recommend more neuroimaging and biomarkers as potential fields. For the critically ill patients, establishing the biomarkers related to Delirium is essential in the risk stratification and early diagnosis. For example, high levels of CRP and procalcitonin are related to increased Delirium and reduction of the coma-free days. These markers can, therefore, be used to understand the condition and the pathophysiology mechanisms further.

### 4.3. Clinical Presentation

The International Classification of Diseases by WHO, the tenth revision describe Delirium as the disturbance in the individual cognition which is reflected in the immediate loss of memory and disorientation of person, place, and time [4]. These authors further base their description on the ICD-10 criteria which entail sleep, emotional, and psychomotor disturbances. The clinical features of the condition are described from the psychological, biological, and physical disturbances. The condition is characterized by an acute rise of symptoms and a dynamic course. According to NICE (2010) description, the condition is at times referred to as an acute confusion state. Other characteristics of the disorder include impaired cognitive perception or function, disturbed consciousness which all have an acute onset. The development is usually within two days and is related to adverse outcomes. The two types of Delirium as noted by NICE guidelines include the hyperactive and hypoactive states. The distinction between the two types is centered on the symptoms and behavior. For the hyperactive state, the

condition is characterized by enhanced arousal, restlessness, aggressiveness, and agitation. For those with the hypoactive state, they are sleepy, quiet, and withdrawn making it challenging to diagnose. Due to the memory impairment issue, Delirium is at times confused with dementia, and in some cases, the patient may have both. NICE guidelines in this regard recommend treatment of Delirium if uncertainty exists. The burden associated with Delirium is based on increased incidence of dementia and hospital complications.

#### **4.4. Assessment**

Various tools have been validated for assessing Delirium. In an expert's paper by Sona [11], there are 6 recognized methods for assessing the condition in the ICU setting. These include the ability by the patient to follow directives, agitated related events, Confusion Assessment Method for the ICU (CAM-ICU), psychiatric consult, the Intensive Care Delirium Screening Checklist (ICDSC), AND THE Clinical Institute Withdrawal of Alcohol Scale-Revised. The Confusion Assessment Method (CAM) which has acquired popularity based on its simplicity and effectiveness was developed in line with the Delirium interventions and psychiatric expert opinions. In addition, the CAM is formulated according to the DSM-V criteria to aid the non-psychiatrists with diagnosing the condition. The validity and reliability of the CAM instrument are centered on its four features which include inattention, changed level of consciousness, disorganized thinking, and acute commencement of the mental status dynamism or altering course. In the ICU setting, however, the CAM instrument is criticized especially when assessing non-verbal patients or those under mechanical ventilation. This is the foundation of developing the CAM-ICU which is modified and tailored towards assessing the non-verbal patients. Delirium is also assessed according to the symptoms. This is demonstrated in the CPG by Barr *et al.* [13] who note that two of the assessments for the condition should be pain and agitation.

#### **4.5. Prognosis and Risk Factors**

The onset and progression of Delirium differ among patients. However, all manifest cognitive disturbance as the main symptom. The condition is severe when not early detected or urgent interventions taken. This is asserted by Kim and Hong [14] who relate the condition with a 6-month mortality rate, a prolonged stay at the hospital, and a high degree of cognitive impairment during discharge from the medical facility. The systematic review by Kim and Hong further reveal that for patients that have prolonged Delirium, there are poor executive functions and global cognition at both 3 and 12 months after discharge. Another prognosis for Delirium patients after discharge is that the majority manifest neuropsychiatric sequel ad cognitive disturbance was 2-fold high within 2 years after discharged as compared to individuals that did not have Delirium. There is also a significant relationship between Delirium and dementia. This is as noted by Silverstein and Deiner [15] who show the

relationship and overlap in Dementia and Delirium symptoms. Although this prognosis provides insights on the diverse factors to evaluate in either condition, the challenge associated with the symptoms overlap is reflected in the underdiagnosis and poor treatment of Delirium. Silverstein and Deiner [15] further note that the overlap in the symptoms is a concern for the diagnosis instruments.

Current and known risk factors for Delirium are several and are categorized according to the elements predisposing the patient to the condition and factors that aggravate the development of these symptoms. In a review conducted by Hayhurst, Pandharipande, and Hughes [16], two main risk factors for the condition are advanced age presenting with cognitive impairment. In addition, patients with chronic conditions and in particular those related to the respiratory system are at high risk. In another systematic review as noted by Armugam *et al.* [12], 25 risk factors were identified for the condition in the ICU. Among these factors, 9 were related to the laboratory while 7 were associated with the medication. The remaining were associated with diverse patient and condition factors such as dementia, age, alcohol and substance abuse, and respiratory disorders. These factors can be categorized into three including acute illnesses, host of patient factors, and iatrogenic or environmental factors. Patient factors are also critical to consider which encompass other features such as environmental. For instance, individuals that lived alone were identified to be at high risk of Delirium as well as those that smoked or consumed alcohol. The administration of some medications including antibiotics, opiates, and metoclopramide are identified as risk factors for the condition. The importance of understanding the prognosis and risk factors related to the Delirium aids in developing intervention measures according to the clinical features or risk factors.

## **5. Managing Delirium**

The foundation of treating and preventing Delirium is understanding the risk factors which are then addressed through a multi-system approach. King and Gratix [17] argue that the diverse management strategies for Delirium should consider the causes, symptoms, and comorbidities. Central in managing the condition is applying the patient-centered model. Fazio *et al.* [8] examines the foundation and application of the person-centered care model and notes that it considers the diverse patient factors including cultures, beliefs, and those related to the disorder. As developed by Carl Rogers, the person-centered care model brings together diverse ideas including the relationship between the patient and healthcare providers which is founded on profound communication. Relating these factors and Delirium management, the social, personal, environmental, health factors should be considered. Two approaches exist in Delirium interventions which include the pharmacological and non-pharmacological measures. As outlined by The Ohio State University [18], both the prevention and treatment approaches may involve the use of medication or modifying the patient factors and environment.

The role of healthcare providers is to identify the specific factors for the patient and develop interventions that are in line with these factors which are unique for the different patients.

### **5.1. Pharmacological Management**

Pharmacological management measures for Delirium are based on the specific symptoms manifesting in the patient. In the CPG by Barr et al. [19], the recommendations are according to the assessment. For analgesia and pain, ICU patients experience high pain levels and trauma. In line with the pain assessment is the routine monitoring of other vital signs including breathing and implementing the most effective medications. Among the recommendations in the CPG are the use of intravenous (IV) opioids. The importance of identifying the precipitating factors is as justified by Ibrahim et al. [10] who note that pharmacological management is aimed at reducing the duration and severity of the condition. However, conflicting justifications on the use of antipsychotics exist based on the effects of these drugs. Ibrahim et al. (2018) for instance note that the atypical antipsychotics can decrease the duration of Delirium although they should not be used for individuals who are at high risk of conditions such as torsades de pointes. Some of the medications approved by the United States Food and Drug Administration include Quetiapine, Dexmedetomidine, Haloperidol, and Ziprasidone which are prescribed and administered in different strengths according to the severity of the condition in the patient.

Kim and Hong [14] define Delirium as a syndrome induced by disease and treating the underlying cause is the foundation of reducing the severity, length of the disorder, and incidence level. These authors further note that although sedatives and analgesics are widely used to manage the condition, they should be implemented with care since they are related to iatrogenic Delirium. The mechanisms of these drugs are increasing the acetylcholine while reducing the dopamine levels. The existence of different medications does not justify their use as there are interaction factors and side effects related to the drugs which must be considered. For instance, although atypical antipsychotics and haloperidol are not established fully, their use in treating Delirium is common based on their mechanism of action. Another limitation related to the use of pharmacological management approach is the paucity of randomized controlled trials of these drugs and their effectiveness [16]. These authors confirm the wide use of typical and atypical medications such as haloperidol and olanzapine respectively as antipsychotics. However, these authors note that there is conflicting and limited evidence on the efficacy of these antipsychotics. Drawing from the above literature, it is apparent that no single pharmacological approach is fully supported by evidence for treating Delirium in the ICU. This, therefore, introduces the importance of the non-pharmacological management approaches which are mainly based on modifying the patient and environmental factors.

### **5.2. Non-pharmacological Management**

Delirium remains undocumented and unrecognized in 66%-84% of the total cases in the ICU. This is as noted by

Smith and Grami [9] who add that the underdiagnosis results in poor patient outcomes and increased healthcare costs. As the hospital costs continue to rise globally, Delirium is a major contributor to this escalates thus the need for effective management strategies. Smith and Grami [9] further note that Delirium will result in a rise of the US healthcare costs by \$6 billion - \$20 billion per year. In the ICU, the incidence level from Delirium rises the overall healthcare cost by \$9000 per patient. As reflected in the pharmacological management analysis, there exist no proved medication for managing the condition which prompts for other management strategies. The non-pharmacological management strategies as espoused by Barr et al. [19] are developed in line with the cause and symptom of the condition. The CPG by these authors, for instance, recommends sufficient rest for patients with Delirium in the ICU. However, this is dependent on the severity of pain and patient factors. Preventing Delirium outweighs the present treatment approaches. According to Smith and Grami [9], the fundamentals in the prevention approaches are decreasing the duration of the condition through early identification of disorder and eliminating or modifying the patient, iatrogenic, and environmental factors. The role of nurses and other healthcare providers involved in assisting the patient include identifying the patient factors and establishing the modification mechanisms.

The Ohio State University [18] on the prevention and management of the condition in the ICU provide a summary of aspects that should be considered in the non-pharmacological management which mainly involve adjusting the environment. This institution recommends the mobilization and ambulation of the individual often and early, ensuring sleep hygiene, increasing the daytime light, ensuring the room is naturally illuminated, ensuring the patient has sufficient sleep, control the noises especially at night, and using special objects from the individual's personal life and environment such as photographs. Barr et al. [19] on the prevention measures recommend the consistent monitoring of the condition and implementing various measures. These include conducting early mobilizing of the individual routinely which reduces the duration and incidence of the condition and altering the environment of the individual such as reducing excessive artificial lighting. These authors did not provide recommendations on the use of pharmacologic agents as a prevention protocol for patients in the ICU. In addition, there was no recommendation for combining the pharmacological and non-pharmacological approaches.

The holistic management of Delirium is effective in preventing the condition in the clinical setting. Hayhurst et al. [16] note that the combination of evidence-based prevention approaches into bundles is aimed at achieving the quality patient outcome and reducing the Delirium rates significantly. These authors described the Awakening and Breathing Coronation, Delirium Monitoring or Management, and Early Exercise/Mobility (ABCDE) that was published in 2011 and examine its effectiveness. In the first category which entails the assessment, prevention, and management of pain, the main target is to control pain. Also included in this category is the

use of nonopioid adjuncts and regional anesthesia. In the second category, it involves both the spontaneous breathing trials (SBT) and spontaneous awakening trials (SAT). The third aspect focuses on the selection of sedation. Key features are targeted light sedation when the sedation is essential, avoiding benzodiazepines, and dexmedetomidine in case there are hypertensive symptoms. In the fifth element, it comprises of exercises and early mobility. Here, occupational and physical therapy assessment is performed while progress in various dimensions such as sitting, standing, walking, the range of motion, and activities of daily living (ADLs) are monitored. The final element involves engaging the family and empowerment. This part of the bundle entails providing sufficient support to the patient, participating in the mobilization, and cognitive stimulation.

Occupational therapy as part of non-pharmacological management is effective in preventing and managing the condition. This was revealed by Ibrahim *et al.* [10] in a systematic review where among the nonintubated ICU patients, a randomized control study demonstrated that the therapy could decrease the Delirium incidence by 3%. In another quality improvement research, Ibrahim *et al.* [10] showed that the implementation of occupational and early physical interventions while reducing the use of benzodiazepine among mechanically ventilated patients in the ICU decreased the incidence level by 21%. Further, this approach reduced the number of hospitalization days by 3.1 when compared to the traditional rates prior to implementing the interventions. Although early mobilization is identified as a major tool in the ABCDEF bundle, its implementation may be challenging particularly among the ICU patients. As a result, medical facilities and healthcare providers should explore further options on increasing the patient mobilization such as user-friendly devices including temporary pacemakers and subclavian intra-aortic balloon pumps. However, the implementation of these mobile mobilization instruments should be feasible and according to the patient's condition.

For ICU patients, sleep deprivation is a key challenge which non-pharmacological management approaches focus on eliminating. Several approaches have been proposed in this regard which includes reducing the alarm volumes, closing the doors, providing the patient with eye masks, and the patient using the earplugs. In addition, timed putting off lights has been proved to enhance the patient's sleep in the ICU. This was asserted by the Ohio State University [18] where adjusting the patient's environment plays a key role in promoting quality of sleep. According to this university, the issue of sleep is described as sleep hygiene where rather than using artificial lighting, daytime natural lighting should be increased. At night, the lights should be off to provide the patient with quality rest time. Controlling the noise in the patient environment is aimed at eliminating distractions. These approaches are applicable both during the day and at night. While still controlling the patient's environment, the number of visitors should be reduced as well as the staff attending the patient. Smith and Grami [9] support the reduction of noise and promoting the quality of sleep for

Delirium patients. According to these authors, these patients should have four hours of continuous sleep.

During and after the condition, the patient's social environment should be included in the management approaches. Both the patient and the family or relatives should be educated on the management of the condition and elimination of the risk patients. According to Kim and Hong [14], preventing Delirium and the severity of the symptoms is based on informing the patient and the family on the risk factors and how they can be involved in its management. Creating awareness for both the patient and the family plays a critical role in early preparation for the condition before it occurs. Besides reducing the severity of the symptoms, this approach ensures that the patients do not feel humiliated when the condition occurs. Some of the elements to include in the education are the sleep-wake cycle, the importance of reducing the noise levels, and consistent interaction with the patient to establish their coordination. Also, the family visits should be regulated to suit the patient's cycle such as sleep-wake. Kim and Hong further note that a picture of the patient's close friend or relative may be helpful in promoting cognitive wellbeing. In line with the 2013 ACCM guidelines, both the patient and the family should be educated on the importance of early mobilization. In case restraints are needed, there is a need to combine it with sedatives since the physical restraint may result in patient agitation.

Non-pharmacological interventions are encompassed in the Nurse-Led Delirium Protocol (NLDP) and are associated with significant positive outcomes on the patient's condition. This was established in a quantitative study by Roca [20] that examined 259 charts before and after the implementation of the NLDP protocol at the hospital of study. Drawing from the CAM scores, this study showed that implementing the NLDP decreases the number of patients testing positive for Delirium. The NLDP is a combination of multiple approaches which are based on the patient factors and condition. The interventions also consider multiple components in the patient's welfare from the cognitive to cardiac and functional independence. Main features of the protocol include ensuring a safe environment, preventing the cognitive decline, protecting the circadian rhythm, maximizing the functional independence, protecting the patient from iatrogenic harm, spiritual interventions, nutritional interventions, and fluid interventions. The implementation of the protocol promotes the patient's overall health and environment. In person-centered care, the healthcare services recognize diverse factors including the culture and beliefs. The NLDP protocol acknowledges these cultures and beliefs to include a soothing voice, presence, and touch by the patient's environment, supplying religious materials, reading appropriate materials, and consulting the hospital chaplain. The implementation of these interventions should first consider early screening to establish the presentation of the condition. In an ICU Delirium in Clinical Practice Implementation Evaluation Study (iDECePTIVE-study), Ista *et al.* [21] showed that early detection of Delirium allows for selecting the most effective interventions from the ICU and organizational protocols.

The NLDP protocol demonstrates the importance of combining lifestyle modification and controlling the patient's environment in an aim to improve the patient's welfare. As presented by Roca [20]. Providing a safe environment involves having a bed/chair alarm, family support, having education materials, and maintaining a bedside scale for symptoms including pain and CAM scores. Preventing cognitive decline entails bringing the patient comforting items from home, providing sensory aides, and frequent place or time orientation. Preventing circadian rhythm encompasses opening curtains during the day, switching off lights during the night, ensuring that the patient toilets before bedtime, and reducing stimuli. The fluid and nutrition interventions in the NLDP protocol involve the patient taking plenty of water, oral care before bedtime and at bedtime, reevaluating the need for IV fluids, feeding assistance and providing the patient with snacks before between meals. Nursing practitioners are therefore required to demonstrate an understanding of the NLDP protocols. To the healthcare facilities, continued training and education should be provided to ensure that the nurses among other healthcare providers are comfortable with using the tool and assist in preventing false positive and false negative CAM scores. Palacios-Cena et al. [22] note that the importance of a nursing protocol in managing Delirium helps in reducing conflicts in care management and provides a diverse option in managing the condition to prevent the severity of its symptoms.

The role of nurses in implementing the non-pharmacological management interventions in the ICU is centered on their ability to establish the patient's condition, the specific needs, and approaches that may improve the individual's condition [23]. In a prospective cohort study conducted by Mori et al. [24], the logic regression and univariate analysis to establish the factors that are associated to high prevalence of delirium revealed that nursing competence is imperative in the early identification of the condition and providing effective care that is according to the patient's characteristics. These authors, for instance, established that physical restraint is related to the condition and it is the role of nurses to identify when the restraint is an issue and implement a management approach. Besides the implementation of the ABCDE bundle care, nurses' competence is essential in formulating other non-pharmacological approaches such as early mobilization which improves the patient's wellbeing while reducing the severity of the symptoms. The research by Mori et al. [16] concurs with that by Arumugam et al. [12] on the importance of enhancing nurses' awareness to address Delirium in the ICU. Notably, the awareness programs should include the ability to identify the risk factors related to the condition and the implementation of effective management approaches based on the patient characteristics. For instance, immobile and restrained patients demonstrate a high level of anxiety. Nurses should therefore consider diverse interventions including early mobilization and removing the restraints to avert the agitation and anxiety levels.

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transcends reducing the patient's symptoms to include the importance of an effective notification system to the healthcare providers. This was established in a quantitative study by Park et al. [25] on the importance of the condition's notification program, electronic chart notifications, and using bedside signs. Although there was no relationship between a simple notification program on the length of stay at the hospital, mortality rate, and the condition duration, it was established that an effective notification system has an effect on the pain and anxiety. Drawing from this study, notification approaches are essential in the ICU which improves the response time for nurses to address the patient's needs. The importance of a notification program coupled with non-pharmacological management approaches is centered on the response by the nurse or physician to the specific need of the individual. According to Laske and Stephens [3], healthcare providers routinely check on the patients to establish their cause of anxiety and discomfort such as pain, light, and noise. Based on the individual's response, urgent interventions are implemented such as sedatives and reducing the intensity of light or noise. Park et al. [25] through the pilot study discovered that in an ICU that has a notification program, the nurse or physician does not routinely check on the patients. Rather, the individual is attended to based on the request or notification.

### ***5.3. Music Therapy in Managing Delirium***

Music therapy aids in addressing confusion among Delirium patients. This was revealed in a quantitative study by Dizon [26] where some of the respondents had reduced CAM scores when subjected to classical music. Although one of the main limitations for this study was the small sample size making it difficult to establish if indeed music had an effect on the CAM scores, the small trends were clear indications that music can be used in reducing Delirium symptoms among aged patients. The study by Dizon [26] concurred with earlier ones to demonstrate that for surgical patients that listened to music, there were limited confusion episodes as compared to those who did not. Music is part of non-pharmacological intervention which can, therefore, be used to assist patients to manage the condition. While relating the findings to Roy's adaptation framework, the environmental influence on a patient is critical in the critical care setting. Notably, having a soothing and calm environment which is achieved using music can help the patients to cope with the condition. The role of nurses in this regard is to work on manipulating the patient's environment which promotes their adaptation and respond to stimuli. This is reflected in the type of behavior by the individual which meets the expected outcome by the hospital and the healthcare providers.

Music therapy continues to gain popularity as part of the non-pharmacological intervention in Delirium. While using the Menorah Park Engagement Scale (MPES) and Observed Emotion Rating Scale (OERS) to measure the effect of music on engagement and mood, Cheong et al. [27] discovered that there is a statistically significant change in passive and constructive engagement according to the MPES and general

alertness during the creative music therapy. An essential discovery is that the positive changes were discovered when the patient's favorite music was played. Music therapy as non-pharmacological management is a goal-oriented approach that where the therapist assists the patient to enhance, sustain, and restore the patient's wellbeing. However, the musical approach to managing Delirium remains underexplored. Drawing from the Heuristic model which consists of five musical features including communication modulation, cognitive modulation, behavior modulation, emotional modulation, and attention modulation, the importance of musical experiences on one cognitive welfare are discussed. Cheong *et al.* [27] note that musical therapy is an effective nursing intervention which is used to reduce Delirium and confusion especially among the elderly. In addition, therapy is used to reduce anxiety and promote relaxation among these patients. The impacts of musical therapy were further demonstrated in a systematic review by Abraha *et al.* [28] although further studies are required to ascertain this literature.

## 6. Comparing Different Non-pharmacological Approaches

Non-pharmacological interventions for managing Delirium are dependent on patient factors and the healthcare providers' selection. In the systematic review by Abraha *et al.* [28] in using the non-pharmacological management for patients above 60 years, it was revealed that multicomponent approach is essential in preventing the condition and that the interventions are profound when administered to the patient at high risk of developing the condition. This review further revealed that for the single component management approaches, only the reorientation protocol, staff education, and Geriatric Risk Assessment Med Guide had significant outcomes in reducing the condition severity. Some of the interventions examined were reorientation protocols, hydration management, music therapy, and bright light therapy. Cunningham and Kim [14] also demonstrate the importance of the multi-component intervention rather than the stand alone. These authors noted that the Hospital Elder Life Program (HELP) which targets different components including sleep deprivation, cognitive impairment, immobility, visual impairment, and dehydration have significant and positive outcomes on prevention and management of Delirium.

## 7. Research Gap

The non-pharmacological management of Delirium for patients in the ICU remains a critical aspect to avoid the overdependence on drugs such as sedation. However, patient factors guide the development of the management approach, and while there are different strategies, most studies concur on the importance of a multi-component intervention [29]. Drawing from the literature analysis above, the main aim of

the non-pharmacological is to promote the patient's state of well-being. Current and widely applied non-pharmacological interventions include patient and family awareness through nursing education, addressing dehydration, providing the patient with nutrition supplements, occupational and physical therapy, using hearing aids, providing the patient with visual covers, and reducing the number of visits [5]. Music therapy as a non-pharmacological intervention has also been explored and noted to decrease the level of anxiety and confusion of the patient [26, 27]. However, more studies are required to explore the relationship between music therapy further and preventing or treating Delirium. This will allow for incorporating the intervention in the ICU as part of the multi-component to promote the patient's wellbeing.

## 8. Conclusion

In summary, Delirium remains a vital condition in the ICU and is challenging to manage. It is related to the increased length of stay at the ICU, reduced quality of life, high medical costs, longer mechanical ventilation, and increase in mortality rates. The above literature analysis demonstrates that the condition is characterized by acute impairment of the brain, particularly among the mechanically ventilated patients. The condition, however, lacks clear pathophysiology and is characterized by memory loss and disorientation of the individual, time, and place. Considering the management of the condition, the non-pharmacological management strategies are considered effective as they limit the use of sedatives. However, this is dependent on the patient's condition and environmental factors. Some of the main non-pharmacological management approaches include reducing noise, early mobilization, and ensuring sufficient and quality sleep. Music therapy as a non-pharmacological approach has a positive correlation with the level of anxiety and confusion although this needs to be explored further which is the foundation of the research proposal.

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