Awareness, Knowledge, and Screening of Post-Intensive Care Syndrome by Primary Care Providers

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Abstract

Background: Major advances in critical care medicine over recent decades have increased intensive care unit (ICU) survivorship (Needham, et al., 2012). Sequelae associated with ICU survival are a set of symptoms comprised of mental, cognitive, and physical impairments recognized as Post-Intensive Care Syndrome (PICS) (Needham, et al., 2012). Upon discharge, many ICU survivors resume care with their primary care provider (PCP) though there is little to no research on the role of the PCP in caring for ICU survivors.

Purpose: The purpose of this project was to describe the level of awareness, knowledge, and current screening practices of PICS by PCPs and PCP perceptions of ways to improve collaboration between primary care and critical care regarding PICS.

Methods: This project surveyed PCPs, including Medical Doctors (MD) or Doctors of Osteopathy (DO), Nurse Practitioners (NP), and Physicians’ Assistants (PA) concerning awareness, knowledge, and screening practices of PICS within the primary care center.

Results: Twenty-eight (28.6%) providers responded of whom 20 (71.43%) reported having no familiarity of PICS, eight (28.57%) having some familiarity, and no respondents being very familiar. Providers aged 40 years or below were more likely to be somewhat familiar with PICS than those over the age of 40 (p=0.044) and MDs age 40 or below were more likely to be somewhat familiar with PICS than with those over the age of 40 (p=0.004).

Discussion: Though limited by a small response rate, the findings suggest that a significant knowledge gap exists and needs to be addressed to improve care of ICU survivors in the primary care setting. Perceptions among PCPs about ways to improve collaboration between ICU teams and providers in primary care should be considered when developing strategies to improve awareness and knowledge of PICS.

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Awareness, Knowledge, and Screening of Post-Intensive Care Syndrome by Primary Care Providers

More than 5.7 million patients are admitted to ICUs annually in the United States with an estimated 4.8 million survivors (Mikkelson, Netzer, & Iwashyna, 2017). Though survival has greatly improved, research has shown that these patients suffer chronic cognitive, functional, and mental health abnormalities found to be associated with their time in the ICU. These abnormalities are grouped together under the label, Post-Intensive Care Syndrome or PICS. PICS is defined as "new or worsening impairments in physical, cognitive, or mental health status arising after critical illness and persisting beyond acute care hospitalization." (Needham, et al., 2012, pg. 505). As many as 80% of ICU survivors experience some form of PICS symptoms (Gunderson, Walter, Ruskin, Ding, & Moore, 2016).

The three separate components of PICS are psychological, cognitive, and physical impairments. Psychological impairments associated with PICS include depression, anxiety, and post-traumatic stress disorder (PTSD). Depression prevalence has been reported as high as 28% to 37% (Wade, et al., 2012; Mikkelson, Netzer, & Iwashyna, 2017) while anxiety is shown to be between 11.9% and 43% (Rattray, Johnston, & Wildsmith, 2005), and PTSD is from nine to 27% (Wade, Hardy, Howell, & Mythen, 2013). Cognitive impairments are demonstrated by decline in executive function, memory, attention, visio-spatial, and mental processing speeds. Thirty to 80% of survivors of critical illness suffer from some form of cognitive impairment (Harvey, 2016). Physical impairments include pulmonary function decline, neuromuscular changes and overall physical function decreases in strength and exercise capacity (Needham, et al., 2012). Physical impairment is comparable to mental health and cognitive impairments with weakness occurring in 85-95% of ICU survivors (Karnatovskaia, Johnson, & Benzo, 2015).

The Society of Critical Care Medicine (SCCM) has prioritized prevention, recognition, and treatment of PICS. The SCCM THRIVE Initiative aims to improve the care of patients and families after ICU survival (Society of Critical Care Medicine, 2017). The initiatives' current collaborative is focused on increasing the number of face-to-face peer support groups for ICU survivors and their families nationwide and internationally (Society of Critical Care Medicine, 2017). When the collaborative was initiated in 2015, six in-person support groups were started around the country (SCCM, 2016). By 2016, there were 13 national and four international in-person support groups (Society of Critical Care Medicine, 2017). The THRIVE site (http://www.sccm.org/Research/Quality/thrive/Pages/default.aspx) also offers many references for patients and families, including the most recently released "Understanding Your ICU Stay: Information for Patients and Families" (Society of Critical Care Medicine, 2017), a booklet that discusses what patients and family members can expect before and after an ICU admission. Other resources include information on how to improve ones' wellbeing, the common symptoms of PICS, and a letter completed by the ICU physician, to be given to the (PCP) after discharge (Appendix A) (Society of Critical Care Medicine, 2017).

Society of Critical Care Medicines' previous THRIVE collaborative focused on implementation of the ABCDEF Bundle to optimize pain control, reduce sedative exposure, and time on mechanical ventilation (Society of Critical Care Medicine, 2017). ABCDEF is an acronym for <u>A</u>ssess, prevent, and manage pain; <u>B</u>oth SAT (spontaneous awakening trial) and SBT (spontaneous breathing trial); <u>C</u>hoice of analgesia and sedation; <u>D</u>elirium: assess, prevent, and manage; <u>E</u>arly mobility and exercise; and <u>F</u>amily engagement and empowerment. The ABCDEF bundle represents a group of collective elements aimed to reduce delirium, improve pain management, and decrease long-term sequelae of critical illness or PICS (Society of Critical

Care Medicine, 2017). Other goals included engagement of family members, improved communication among providers, and creation of partnerships between institutions to share ideas.

Though the establishment of PICS Clinics has been common practice in Europe for many years with as many as 80 PICS clinics in 2006, (Huggins, et al., 2016), the first clinic in the US for the treatment of PICS, the Critical Care Recovery Center (CCRC), was started in 2011 at the Sidney and Lois Eskenazi Hospital (Khan, Lasiter, & Boustani, 2015) in collaboration with the Indiana University School of Medicine. The second, and only other PICS Clinic in the US as of 2016, the ICU Recovery Center, was started in 2012 at Vanderbilt University Medical Center (Huggins, et al., 2016). Both centers have multidisciplinary teams that work together to recognize, diagnose, and treat the physical, psychological, and cognitive issues that may arise in their patients. Initial data and anecdotal evidence from both clinics indicate positive outcomes for patients and families, though there is little other research supporting the use of PICS clinics. This may be contributing to the slower implementation of PICS clinics across the US. Both the CCRC and the ICU Recovery Center have ongoing studies to determine how to best prevent, identify, and treat the components of PICS (Huggins, et al., 2016; Khan, Lasiter, & Boustani, 2015).

Primary care providers are in a prime position to screen patients for PICS. PCPs presumably have a previous relationship with the patient and may see them on a regular basis after discharge. This previous relationship may allow the provider to notice subtle differences that a new provider may not. Given the current inability to accurately and reliably predict which patients are at risk of developing PICS and the need for more work in validating available screening instruments (Davydow, Gifford, Desai, Needham, & Beinvenu, 2008; Dowdy, et al., 2009; Karnatovskaia, Johnson, & Benzo, 2015; Schandl, Bottai, Hellgren, Sundin, & Sackey, 2013; Wade, et al., 2014; Wolters, Slooter, van der Kooi, & van Dijk, 2013; Woon, Dunn, & Hopkins, 2012), this project assessed PCPs awareness of PICS in ICU survivors. The purpose of this project was to describe the level of awareness, knowledge, and current screening practices of PICS by PCPs and PCP perceptions of ways to improve collaboration between primary care and critical care with regard to PICS. The information gained from this project will inform the development of strategies to improve awareness and knowledge of PICS and improve collaboration between critical care providers and PCPs who manage ICU survivors at risk of PICS after discharge from the ICU.

Theoretical Framework

The theoretical framework used to design this quality improvement project was Donabedian’s Structure, Process, Outcome (SPO) Quality Framework (Donabedian, 1966). SPO was identified by the Stanford-UCSF Evidence-based Practice Center (EPC), for the Agency for Healthcare Research and Quality (AHRQ), as a potential framework for understanding how care coordination can be improved. The three interrelated concepts, structure, process, and outcome are used to assess the quality of care that is being provided.

Structure, when looking at coordination of care, is the physical, organizational and environmental aspects of care (Stanford University-UCSF Evidence-based Practice Center, 2007; Holly, 2014), including resources such as the material, human, and organizational aspects. The structure of this project is looking at the primary care environment in which the ICU survivor is receiving care after discharge.

Process in the setting of coordination of care can be defined as the way in which patient care services are delivered, including decisions and performance of those providers delivering the care (Holly, 2014). Processes in this project include the surveying of primary care providers regarding the care that the ICU survivor receives and the screening measures employed in the primary care setting.

Outcomes according to Donabedian are all of the effects on healthcare including heatlh status, knowledge and behavior (Holly, 2014). Outcomes for this project are the data collected regarding the awareness and knowledge about PICS and the screening measures being performed, as well as the recommendations of PCPs on areas of improvement regarding the collaboration of critical care providers and PCPs. This data will be used to make recommendations for future improvments that may lead to better outcomes for ICU survivros.

Review of the Literature

The purpose of this literature review was to assess relevant literature regarding PICS screening in primary care and levels of awareness of PICS in PCPs. A second search was conducted to identify reliable, validated instruments used to screen patients for PICS and/or screening patients for the mental, cognitive, and physical impairments associated with PICS.

Evaluating and Managing PICS

The literature review was conducted by searching PubMed, CINAHL, and Web of Science with the search terms: post intensive care syndrome AND (provider* or screen* or aware*). Inclusion criteria were English language, adults, and peer-reviewed journal articles. Exclusion criteria were neurologic dysfunction and pediatric or post-partum patients. The search initially returned a total of 209 articles, which was reduced to 169 after the removal of duplicates. Of these 169, 16 were included based on review of title alone. Following abstract and article review, four articles were selected and summarized to describe current PICS evaluation and management (Figure 1).

The report from the 2002 Brussels Roundtable, Surviving Intensive Care, made recommendations for a more global awareness of critical illness within and outside the ICU and that critical care providers create better relationships with providers outside of the ICU. The authors discussed the need for improving education in non-critical care providers in order to assess and treat PICS patients (Angus & Carltet, 2003).

Kahn and Angus (2007) reviewed health policy and health-system barriers to post-ICU care to understand the contributors to poor outcomes post discharge. The authors found that acute care had better resources and better financial compensation. The authors also found that many patients get follow up care from general practitioners who manage many patients. These providers often have little information about what happened in the ICU or if the patient is at risk for PICS. The authors recommended the design of a longitudinal care model that could facilitate the transition from the ICU to the outpatient setting, leading to improved and early recognition of the sequelae of PICS (Kahn & Angus, 2007).

The participants of the 2010 Society of Critical Care Medicine Post-Intensive Care Stakeholders conference reported that the largest barrier to awareness of PICS was the existence of silos among clinician groups contributing to decreased collaboration and continuity of care (Needham, et al., 2012). The authors noted that critical care is often practiced in isolation from PCPs. This separation leads to inadequate discharge planning, deficits in PCPs awareness of and readiness to care for ICU survivors, and barriers in communication that may be contributing to missed opportunities for process improvement and education. Currently, there is no consensus for the best way to provide post-ICU care (Needham, et al., 2012).

A multidisciplinary group of providers and critical illness survivors convened in 2012 to discuss progress since the 2010 conference (Elliott, et al., 2014). Specifically, they aimed to report on engagement of non-critical care providers since the initial conference recommendations. The conference included members from 21 professional stakeholders from both critical care and non-critical care providers and health care systems. The founders of two patient advocacy groups were in attendance to represent ICU survivors and families. The conference placed emphasis on the education of and collaboration with non-critical care providers. The main published outcomes included future plans to address recognizing, preventing, and treating PICS, building institutional capacity to improve ability to care for PICS patients, and increasing the understanding of what barriers still exist to the adequate treatment of PICS. The participants discussed the potential use of post-ICU clinics but found that the data on actual effectiveness is mixed and may not be the answer in every situation. One research gap was the area of transitional care for patients leaving the ICU. The group supported the concept of "functional reconciliation" as a means to ensure all patients' providers are fully aware of the patients' mental, cognitive, and functional status at the time of discharge or transfer and what needs the patient may have in these areas. Functional reconciliation was described as an assessment of the gaps between the patients' pre-admission and current functional abilities to be conducted at all intra and/or interinstitutional transitions of care, similar to a medical reconciliation. The goal of the functional reconciliation is to ensure early identification of symptoms of PICS. The group once again reinforced the need for education and support of non-critical care providers so PICS is more consistently identified and managed.

Screening for and predicting PICS

In the second portion of the literature review, studies were examined that reported the use of screening instruments to predict patients at risk for PICS and the various components of PICS. PubMed, CINAHL, and Web of Science were searched using the search string ("post intensive care syndrome" or "physical impairment" or "psychiatric impairment" or "cognitive impairment" or PTSD or depression) AND screen* AND (ICU or "intensive care unit"). Search limits were set to English language, adult patients, peer reviewed, and human subjects only. Exclusion criteria included pediatric, post-partum or obstetrical and dementia patients. The initial search of PubMed returned 225 articles, of which 20 were retained for further review. CINAHL returned 75 and Web of Science returned 215; 5 articles from CINAHL and 15 articles from Web of Science were kept for further review. After removal of duplicates, 27 total articles remained, 11 were excluded after abstract review and five more were excluded upon reviewing the article, leaving a total of 11 articles to be included in this review of literature. An ancestry search was then conducted by which 16 articles were identified for further review. Ten articles were historical articles confirming the validity and reliability of the screening tools, which were not included in this review, and four were included in this literature review. In total, 15 articles were included in this portion of the review (Figure 2).

There were no screening instruments identified in the literature to assess the risk for PICS as a whole. Two articles were identified that assessed the ability to predict patients who are at risk for the mental health component of PICS (Schandl, Bottai, Hellgren, Sundin, & Sackey, 2013; Wade, et al., 2014).

A prospective cohort study by Schandl, Bottai, Hellgren, Sundin, and Sackey (2013) was aimed at developing a predictive screening instrument to be administered at ICU discharge to identify patients at risk for the mental health components of PICS. The study identified 21 potential risk factors at discharge from a sample of 252 patients. The Post-Traumatic Stress Symptom Scale-10 (PTSS-10) and the Hospital Anxiety and Depression Scale (HADS) were mailed to the participants two months post discharge to assess for PTSD and anxiety or depression. One-hundred fifty surveys were returned. The authors selected 21 potential risk factors for mental health impairment after critical illness, as identified by a literature review, which were analyzed for univariate association with demographic data and information that was collected at discharge. From this analysis, six variables were selected as predictors of adverse psychological outcomes: major pre-existing diseases, having children under the age of 18 still living in the home, previous psychological issues, in-ICU agitation, being unemployed or on sick-leave at the time of hospitalization and appearing depressed in the ICU. The analysis of the final model showed fair predictive accuracy as assessed with an area under the receiver operating characteristic curve (AUROC) of 0.77. The authors concluded that while this screening instrument may be useful in predicting future risk of mental health impairment after critical illness, further external validation and replication was required (Schandl, Bottai, Hellgren, Sundin, & Sackey, 2013).

The Intensive Care Psychological Assessment Tool (IPAT), was created by Wade et al. in an attempt to detect acute stress and predict risk of future psychological morbidity (Wade, et al., 2014). The investigators created the IPAT by adapting the 18-item intensive care stress scale (ICUSS). Ten of the 18 items were retained for inclusion in the IPAT: hopelessness, tension, panic, delusions, intrusive memories, sadness, sleeplessness, communication difficulties, hallucinations, and disorientation. The IPAT had good test-retest reliability and comparison of the IPAT scores and the follow-up instruments showed concurrent validity for anxiety ($r=0.7$, $p<0.001$) and depression ($r=0.6$, $p<0.01$). Predictive validity was found to be decent ($r=0.4$, $p<0.01$, $r=0.64$, $p<0.01$ for PTSD). Specificity and sensitivity were calculated at 71% (95% CI 49-87) and 48% (95% CI 37-59) for predictive diagnosis of PTSD and 57% (95% CI 43-70) and 69% (95% CI 55-82) for overall psychological morbidity, respectively. The investigators concluded that the IPAT was useful to detect acute distress while the patient was in the ICU, however, replication and additional validation was needed. The investigators also concluded that the IPAT would require more work to refine the psychometric properties to be useful in prediction of future psychological morbidity.

This literature review identified seven depression screening instruments, two anxiety screening instruments, four for the screening of PTSD, five for cognitive dysfunction, and three for physical impairment. Each instrument is listed and discussed in detail in Table 1.

The literature review identified major gaps in the research regarding the role of primary care providers in the care of ICU survivors, as well as the ability to predict which patients are most at risk for PICS. The literature search did not reveal any studies aimed at improving the awareness of PICS by primary care providers. Gaps in the literature exist describing the best practice for caring for PICS patients after discharge from the ICU. This literature review did find two studies that showed potential for creating a reliable, valid procedure for screening patients for PICS (Schandl, Bottai, Hellgren, Sundin, & Sackey, 2013; Wade, et al., 2014) and many useful instruments in the assessment of the components of PICS. A valid, reliable means of predicting patients at risk for PICS was not found. The purpose of this project was to describe the level of awareness, knowledge, and current screening practices of PICS by PCPs and PCP perceptions of ways to improve collaboration between primary care and critical care regarding PICS.

Methods

PICS is defined as "new or worsening impairments in physical, cognitive, or mental health status arising after critical illness and persisting beyond acute care hospitalization" (Needham, et al., 2012, pg. 505). Expert opinion supports the importance of improving awareness among non-critical care providers, improving recognition of signs and symptoms of PICS, and improving collaboration and communication between critical care and non-critical care providers (Angus & Carltet, 2003; Elliott, et al., 2014; Kahn & Angus, 2007; Needham, et al., 2012). The purpose of this project was to describe the level of awareness, knowledge, and current screening practices of PICS by PCPs and PCP perceptions of ways to improve collaboration between primary care and critical care in regard to PICS.

Project Design

This scholarly project was conducted using a descriptive design. A survey to assess levels of awareness, knowledge, current screening practices and areas for improved collaboration was created by the lead investigator (Appendix B). The survey collected demographic data such as age, gender, board certification and years in practice to assess for differences amongst or between identified groups. The survey assessed awareness by simply asking the provider to rate their level of awareness on a three-point Likert scale – very familiar, somewhat familiar, or not at all familiar. If the provider answered not at all familiar, the survey ended. Knowledge was assessed by asking six questions synthesized from the literature review. The answers were in Likert scale to encourage increased participation by lessening the perception of taking a test. Participating PCPs were asked if they currently screen for PICS and, if so, to identify which of the 10 most popular screening instruments found in the literature review they currently use in practice. The final section of the survey asked the respondent to identify ways to improve collaboration between critical care and primary care providers using fixed and free text answers that were then placed in rank order.

Prior to dissemination via Qualtrics© (Qualtrics), the survey was distributed to two primary care providers and two critical care providers to determine face validity. The providers were asked to complete the survey as many times as they wished to determine if it appeared to measure awareness, knowledge, and screening practices of PICS, as well as identifying areas of improvement between critical care and primary care providers. The providers were asked to answer four questions (Appendix C) about the ease of completion, time to complete, ease of understanding, and whether the survey appeared to measure the outcomes that it is intended to measure. All respondents agreed that the survey was easy to navigate and understand. Two respondents said that they completed the survey in six to ten minutes and two said that they were able to complete it in under five minutes. Two respondents were neutral about the surveys ability to measure the current use of screening instruments, otherwise they stated that they agreed that the survey achieved intent.

Setting

This project was conducted in the primary care center of a tertiary, academic medical center with 22 clinics in the central and northern Virginia region. At the time of this project, the primary care center employed 105 PCPs including 74 medical doctors, 23 nurse practitioners, four physician's assistants, and three doctors of osteopathy. The medical center had approximately 2747 ICU admissions over a one-year period with a greater than 24-hour length of stay and 537 (20%) of those patients were considered established patients as they had been seen in a clinic within 30 days of ICU admission. Of those, 346 (64%) were seen in a primary care clinic of the medical center in the 30 days after discharge from the ICU.

Sample

A convenience sample of 104 PCPs employed in the primary care center was identified by searching the primary care website, which listed each provider at each clinic. The only inclusion criteria were physicians, nurse practitioners, and physician's assistants working within the primary care center of the academic medical center. Board specialties included family medicine, internal medicine, primary care, and geriatrics for MDs and DOs. Family, adult, acute-care, and general nurse practitioners were included, as well as PAs with any or no specialty. Exclusion criteria were residents, non-licensed providers including registered nurses, licensed practical nurses, nursing assistance, and administrative staff. Additional PCPs with board certifications in pediatrics, mental-health and obstetrics/gynecology, were excluded. This resulted in 104 total providers: 74 MDs, 23 NPs, three DOs, and four PAs, 64 of which were female and 40 were male, with a mean length of practice of 14.9 years. Additional descriptive data can be found in Table 2.

Procedures

Institutional review board (IRB) approval was sought through the review board for Social and Behavioral Sciences (SBS) and determined to be IRB exempted. The principal investigator completed the required training through the Collaborative Institutional Training Initiative (CITI). Anonymity was maintained by using Qualtrics©, a secure surveying program. The respondents' data was deidentified upon response return and cannot be linked to any one person or email. Verbal approval to conduct this study was obtained from the chiefs of family medicine and internal medicine departments. The final sample size was 98 as the investigator was unable to locate three email addresses and three emails were returned as undeliverable. The survey was sent via Qualtrics©, a secure electronic communication system, to all identified PCPs with a suspense of 14 days. Due to low response, the survey was extended for an additional seven days. Reminder emails were sent at day 6 and again at day 14, when the survey was extended.

Measures

The survey consisted of three sections: demographics and awareness, knowledge and screening practices, and perceptions for improvement in collaboration. Demographics included: gender, age, board specialty, years in practice, and if and how they are notified when one of their patients has survived an ICU episode. The final question in this first section assessed awareness of PICS. If they answered no, the survey was concluded. If the provider reported any familiarity with PICS, the survey continued to the second section, assessment of knowledge and screening practices. The knowledge portion consisted of five questions on a Likert scale that assessed providers degree of knowledge with statements regarding PICS. Current practices used by PCPs to screen patients for one or more of the components of PICS was assessed by asking if the provider currently screened for PICS. If they answered affirmatively, a list of valid screening instruments was provided, and the provider was asked to select which instruments they use. The final section, perceptions for improvement in collaboration between PCPs and critical care providers, was assessed with one question with choose all that apply and free text responses.

Results

Seventeen MDs (60.7%), 10 NPs (35.7%), and one DO responded to the survey, with 22 (78.6%) being female. No PAs responded to the survey. The demographics of the respondents was similar to those in the sample with the exception of significantly more males responding to the survey (p=0.030). The specialty and years in practice demographics of the respondents can be found in Table 3.

Of the 28 people who responded, 20 (71.4%) reported being not at all familiar with PICS, 8 (28.6%) reported being somewhat familiar, and no respondents reported being very familiar. When comparisons were made using the exact chi square between those who were somewhat familiar and those who were not at all familiar, those respondents 40 years or younger were significantly more likely to report being somewhat familiar than those over the age of 40 years (*p*=0.044) and specifically MDs 40 years or younger were significantly more likely to be somewhat familiar than those MDs over the age of 40 years (p=0.004).

When asked if they are typically notified of a patient that has survived an ICU admission, 13 (46.4%) providers reported that they are not notified and four (14.3%) were unsure if they are typically notified. Ten of the 11 (39.3%) providers that reported being notified, said that they are typically notified via the electronic medical record (EMR), one stated that they received a letter, and one stated that they were notified via patient disclosure.

The eight providers that reported being somewhat aware of PICS consisted of seven MDs and one NP, five were female, and six were between the ages of 31-40 years (Table 4). Two of those providers reported screening for PICS using the PHQ-2 and the MMSE. Six providers reported caring for at least one patient who had recently survived an ICU admission, with two of those providers reporting that they had considered PICS in the care of the patient.

The level of knowledge among the eight providers that were familiar with PICS was relatively high. The average score was 82.5% with three respondents scoring 100%, four scoring 80%, and one with a score of 40%. None of the respondents gave a response of "disagree" so all answers of "unsure" were counted as an incorrect response. The most frequently missed question was about PICS in family members which was answered correctly only 62.5% of the time. Questions 13, 14, and 15, which asked about the different components of PICS, were each answered correctly 87.5% of the time and incorrectly one time each. Question 16, which asked about how long the sequelae of PICS lasts, was answered correctly 100% of the time (Table 5).

Participants were asked to rank order a list of strategies to improve collaboration between PCPs and critical care providers. This list included: mandatory follow-up appointment, MyChart notification, designated PICS Clinic, email from discharging provider, and other. Figure 3 shows the breakdown of responses. The response “mandatory follow-up” appointment was consistently ranked in the top three preferences, with one respondent choosing it as the most preferred way to improve collaboration, five respondents placing it second, and two respondents choosing it as their third most preferred way to improve collaboration between PCPs and critical care providers regarding the care of ICU survivors. Two respondents placed “MyChart notification”, designated PICS clinic, and “other” as their top choice. The respondents that chose “other”, both stated a preference for EMR notification. One respondent chose “email from discharging provider” and “mandatory follow-up appointment scheduled” as their preferred means of improving collaboration. Responses for the second most preferred collaboration included an email from the discharging provider (1) and phone call from the discharging provider (2).

Discussion

The purpose of this project was to describe the level of awareness, knowledge, and current screening practices of PICS by PCPs and PCP perceptions of ways to improve collaboration between primary care and critical care in regarding PICS. While the project was able to describe these factors at this facility, the low number of responses limits generalizability to other facilities. The data did show areas that could be improved to support early diagnosis and appropriate management of PICS in ICU survivors. As early as 2002, experts identified a need for increased awareness of PICS outside of the ICU, improved communication between critical care and outside providers, and a need for improved education of those providers in non-critical care areas to better assess and treat PICS in ICU survivors (Angus & Carltet, 2003). Deficits in PCP awareness were identified in 2012 by Needham, et al. who stated that those deficits, along with the tendency of critical care providers to operate in silos has led to inadequate discharge planning, barriers in communication, and missed opportunities in caring for ICU survivors

(Needham, et al., 2012). This project identified similar missed opportunities in the processes used to care for ICU survivors. With a fairly representative sample, 71% of providers were not at all familiar with PICS, indicating a definite opportunity to improve awareness and at the same time, knowledge among PCPs regarding PICS.

Another area for improvement is in the collaboration and communication among PCPs and critical providers. Less than half of those surveyed reported being notified if their patient is an ICU survivor and only a quarter of respondents reported screening for PICS regularly. Increasing awareness of PICS through education or improved collaboration could improve the early identification and treatment of PICS symptoms in patients. The most frequent response for how PCPs feel collaboration could be improved was the use of mandatory follow-up appointments being scheduled on discharge and the use of the EMR to communicate patients that have survived the ICU. Unfortunately, if the PCPs are not aware of PICS, no communication means will be able to improve the care received by patients.

This project revealed a significant difference in awareness of PICS by those above or below the age of 40. This could be due to many factors including an increased awareness overall of PICS, increased use of the EMR, and possible addition of PICS to educational programs. Increased emphasis on education during clinical rotations in the ICU could both increase awareness and knowledge among PCPs.

Given the small sample size from a single tertiary medical center more research is needed in this area to adequately identify the role of the PCP in caring for ICU survivors. The survey needs to be further developed and assessed for reliability and validity. The survey also restricted the responses related to collaboration by limiting responses to only those who were familiar with PICS. In retrospect, it could have been useful to collect data from all respondents regarding collaboration in general as it is an identified barrier to transitions in care and adequate care of ICU survivors and PICS patients. A response of only eight limits conclusions or descriptions of awareness and knowledge of PICS by PCPs. A strength of the project was that survey completion was anonymous. Using Qualtrics to distribute the survey made for ease of data collection and interpretation, leaving less room for error.

Conclusion

This project identified a need for improved screening, recognition, and treatment of PICS in the primary care setting. This is specifically important for advanced practice providers (APP). As the level of responsibility increases for advanced practices providers in the primary care setting, the care of ICU survivors will be an expected area of expertise. The information gleaned from this project identified a need for education of APPs and all licensed independent providers who may care for ICU survivors. Increased education will help to better recognize and treat these patients. In an ideal world, patients would be identified as being at risk for PICS before discharge from the ICU. Improving the awareness and knowledge of PCPs regarding PICS is one way that these patients can be identified early and treated appropriately. This will require improved collaboration between primary care and critical care and this project contributed to the current state of how ICU survivors at risk of PICS receives follow up care in the community.

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Table 1

Screening Instruments

Screening Instrument	Description	Studies/Literature	Conclusion/Comments
Depression			
HADS	Self-report, 2-part questionnaire; 14 questions in total: HADS-D for depression (7 questions) HADS-D for anxiety (7 questions)	Originally validated in 1983 (Zigmond & Snaith, 1983) Reviewed and revalidated in 2003 (Bjelland, Dahl, Haug, & Neckelmann, 2002) Psychometric analysis completed in 2003 found HADS reliable in post-MI patients (Martin, Lewin, & Thompson, 2003) Validated in general ICU patients (Schandl, et al., 2011; Sukantarat, Williamson, & Brett, 2007)	Most frequent depression screening instrument identified No predictive value identified (Schandl, Bottai, Hellgren, Sundin, & Sackey, 2013)
PHQ-2	2-question, self-report questionnaire w/ likert scale answers	Diagnostic meta-analysis found to need more validation (Gilbody, Richards, Brealey, & Hewitt, 2007) Found to be a good predictor of need for further assessment (Sowden, Mastromauro, Januzzi, Fircchione, & Huffman, 2010)	Shorter, easier to administer than PHQ-9
PHQ-9	9-question, self-report questionnaire w/ likert scale answers	Found to be as good as other instruments in identifying depression (Gilbody, Richards, Brealey, & Hewitt, 2007)	
DASS	42-item self-administered questionnaire	Found to be as consistent as HADS in identifying depression and anxiety (Sukantarat, Williamson, & Brett, 2007)	Three times as long as HADS, less convenient and time consuming
CES-D	20-item self-report questionnaire	Found to be valid and reliable as a measure of depression (Radloff, 1977)	Used in the development of the IPAT (Wade, et al., 2014)
BDI-II	21-item self-report 2-part questionnaire; BDI-II and BDI-II cog (8 questions)	Found to be valid and reliable in predicting depression in medical patients (Arnau, Meagher, Norris, & Bramson, 2001)	BDI-II cog is much shorter and as effective as the entire BDI-II

		Both found to be good-to-excellent at identifying depression (Huffman, et al., 2010) BDI-II cog is much shorter and as effective as the BDI-II (Huffman, et al., 2010)	
Anxiety			
HADS	Self-report, 2-part questionnaire; 14 questions in total: HADS-D for depression (7 questions) HADS-D for anxiety (7 questions)	Originally validated in 1983 (Zigmond & Snaith, 1983) Reviewed and revalidated in 2003 (Bjelland, Dahl, Haug, & Neckelmann, 2002) Psychometric analysis completed in 2003 found HADS reliable in post-MI patients (Martin, Lewin, & Thompson, 2003) Validated in general ICU patients (Schandl, et al., 2011; Sukantarat, Williamson, & Brett, 2007)	Most frequent anxiety screening instrument identified No predictive value identified (Schandl, Bottai, Hellgren, Sundin, & Sackey, 2013)
DASS	42-item self-administered questionnaire 3 subscales: anxiety, depression, stress	Found to be as consistent as HADS in identifying depression and anxiety (Sukantarat, Williamson, & Brett, 2007)	Three times as long as HADS, less convenient and time consuming
STAI	2, 20 item, self-administered questionnaires (American Psychological Society, 2017)		Used in the development of the IPAT (Wade, et al., 2014)
Post-Traumatic Stress Disorder			
PTSS-10	10-item self-administered questionnaire	Found reliable and valid in identifying PTSD (Parker, et al., 2015)	Used by Schandl, et al to develop predictive screening tool (Schandl, Bottai, Hellgren, Sundin, & Sackey, 2013)
IES	20-item self-administered questionnaire	Valid screening instrument that assesses intrusion (9 questions) and avoidance (11 questions) (Horowitz, Wilner, & Alvarez, 1979)	Most commonly identified screening instrument for assessing for PTSD (Parker, et al., 2015)

PLC-C	17-item self-administered questionnaire	Psychometric properties support reliability and validity in identifying PTSD (Ruggiero, Del Ben, Scotti, & Rabalais, 2003) Validated in general ICU patients and bone marrow transplant patients (Conybeare, Behar, Solomon, Newman, & Borkovec, 2012; Smith, Redd, DuHamel, Vickberg, & Ricketts, 1999)	
UK-PTSS-14	14-item self-administered questionnaire	Preliminary validation in ICU patients (Twigg, Humphris, Jones, Bramwell, & Griffiths, 2008)	
Cognitive Impairment			
MMSE	30-item proctored questionnaire	Validated in hospitalized patients to identify cognitive impairment (Teng & Chui, 1987) Used in studies as a baseline comparison to assess newer instruments (Koller, et al., 2017; Woon, Dunn, & Hopkins, 2012)	Gold standard of cognitive instruments (Teng & Chui, 1987) Not found to have predictive value (Woon, Dunn, & Hopkins, 2012)
MOCA	30-item, proctored questionnaire	Found useful in screening post MI patients for cognitive impairment (Koller, et al., 2017) More sensitive and specific than the MMSE (Nasreddine, et al., 2005) Less expensive, shorter, and less intensive than CAMCI in MI patients with similar results as the 41CT (Koller, et al., 2017)	
CAMCI	11 cognitive subscales self-administered on a tablet	Found to be highly sensitive and specific at identifying mild cognitive impairment (Saxton, et al., 2009) More precise in post MI patients than the MOCA and 41CT (Koller, et al., 2017)	30-minute administration time Expensive
41CT	Oral exam involving a penny, nickel, dime, and quarter and six questions	Shorter, cheaper, and easily administered but needs more study (Koller, et al., 2017)	
3MS	Modified version of the MMSE	Score was increased from 30 to 100 to increase validity and reliability (Teng & Chui, 1987)	

Mini-Cog	3-item, proctored questionnaire	Found to be as good or better than MMSE at identifying cognitive impairment (Woon, Dunn, & Hopkins, 2012) Reliable and valid, shorter administration	Not found to have predictive value (Woon, Dunn, & Hopkins, 2012)
Physical Impairment			
6MWT	6-minute walk with subjective and objective measures recorded	Useful in measuring exercise capacity (Needham, et al., 2014; Pfoh, et al., 2016)	
SF-36	36-item self-administered questionnaire	Intended to measure quality of life and health outcomes (RAND Corporation, 2017) Useful in measuring physical functioning (Needham, et al., 2014; Pfoh, et al., 2016)	
Katz ADL		Good measurement of overall physical functioning (Govers, et al., 2014)	

Table 2.
Demographic Characteristics of Sample

Demographic	**Provider Pool N=104**
	n (%)
Gender	
Female	64 (61.5)
Male	40 (38.5)
Licensure Type	
Medical Doctor (MD)	74 (71.2)
Nurse Practitioner (NP)	23 (22.1)
Doctor of Osteopathy (DO)	3 (2.9)
Physicians' Assistant (PA)	4 (3.8)
Specialty	
MD	n=74
Internal Medicine	41 (55.4)
Family Medicine	27 (36.5)
Primary Care	6 (8.1)
NP	n=23
Family	21 (91.4)
Acute Care	1 (4.3)
Adult	1 (4.3)
DO	n=3
Primary Care	1 (33.3)
Family Medicine	1 (33.3)
Internal Medicine	1 (33.3)
Years in Practice (Mean = 14.9)	
0-5	32 (30.8)
6-10	11 (10.6)
11-15	17 (16.3)
16-20	12 (11.5)
>20	32 (30.8)

Table 3.
Demographic Characteristics of Respondents and Non-respondents

Demographic	**Respondents n=28**	**Non-Respondents n=76**	***p***
	n (%)	**n (%)**	
Age			
<=30	1 (3.6)	N/A (Data unavailable)	
31-40	11 (40.3)		
41-50	7 (25.0)		
51-60	7 (25.0)		
>60	2 (7.1)		
Gender			.030[†]*
Female	22 (78.6)	42 (55.3)	
Male	6 (21.4)	34 (44.7)	
Licensure Type			0.122[††]
Medical Doctor (MD)	17 (60.7)	57 (75.0)	
Nurse Practitioner (NP)	10 (35.7)	13 (17.1)	
Doctor of Osteopathy (DO)	1 (3.6)	2 (2.6)	
Physicians' Assistant (PA)	0 (0.0)	4 (5.3)	
Specialty			
MD	n=17	n=57	.063[††]
Internal Medicine	7 (41.2)	34 (59.6)	
Family Medicine	10 (58.8)	17 (29.8)	
Primary Care	0 (0.0)	6 (10.5)	
NP	n=10	n=23	n/a
Family	9 (90.0)	21 (91.4)	
Acute Care	§	1 (4.3)	
Adult		1 (4.3)	
DO	n=1	n=3	n/a
Primary Care	§	1 (33.3)	
Family Medicine		1 (33.3)	
Internal Medicine		1 (33.3)	
Years-In-Practice			.353[††]
0-5	8 (28.6)	24 (31.6)	
6-10	5 (17.9)	6 (7.9)	
11-15	4 (14.2)	13 (17.1)	
16-20	5 (17.9)	7 (9.2)	
>20	6 (21.4)	26 (34.2)	

[†] Chi-square test comparing respondents and non-respondents

[††] Exact Chi-square test comparing respondents and non-respondents

* *p*<.050

§ Specialty area withheld to maintain anonymity

Table 4.

Demographics of Respondents Somewhat aware of PICS and Not Aware of PICS

Demographic		**n=8**	**n=20**
		n (%)	**n (%)**
Age (Years)			
	<=30	0 (0.0)	1 (5.0)
	31-40	6 (75.0)	5 (25.0)
	41-50	0 (0.0)	7 (35.0)
	51-60	1 (12.5)	6 (30.0)
	>60	1 (12.5)	1 (5.0)
Gender			
	Female	5 (62.5)	17 (85.0)
	Male	3 (37.5)	3 (15.0)
MD		n=7 (87.5)	n=10 (50.0)
	Internal Medicine	4 (57.0)	3 (30.0)
	Family Medicine	3 (43.0)	7 (70.0)
NP	(FNP)	1 (12.5)	9 (45.0)
DO		0 (0.0)	1 (5.0)
Years-In-Practice			
	0-5	4 (50.0)	4 (20.0)
	6-10	2 (25.0)	3 (15.0)
	11-15	1 (12.5)	3 (15.0)
	16-20	0 (0.0)	5 (25.0)
	>20	1 (12.5)	5 (25.0)

Table 5.

Knowledge Question Responses

	Question				
	13	14	15	16	17
Respondent 1	Agree	Agree	Unsure	Agree	Agree
Respondent 2	Agree	Agree	Agree	Agree	Agree
Respondent 3	Agree	Agree	Agree	Agree	Agree
Respondent 4	Agree	Agree	Agree	Agree	Agree
Respondent 5	Unsure	Agree	Agree	Agree	Agree
Respondent 6	Agree	Agree	Agree	Agree	Unsure
Respondent 7	Agree	Agree	Agree	Agree	Unsure
Respondent 8	Agree	Unsure	Unsure	Agree	Unsure

13. The three components of PICS are mental, cognitive, and physical impairments.
14. It is estimated that as many as 50% of ICU survivors suffer from at least one component of PICS.
15. The incidence of cognitive impairment in ICU survivors has been reported to be as high as 78%.
16. The sequelae of PICS can last from months to years.
17. PICS has been identified in family members of ICU survivors.

Figure 1.

Literature Review of Primary Care and PICS

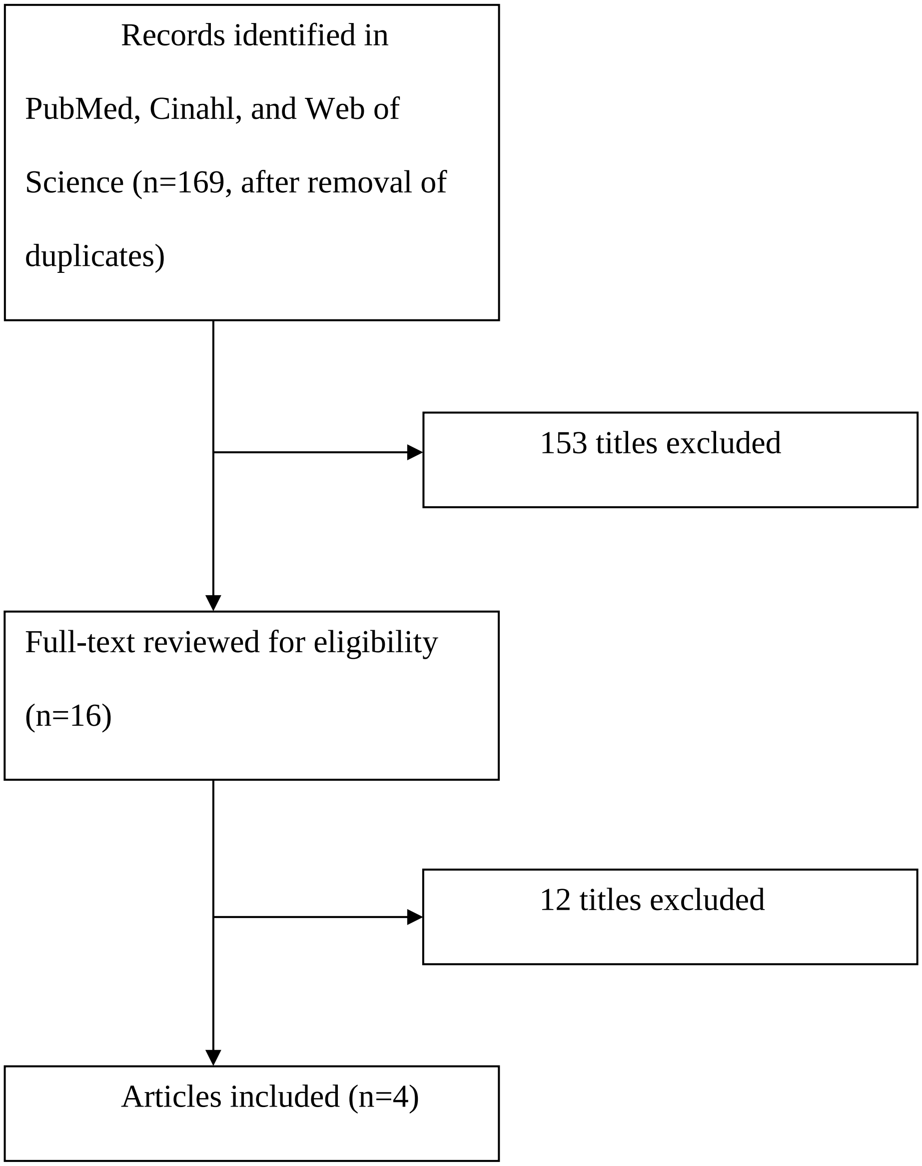


Figure 2.

Literature Review of Screening Instruments

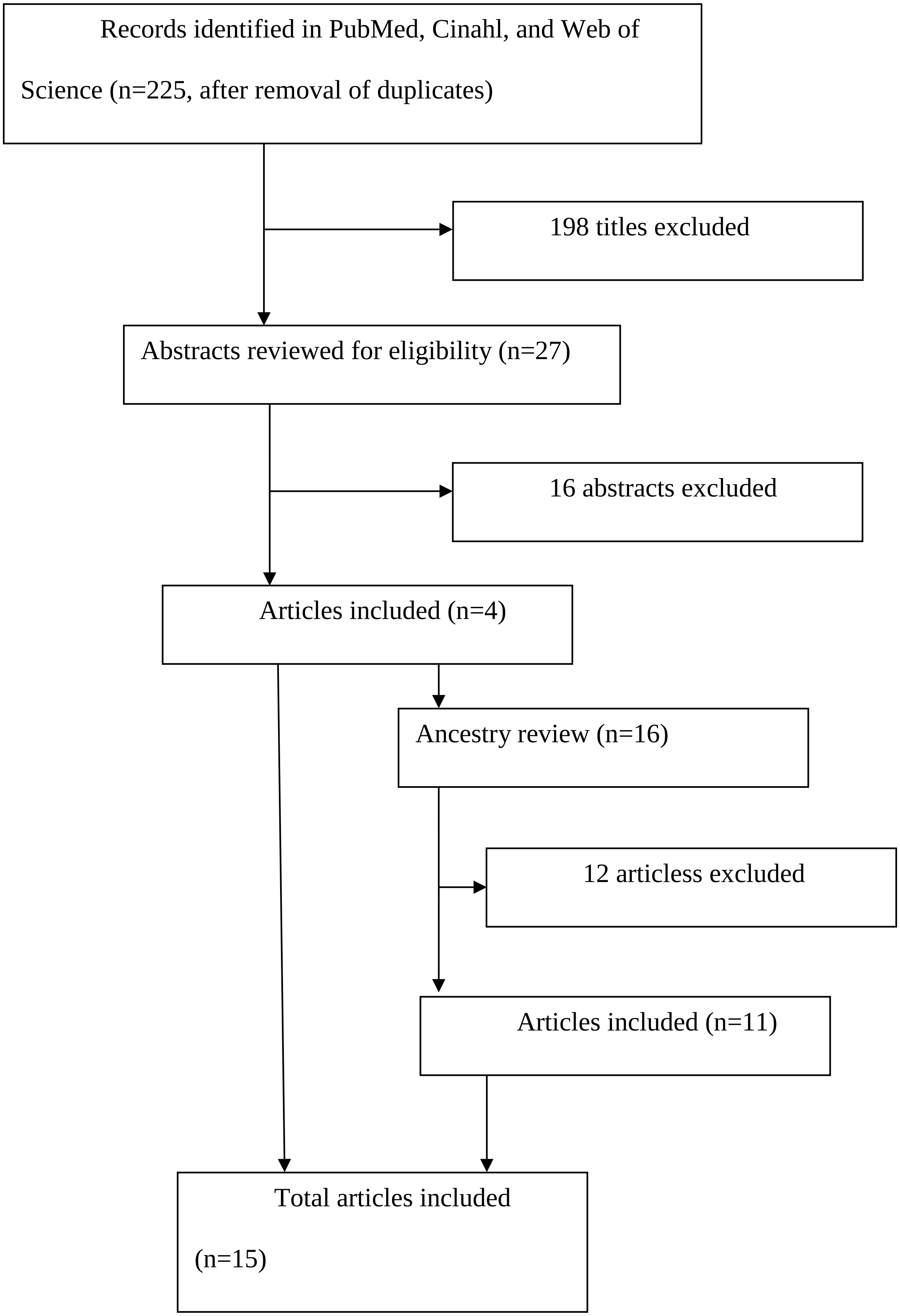
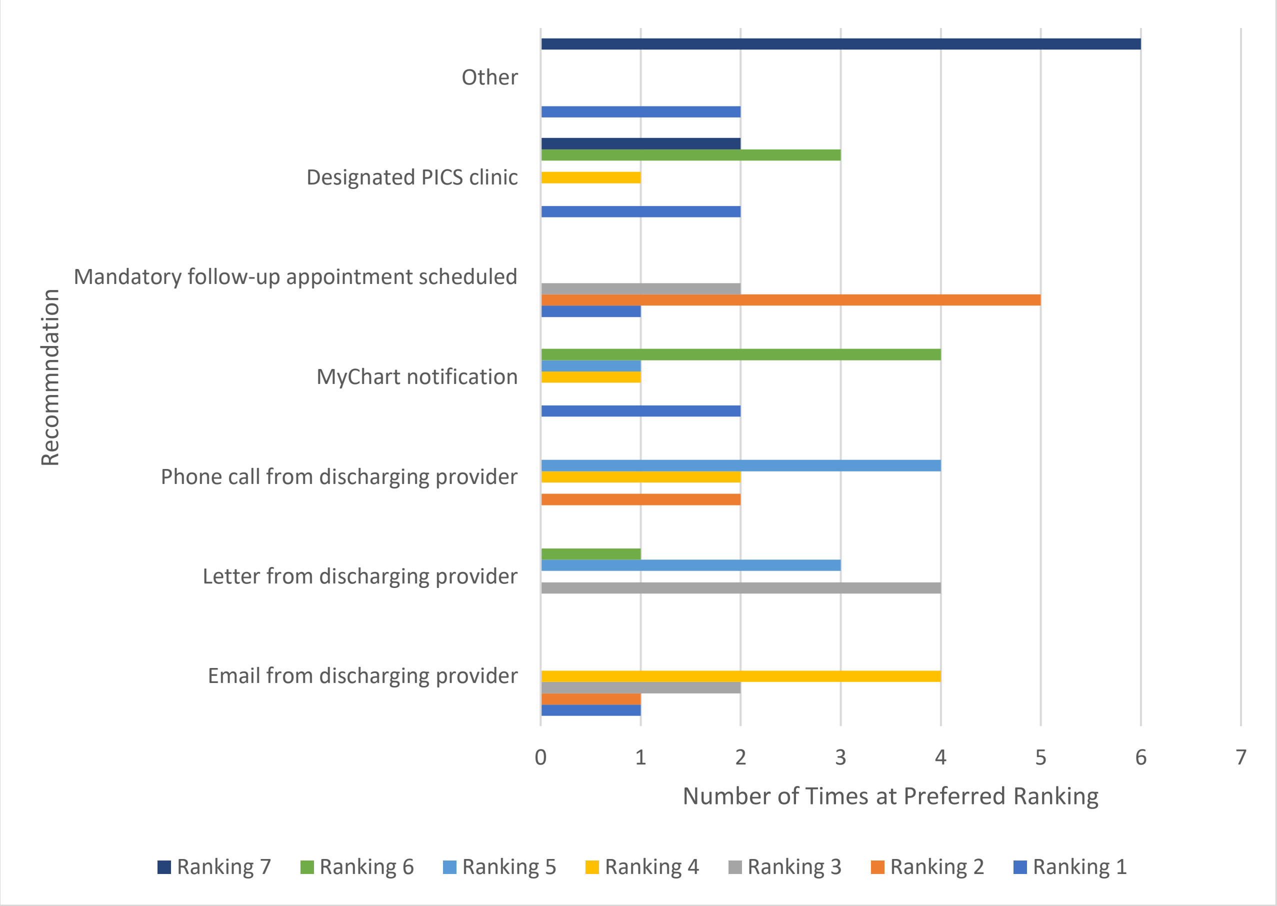


Figure 3.

Provider Perceptions of How to Improve Collaboration Between PCPs and Critical Care



Appendix A

SCCM Letter to Primary Care Provider Example

DATE:

TO: Dr.

FROM: Dr.

PHONE:

RE: Patient:

I recently cared for your patient, referenced above, in our intensive care unit. This patient had the following diagnoses and hospital course.

Diagnoses:

Hospital course (insert narrative):

Surgeries/procedures:

Discharge medications (mark psychotropic medications with asterisks):

I would also like to make you aware of **post-intensive care syndrome (PICS)**, a pattern of symptoms experienced by some patients who have been hospitalized in the ICU. Often these symptoms go unrecognized; sometimes patients are reluctant to admit that they are experiencing them.

What are the symptoms of PICS?

- **Functional deficits.** Patients may experience this even if they were not in the ICU for a long period of time. They may report:
    - Chronic fatigue and weakness
    - Inability to perform even basic activities of daily living
    - *It is important to note that the deficit may appear to be unrelated to the reason for the patient's ICU admission (eg, a patient admitted for urosepsis may have upper extremity weakness). Other medical causes must be ruled out, but PICS should be considered a possibility.*
- **Posttraumatic stress symptoms.** Patients sometimes experience depression, be easily startled, have nightmares, have avoidance symptoms that might manifest as missing appointments due to fear of going to the hospital/medical center.
- **Anxiety, depression, and/or sleep problems.**
- **Memory loss and/or other cognitive deficits.** Patients may say that they are unable to perform cognitive functions that were easy for them before their illness.

PICS can also affect family members (this is called PICS-F); they may experience symptoms of depression and anxiety for months after the patient comes home.

What should be done if a patient or family member exhibits symptoms consistent with PICS or PICS-F?

It is very important to reassure patients and families with PICS that what they are experiencing is not unusual for people who have been hospitalized in the ICU. Although we are still learning about how best to treat PICS, here are some articles that you may find useful:

Davidson JE, Harvey MA, Schuller J. Post-intensive care syndrome: what it is and how to help prevent it. *Am Nurse Today.* 2013;8(5):32-37.

Davidson JE, Jones C, Bienvenu OJ. Family response to critical illness: postintensive care syndrome - family. *Crit Care Med.* 2012 Feb;40(2):618-624.

Needham DM, Davidson J, Cohen H, et al. Improving long-term outcomes after discharge from intensive care unit: report from a stakeholders' conference. *Crit Care Med.* 2012 Feb;40(2):502-509.

The **Society of Critical Care Medicine (SCCM)** website also has a wealth of information that may assist you, the patient, and the family. Here's how to find it:

- ➢ On the website www.sccm.org, the initial screen has four tabs at the top, ➢ Click on the "Patient and Families" tab.
- ➢ Click on the drop-down menu "After the ICU."
- ➢ Click on "Post-Intensive Care Syndrome" to get additional information.
- ➢ Information can also be obtained at http://www.myicucare.org/Thrive, the new THRIVE Initiative website specifically devoted to PICS information.

Finally, patients and family members with symptoms of PICS or PICS-F may benefit from referral to a mental health professional—a psychiatrist, psychologist, social worker, or other mental health counselor can often assist patients and families in developing coping strategies for dealing with this syndrome.

I would be happy to speak with you any time if you have questions about this patient's ICU course or about PICS. Feel free to contact me at the phone number shown above.

Appendix B

Awareness of Post-Intensive Care Syndrome

The purpose of this study is to describe primary care providers' (PCP) level of awareness, knowledge, and current screening practices of Post-Intensive Care Syndrome (PICS) and PCP perceptions of ways to improve collaboration between primary care and critical care regarding PICS. The survey should take less than five minutes to complete and the information gained from this survey will inform the development of strategies to improve collaboration between critical care providers and PCPs managing ICU survivors.

In this survey, you will be presented with several questions about PICS. There are no inherent risks or benefits to participating in this project, your choice to participate is completely voluntary and the survey is anonymous. You may withdraw at any time. Completion of the survey will act as your consent to participate in this project.

Point of contact: Melanie D Sims, DNP Student @ ms4xk@virginia.edu

Part A: Demographics and Awareness

1. Gender?
    a. Male
    b. Female
    c. Other
2. Age?
    a. <30 years
    b. 31-40 years
    c. 41-50 years
    d. 51-60 years

   e. >61 years

3. Licensure type?
   a. MD
   b. DO
   c. NP
   d. PA
4. Board specialty? (by licensure type, choose all that apply)
   a. MD – Family Medicine, Internal Medicine, Geriatric Medicine, Other_____________
   b. NP – FNP, AG-ACNP, ACNP, NP, Other_______________
   c. PA – Hospital Medicine, Emergency Medicine, Other __________
5. When did you complete your residency (MD/DO) or licensure program (NP/PA)?
   a. <5 years
   b. 6-10 years
   c. 11-15 years
   d. 16-20 years
   e. 21-25 years
   f. >26 years
6. Are you routinely notified if your patient has survived a stay in the ICU?
   a. Yes
   b. No
   c. Unsure

   If yes, how?

   a. email
   b. telephone
   c. letter
   d. MyChart
   e. Patient disclosure
   f. Other________________

7. Are you familiar with Post-Intensive Care Syndrome?
   a. Very Familiar
   b. Somewhat Familiar
   c. Not Familiar

If not familiar, thank you for your participation in this survey. The following link has more information about Post-Intensive Care Syndrome (PICS).

http://www.sccm.org/Research/Quality/thrive/Pages/default.aspx

If very or somewhat familiar, please continue to Part B.

Part B: Knowledge and Screening Practices

1. The three components of PICS are mental, cognitive, and physical impairments.
   a. Agree
   b. Unsure
   c. Disagree
2. It is estimated that as many as 50% of ICU survivors suffer from at least one component of PICS.
   a. Agree

    b. Unsure
    c. Disagree

3. The incidence of cognitive impairment in ICU survivors has been reported to be as high as 78%.
    a. Agree
    b. Unsure
    c. Disagree
4. The sequelae of PICS can last from months to years.
    a. Agree
    b. Unsure
    c. Disagree
5. PICS has been identified in family members of ICU survivors.
    a. Agree
    b. Unsure
    c. Disagree
6. Have you provided care for an ICU survivor in the last 30 days?
    a. Yes
    b. Unsure
    c. No

    If yes, did you consider PICS when treating this patient?

    a. Yes

    b. Unsure

    c. No

7. Do you screen for PICS components in patients that have survived an ICU stay?
    a. Yes
    b. No

If yes, which screening instruments do you use? (choose all that apply)

Hospital Anxiety and Depression Scale (HADS)

Patient Health Questionnaire – Subscale 2 (PHQ-2)

Patient Health Questionnaire – Subscale 9 (PHQ-9)

Depression, Anxiety, and Stress Scale (DASS)

Post-Traumatic Stress Syndrome – 10 (PTSS-10)

Impact of Events Scale (IES)

Mini Mental State Examination (MMSE)

Modified-Mini Mental State Examination (3MS)

Short Form Health Survey (SF-36)

Six-minute Walk Test (6MWT)

Other ____________________________

Part C: Better Collaboration

1. What would most improve collaboration between primary care and critical care providers in caring for ICU survivors? Please arrange the following (by dragging and dropping) from most helpful at the top (1) to least helpful at the bottom (7)
    a. Email from discharging provider
    b. Letter from discharging provider
    c. Phone call from discharging provider
    d. MyChart notification

e. Mandatory follow-up appointments

f. Designated PICS clinic

g. Other ____

Thank you for your participation! If you would like to see the results of this survey, please email ms4xk@virginia.edu after August 15, 2018.

Appendix C

Face Validity Questions

1. The survey is easy to navigate.

   Agree Neutral Disagree

2. The survey is easy to understand.

   Agree Neutral Disagree

3. The time I spent completing the survey:

   <5 minutes 6-10 minutes 11-15 minutes >16 minutes

4. The survey measured to intended outcomes:

   a. Awareness

      Agree Neutral Disagree

   b. Knowledge

      Agree Neutral Disagree

   c. Screening Instruments

      Agree Neutral Disagree

   d. Opportunities for improved collaboration

      Agree Neutral Disagree

Recommendations:

Appendix D

Author Guidelines

Author guidelines for the Journal for Nurse Practitioners can be found at:

https://www.elsevier.com/journals/the-journal-for-nurse-practitioners/1555-4155/guide-for-authors