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School of Occupational Therapy

Exploring the Role of Occupational Therapy in the Prevention and Treatment of Post-Intensive Care Syndrome

Claire Kittridge

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A capstone project submitted in partial fulfillment for the requirements of the Doctor of Occupational Therapy degree from the University of Indianapolis, School of Occupational Therapy.

Under the direction of the faculty capstone advisor:

Lucinda Dale, EdD, OTR, CHT, FAOTA

A Capstone Project Entitled

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By

Claire Kittridge

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Approved by:

Faculty Capstone Advisor

Date

Doctoral Capstone Coordinator

Date

Accepted on this date by the Chair of the School of Occupational Therapy:

Chair, School of Occupational Therapy

Date

Abstract

The purpose of my doctoral capstone experience was to explore the role of occupational therapy in the prevention and treatment of post-intensive care syndrome (PICS). My project consisted of three main components: a) developing a cognitive wellness program for patients in the Intensive Care Unit (ICU), b) adding an occupation-based functional cognition assessment to the Critical Care Recovery Center (CCRC) and facilitating appropriate outpatient therapy referrals, and c) developing education resources for family members of patients in the ICU. After I developed these components, I presented the findings to the inpatient therapy staff at my site. Then, I distributed a survey to assess understanding of the information and feasibility of the cognitive wellness program. Results of the survey indicated that 92% of therapists reported proficient understanding of the program ($n = 11$). Therapists reported feasibility of the program on a 0-100 scale, with an average feasibility rating of 76. Occupational therapists can aid in the prevention of delirium and resulting PICS by providing cognitive stimulation tasks alongside traditional treatment in the ICU. Additionally, occupational therapists can evaluate patients with PICS in outpatient settings using occupation-based measures.

Literature Review

Post intensive care syndrome (PICS) is described as a collection of physical, cognitive, and/or mental health deficits following an ICU stay (Elliot et al., 2014). However, these effects were not restricted to the patient; families of patients in the ICU often experienced stress, anxiety, and post-traumatic stress disorder (PTSD) (Needham et al., 2012). Members of the Society of Critical Care Medicine developed a model (see Appendix A) to demonstrate the symptoms of PICS, as well as the effects on family, also referred to as post-intensive care syndrome – family (PICS-F) (Needham et al., 2012). Individuals with PICS experienced symptoms in three categories: (a) mental health decline, (b) cognitive impairments, and (c) physical impairments. The family of the individual who survived the ICU experienced mental health symptoms, including anxiety, PTSD, depression, and complicated grief (Needham et al., 2012).

The most common cognitive deficits found in this population were decreased global cognitive function and decreased executive function (Pandharipande et al., 2013). Although the mechanism of cognitive impairment following an ICU stay was unknown at the submission of this paper, the long-term cognitive deficits and resulting functional impairments have been well documented. Pandharipande et al. (2013) found that at three months post-discharge, 40% of patients admitted to an ICU with respiratory failure or shock scored a global cognition level similar to an individual with a moderate traumatic brain injury. An additional 26% of patients produced scores similar to an individual with mild Alzheimer's disease three months after discharge (Pandharipande et al., 2013). In a study that took place at the Critical Care Recovery Center (CCRC) at Eskenazi Health, Lasiter and Boustani (2015) found that approximately one-third of individuals who survived critical illness had inadequately treated depression similarly to

the findings of Wang et al. (2017). These ongoing chronic deficits negatively affected long-term health related quality of life (Van den Boogaard et al., 2012). For example, on self-report questionnaires, patients who experienced delirium rated themselves lower in the cognitive domain than individuals who also survived the ICU but did not experience delirium, most markedly in the areas of “memory” and “names” (Van den Boogaard et al., 2012). Additionally, patients who experienced cognitive deficits following an ICU stay reported lower health-related quality of life than did those who did not experience cognitive deficits and increased rates of new unemployment at three and twelve months post-discharge (Norman et al., 2016; Rothenhausler, Ehrentraut, Stroll, Schelling, & Kapfhammer, 2001). Despite this evidence, much of standard ICU rehabilitation is centered on mobility. Schweickert et al. (2010) indicated that a combined occupational therapy and physical therapy early mobilization program decreased incidence of delirium, but did not necessarily address the patient in a holistic manner with long-term cognitive deficits.

Delirium was a predictor of long-term cognitive impairment among individuals who survived a critical illness (Girard et al., 2010). Delirium is defined as

a disturbance in attention and awareness [that] develops over a short period of time. . . . represents an acute change from baseline attention and awareness, . . . tends to fluctuate in severity during the course of the day. . . . [and is] not better explained by a pre-existing, established, or evolving neurocognitive disorder. (American Psychiatric Association, 2013, p. 596)

In many ICU settings across the country, delirium is objectively identified using the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) (Ely, 2002; Martinez, Tobar, & Hill, 2014). This tool is used by a variety of healthcare practitioners; patients respond to yes or

no questions based on performance of simple motor tasks. The Richmond Agitation Sedation Scale (RASS) is another tool used in hospitals around the country to evaluate level of sedation. This tool can help practitioners identify appropriate interventions and pharmacological management (Ely, 2002). The CAM-ICU and RASS are used at Eskenazi Health among nursing staff, medical teams, and rehabilitation professionals to identify delirium. However, there was no specific protocol to address delirium or decrease level of sedation with non-pharmacological methods, such as environmental adaptations, in regards to cognitive function, such as the methods described in Martinez, Tobar, Beddings, Vallejo, & Fuentes (2012).

Family involvement is a critical aspect of ICU care. Family members of individuals admitted to intensive care units have been diagnosed with general anxiety disorder, PTSD, depression, and complicated grief following a family member's stay in the ICU (Needham et al., 2012). Symptoms of PTSD have been demonstrated in family members of ICU patients, and symptoms were even greater when the family member shared the end of life decision making (Azoulay et al., 2005). Additionally, these symptoms do not necessarily resolve after the individual returns home (Jones et al., 2004). Involving the family with non-pharmacological intervention may improve patient outcomes as well as empower family members to provide appropriate interventions and reduce overall caregiver stress (Martinez et al., 2012).

Occupational therapy practitioners are equipped to address PICS as well as PICS-F in three major ways. First, occupational therapy practitioners can use sensory integration, mobility related to activities of daily living, and cognitive rehabilitation principles in order to address delirium in the ICU and therefore decrease the incidence of cognitive impairment among individuals who survived the ICU (Alvarez et al., 2017). Occupational therapy practitioners can also address cognitive deficits acquired after an ICU stay in a unique manner that focuses on

function for individuals in a post-acute care setting in order to maximize safety and independence with activities of daily living and instrumental activities of daily living (IADL) (Giles & Wolf, 2017). Identifying these deficits as they relate to performance in activities of daily living and IADL can help to prevent readmissions and lower healthcare costs (Lone et al., 2016; Rogers, Bai, Lavin, & Anderson, 2016). Additionally, occupational therapy practitioners can use their knowledge of activity adaptation and health literacy to educate family members of individuals affected by PICS-F in order to reduce stress levels and PTSD symptoms. Iwashyna (2010) indicated critical care is shifting towards a survivorship mindset and occupational therapy practitioners are equipped to increase the independence of individuals who survive the ICU in multiple ways that benefit the healthcare system as a whole.

Screening and Evaluation

As a part of the initial screening process, I had multiple conversations with site mentors, occupational therapists at Eskenazi Health, the rehabilitation department manager, the physician who directs the CCRC, and pharmacists working in the ICU and CCRC. The early mobility program at Eskenazi began five years ago and there was a foundation of multidisciplinary collaboration. However, there was not a standard, therapy-driven method of preventing delirium in the ICU, despite evidence supporting non-pharmacological methods for addressing delirium (Martinez et al., 2012). Additionally, the CCRC collected data using neuropsychological tests, physical fitness batteries, and depression and post-traumatic stress disorder (PTSD) screenings, but did not address functional cognition as it relates to performance in activities of daily living and IADLs (Lasiter & Boustani, 2015). The assessments used are similar to those administered at other successful follow-up clinics targeted towards individuals who have survived the ICU, such as the Vanderbilt University Medical Center's Critical Illness, Brain Dysfunction, and

Survivorship Center (2019). There was also a lack of uniform and appropriate family education regarding delirium and follow-up to the CCRC clinic throughout the hospital. This screening process led to a strengths, weaknesses, opportunities, and threats (SWOT) needs assessment for the inpatient and outpatient settings (Bonnell & Smith, 2018).

Strengths identified for the ICU included (a) multidisciplinary collaboration and mutual respect among professions, (b) a well-established early physical mobility program, (c) and strong occupational therapy involvement in the ICU. However, the weaknesses identified in the ICU included varying knowledge on long-term effects of delirium as well as no formal protocol for providing cognitive rehabilitation. Based on the SWOT analysis, the opportunity was identified to create a cognitive wellness program for ICU patients to prevent PICS. Threats to this opportunity were feasibility and increasing workload for therapists.

The CCRC was equipped with a multidisciplinary and collaborative staff, which was identified as a strength for the SWOT assessment (Lasiter & Boustani, 2015). However, the clinic had a poor rate of patient return, lacked a formal functional cognitive assessment, and only received referrals from one case manager. To minimize these weaknesses, there was an opportunity to add an occupation-based assessment and educate a larger multidisciplinary team on occupational therapy's role in cognitive rehabilitation. The primary threat was difficulty with structuring billing for services rendered at the CCRC.

This project occurred in a traditional medical model practice setting. If the project were to be in a community-based setting, screening and evaluation would need to be completed differently. For example, it would be impossible to work with patients currently admitted to an ICU in a community-based setting and very difficult to identify individuals who have survived the ICU in this type of setting. However, there would be benefits to working with these

individuals in a community based setting. The current CCRC schedule allows for approximately ten minutes of appointment time for each health care practitioner limiting what an occupational therapist can accomplish. To assess functional cognition, implementation of the medication management portion of the Executive Function Performance Test (EFPT) occurred (Baum & Wolf, 2013). However, with more time, the entire EFPT could be implemented and provide a more thorough assessment.

Implementation Phase

For the implementation phase, I addressed the three main goals and resulting objectives that I developed prior to the beginning of my project. The goals all contributed towards achieving in-depth knowledge of occupational therapy's role in the prevention and treatment of PICS. My initial goals were as follows: (a) student will implement cognitive based interventions with the purpose of decreasing length of delirium in the ICU with at least 10 patients, (b) student will implement at least one occupation-based assessment in the CCRC, and (c) student will develop family education material to increase health literacy and lower stress associated with caring for a family member in the ICU. I developed three different programs to address my initial goals: a) ICU cognitive wellness programming, b) CCRC assessment tool implementation and referral education, and c) family education resources. Each of these areas corresponded to a goal and resulting objectives that contributed towards achieving in-depth knowledge of occupational therapy's role in the prevention and treatment of PICS.

Intensive Care Unit Cognitive Wellness Programming

For the ICU cognitive wellness programming, I developed a system of graded cognitive activities for patients based on RASS level and CAM-ICU score that corresponded with the established Eskenazi Health mobility protocol (Ely, 2002). The purpose of these activities was to

increase cognitive stimulation and engagement in meaningful activity during an ICU stay. For example, a patient with a history of delirium with a current RASS level of 0 participated in a moderate challenge word search puzzle (see Appendix B). The formatting of these activities is based on the Activity and Cognitive Therapy in the Intensive Care Unit Trial through Vanderbilt University (Brummel et al., 2012). In this study, researchers also provided graded cognitive stimulation activities based on RASS level (Ely, 2002).

Critical Care Recovery Center (CCRC) Assessment Tool Implementation

In the CCRC, I implemented the medication management portion of the EFPT (Baum & Wolf, 2013). I added this subtest to the list of assessments already provided at the CCRC in order to understand functional cognition as it relates to IADL performance. Additionally, I worked with the interdisciplinary team in the CCRC, which included a critical care physician, critical care pharmacist, social worker, neuropsychologist, and medical assistant. This collaboration facilitated appropriate referrals for outpatient therapy services for patients who survived the ICU. Further collaboration with an outpatient speech therapist was essential to developing cognitive compensatory strategies handouts for patients with cognitive deficits following an ICU stay (see Appendix C).

Family Education

For the family education portion of my project, I developed handouts on delirium prevention and discharge expectations from the ICU, specifically addressed the “F” portion of the bundle, or “Family Engagement and Empowerment” (Ely, 2017; see Appendices D and E). I collaborated with the Medical Quality Assurance team to develop these education materials in alignment with hospital implementation of the Society of Critical Care Medicine’s ABCDEF bundle (Ely, 2017). The ABCDEF bundle stands for A) assess, prevent, and manage pain, B)

both spontaneous awakening trials and spontaneous breathing trials, C) choice of analgesia and sedation, D) delirium: assess, prevent, and manage, E) early mobility and exercise, and F) family engagement and empowerment (Ely, 2017). Health literacy was an important part of the family education component of my project. I utilized Readable, an online tool that measures the Flesch-Kincaid reading level, to ensure all materials were at an eighth grade level or lower (Badarudeen & Sabharwal, 2010). All materials created for this project were at less than an eighth grade level.

Leadership and Staff Development

Leadership is an important aspect of the Doctoral Capstone Experience. I demonstrated leadership by developing an inservice for the inpatient therapy team. The purpose of this inservice was to market the cognitive wellness program, explain the role of the CCRC and referral process, and distribute the family education materials. In order to address staff competency, I included case studies for the therapy staff to discuss ways to use the cognitive wellness program as well as appropriate CCRC referrals. Additionally, throughout my project I consistently advocated for appropriate occupational therapy services when working with the inpatient and outpatient therapy teams. I advocated for patients with members of the interdisciplinary team including: physicians, residents, nursing staff, occupational therapists, physical therapists, speech therapists, pharmacists, case managers, and social workers. Throughout this process, I was able to advocate for individual patients as well as the general role of occupational therapy in the ICU.

Discontinuation and Dissemination

The discontinuation phase of my project began by developing a “Lunch and Learn” for the inpatient therapy staff. Outcomes were measured by sending out a survey to the therapists

that attended the inservice to measure understanding and feasibility. This survey also addressed ongoing quality improvement measures. The survey and results are included in Appendix F.

In order to address sustainability, I worked with multiple occupational therapists to ensure carryover and understanding of the cognitive wellness program. I collaborated with other occupational therapists to develop effective interventions and provided appropriate resources for the interventions according to the chart (see Appendix B). Additionally, I collaborated with an outpatient speech therapist to develop referral protocols for the CCRC for outpatient occupational and speech therapy services.

Aside from the survey addressing ongoing quality improvement, I met with multiple occupational therapists and the department manager to ensure quality services and make adjustments according to feedback. For example, one therapist suggested placing the activities in a specific central location in the hospital instead of the rehabilitation department office so that the materials are more easily accessible. This was an easy change that made a huge difference in feasibility of using the materials.

My project was developed as a response to the societal need to address ICU survivorship (Iwashyna, 2010). There is an increasing number of patients who survive critical illness, but have resulting impairments in physical function, cognitive function, and mental health (Needham et al., 2012). My project addresses this societal need in two ways: a) addressing delirium management and prevention in the ICU and b) addressing physical and cognitive function needs in the CCRC.

Overall Learning

Throughout the project, I consistently communicated with various healthcare professionals verbally, nonverbally, and through written communication such as email.

Additionally, I created resources to enhance family education and verbally communicated with families of patients in the ICU to provide education on delirium management and discharge follow-up to the CCRC. Communication with the inpatient therapy team was crucial as I marketed and disseminated the cognitive wellness program and CCRC referral information.

I learned how to communicate efficiently in a fast-paced setting with health professionals who understand occupational therapy at varying levels. Additionally, I learned how to function as a member of an interdisciplinary team and provide advice and suggestions to other therapists while also receiving feedback. My leadership skills grew substantially as I became more confident communicating with other healthcare professionals and advocating for appropriate occupational therapy services for patients. I also learned how to efficiently and effectively demonstrate occupational therapy's value in the ICU.

Overall, I improved substantially in areas of advocacy and leadership. I developed self-confidence in speaking with other health professionals and advocated for the diverse role of occupational therapy in the ICU. Additionally, I learned how to advocate for specific patient needs, such as CCRC visits or additionally outpatient therapy needs. This project was an excellent experience that significantly contributed to my growth on a personal and professional level.

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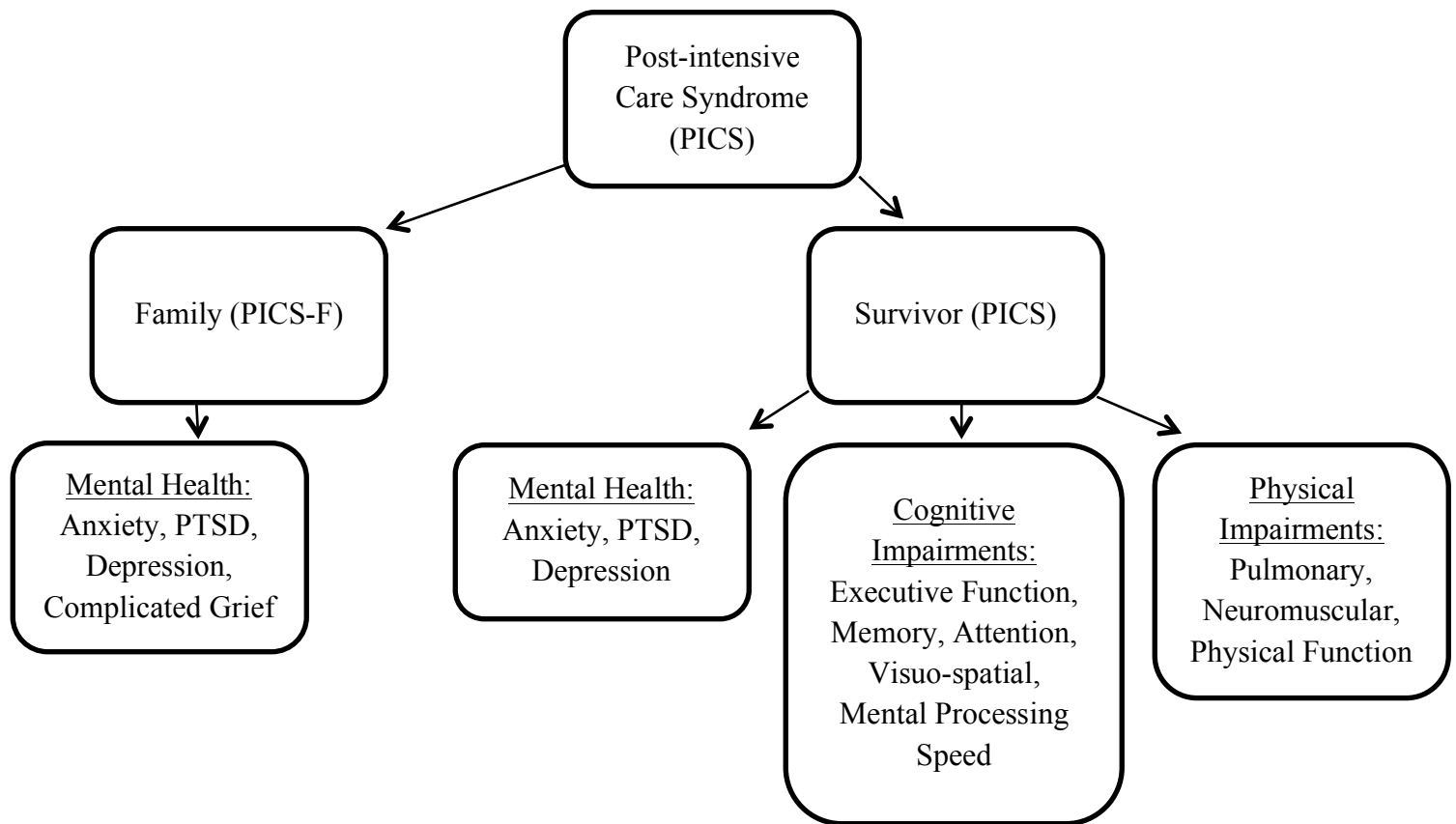
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Appendix A



Post-intensive care syndrome (PICS) conceptual diagram. Needham, D. M., Davidson, J., Cohen, H., Hopkins, R. O, Weinert, C., Wunsch, H., ... Harvey, M. A. (2012). Improving long-term outcomes after discharge from intensive care unit: Report from a stakeholders' conference. *Critical Care Medicine*, 40(2). doi: 10.1097/CCM.0b013e318232da75

Appendix B

Activities for Patients who Score CAM +

RASS Score	Mobility Protocol	Treatment
+3/+4/+2	Chair mode in bed, cardiac chair, or sitting EOB	<ul style="list-style-type: none"> • Reorient patient • Modify environment to regulate sleep cycle (blinds up during the day, lights off at night) • Educate family → use delirium handout • Assist nursing to address patient comfort
+1	Progress to bedside chair	<ul style="list-style-type: none"> • Reorient patient • Coloring pages/ drawing with verbal assist
0	Progress to bedside chair/progress ambulation	<ul style="list-style-type: none"> • Reorient patient • <i>Easy/moderate</i> crossword/word search/ hidden pictures on laminated paper with assist • Coloring pages/ drawing with assist • Low challenge games with verbal cues (i.e. tic tac toe, connect four) • Trail-making with assist
-1	Progress to bedside chair/progress ambulation	<ul style="list-style-type: none"> • Reorient patient • Coloring pages/drawing with verbal assist

-2/-3	Chair mode in bed, cardiac chair, or sitting EOB	<ul style="list-style-type: none"> • Reorient patient • Modify environment to regulate sleep cycle (blinds up during the day, lights off at night) • Educate family → use delirium handout • Polysensory stimulation
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Activities for Patients with a History of Delirium

RASS Score	Mobility Protocol	Cognitive Activities
+1	Progress to bedside chair	<ul style="list-style-type: none"> • <i>Easy</i> crossword/word search/ hidden pictures on laminated paper with assist • <i>Easy/moderate</i> games with verbal assist (dot game, hangman, cards, connect four)
0	Progress to bedside chair/progress ambulation	<ul style="list-style-type: none"> • Target executive functioning → IADL performance (i.e. med management) • <i>Moderate challenge</i> games with limited assistance (cards, board games) • <i>Moderate challenge</i> crossword/word search (start with assist, progress to independent) • Errorless learning/spaced retrieval activities (i.e. remember these 5 names) • Goal-directed activities (i.e. goals for rehabilitation, discharge to-do list) <p>Independent activities</p> <ul style="list-style-type: none"> • Coloring books, magazines, books → encourage family to bring from home if possible • <i>Challenging</i> word searches, crosswords, hidden pictures, logic puzzles • <i>Moderate</i> independent games (i.e. solitaire, phone games) • <i>Challenging</i> logic puzzles, riddles

-1	Progress to bedside chair/progress ambulation	<ul style="list-style-type: none">• <i>Easy</i> crossword/word search/ hidden pictures on laminated paper with assist• <i>Easy/moderate</i> games with verbal assist (dot game, hangman, cards, connect four)
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Appendix C

Memory Strategies

Using a Daily Planner

A planner can help you remember things while your memory skills are still recovering. You can use a notebook, dry erase board, or online templates.

Label Items

Try labeling cabinets and boxes around your home to remember where important items are.

Set Alarms

Use your phone, watch, or kitchen appliances to set alarms to remember tasks that need to be completed.

Pill Box

Set up a pill box (or have a caregiver help you) so that you can remember what pills to take at what time.

Appendix D

What is Delirium?

Delirium is when a person suddenly becomes confused, sees things that aren't there, or forgets where they are. Delirium is *different* than dementia - it happens quickly and can go away quickly. Delirium can happen to anyone, but is more common in older adults.

Why is my loved one confused?

Around 2 out of every 3 people in the ICU become delirious at some point while they are in the hospital. This can happen after a person uses a breathing machine. It is important to try and reduce how often someone is delirious so that long-term problems with memory and behavior can be prevented.

How can I help?

- Be patient with your loved one.
- Try to keep the blinds open and lights on during the day, but turn the lights off at night (make sure this is okay with your loved one's nurse).
- Calmly remind him or her what day it is, where they are, and why they came to the hospital.
- Bring any glasses, dentures, or hearing aides your loved one uses and make sure he or she is wearing them whenever possible.
- Bring familiar objects to his or her room (photos, blankets, special objects).

After going home...

Your loved one may go directly home from the hospital or may need to stay at a rehabilitation facility first. Follow up with your primary care provider **AND** schedule an appointment with the Critical Care Recovery Center at Eskenazi (317-880-2224).

More Information:

- <https://www.eskenazihealth.edu/health-services/recovery-center>
- www.icudelirium.org/patients-and-families/overview

Appendix E

What To Expect After Leaving the Intensive Care Unit (ICU)

Being in the ICU for a long time can be stressful. You may leave the hospital and go home right away, or you may need to stay in a rehabilitation facility to get stronger before you can go home.

Strength

Some people feel weak or have problems with balance and/or completing daily routines after leaving the ICU. You may need to follow up with a physical or occupational therapist to regain these skills.

Thinking and Memory

Many people notice problems with memory and problem solving after leaving the ICU.

Mental Health

Many people feel sad, angry, and/or anxious after leaving the ICU. **Talk about these symptoms with your primary care provider as soon as possible.**

*If you experience any of these symptoms, talk with your primary care provider **and** call the Critical Care Recovery Center at (317) 880-2224.*

Appendix F

Survey Questions and Results:

1. I know where to find the cognitive wellness program Activities.
 - a. 82% answered yes, 18% answered no
2. I know which patients are appropriate for the cognitive wellness program activities.
 - a. 100% answered yes, 0% answered no
3. It is feasible to use these activities with some patients.
 - a. Answers provided on sliding scale from 0 to 100 with an average score of 76.
4. I know the referral criteria for the Critical Care Recovery Center.
 - a. 91% answered yes, 9% answered no.
5. I know how to request a referral for the Critical Care Recovery Center.
 - a. 91% answered yes, 9% answered no.
6. I have requested a referral for a patient for the Critical Care Recovery Center.
 - a. 18% answered yes, 82% answered no.
7. Please provide any feedback, suggestions, or further questions you may have.
 - a. Two therapists answered this question with the following responses:
 - i. “Great program and presentation. Thanks for gathering all these materials and teaching us about the clinic (which I had no clue even existed!)”
 - ii. “Thank you for your hard work with this.”