

Pediatric Psychology Critical Care Consultation: An Emerging Subspecialty

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As the field of pediatric psychology expands and evolves, pediatric critical care settings hold considerable promise for our profession. Although extensive mental health needs have been recognized in patients and families affected by care in the pediatric intensive care unit (PICU), specifics regarding the need for, utilization of, and nature of pediatric psychology services have not yet been systematically examined. The current study provides a descriptive analysis of all consecutive referrals to a pediatric psychology consultation service within the critical care setting of a large metropolitan pediatric medical center from January 2006 through December 2009. During the study period, 611 pediatric psychology referrals (4.6% of PICU admissions) were generated. Consultations were initiated by interdisciplinary staff and spanned a diverse and far-reaching range of behavioral health needs for patients and family members. Numerous factors were associated with increased need for pediatric psychology consultation, including longer than average hospitalizations, unanticipated critical care admissions, and previously healthy children who had sustained accidental trauma and those with new onset acute critical illness. Of note, the mortality rate within referred patients was significantly higher compared with the general PICU population, suggesting high need for pediatric psychology services during end-of-life care. Findings are discussed with respect to viable consultation models and training of pediatric psychologists who can function capably and confidently in the critical care setting.

Keywords: intensive care, pediatric critical care, mental health consultation, models of care delivery, consultation liaison

In recent years the role of the pediatric psychologist has expanded to include work across a range of medical, academic, school-based, and independent practice settings, and the field has seen the development of multiple specialties

and subspecialties (Buckloh & Greco, 2009). Pediatric critical care is one such emerging subspecialty. Children requiring treatment in the critical care setting present with an extensive range of medical and surgical concerns includ-

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ing traumatic injuries, postsurgical care, complex chronic physical illnesses, congenital and/or developmental conditions, nonaccidental injuries, and acute physical conditions (e.g., systemic infection, new-onset diabetes). These presentations parallel those seen across other pediatric settings, but are generally more severe or urgent (Colville, 2001; Williams & Koocher, 1999), and thus, the pediatric critical care setting is ripe with opportunities for mental health support and intervention.

The breadth of mental health concerns inherent in critical illness and the promise of critical care as a venue for pediatric psychology practice has been well described (e.g., Colville, 2001; Meyer, DeMaso, & Koocher, 1996; Tunick & Meyer, 2010; Williams & Koocher, 1999). However, there remains a lack of systematic research regarding specific mental health needs and service utilization in this setting. To address this issue, the present study aimed to provide a comprehensive, descriptive review of pediatric psychology referrals in a critical care setting, in order to better characterize the need for psychological services and inform the development of appropriate interventions and service delivery models in this unique milieu.

Pediatric Critical Care

Pediatric critical care is a subspecialty of pediatrics that has grown substantially in recent years. Randolph and colleagues reported a 14% growth in the number of pediatric intensive care units (PICUs) and a 24% growth in the number of general PICU beds in the United States between 1995 and 2001, a rate exceeding the rate of pediatric population growth as a whole (Randolph et al., 2004). Recent estimates suggest that more than 200,000 U.S. children are admitted annually into PICUs (Colville, 2008; Odetola et al., 2005). These units serve patients across a wide age range, spanning from infancy through young adulthood, as well as adults with congenital or other pediatric conditions (e.g., cystic fibrosis, congenital heart disease). Recent years have also seen the growth of specialized pediatric critical care units; for example, a growing number of high-volume pediatric centers now have dedicated cardiac PICUs for critically ill infants, children, and adults with congenital or acquired heart disease (Fraisie et al.,

2010). Across PICUs, low staff-to-patient ratios (Odetola et al., 2005) and high levels of advanced technological monitoring and life support are common, and these settings are marked by high levels of “traffic” consisting of urgently busy interdisciplinary clinicians, as well as family members, friends, and other patient visitors (Tunick & Meyer, 2010).

Mental Health Concerns in Pediatric Critical Care

As pediatric critical care has grown, the medical and nursing staff have increasingly recognized the urgency and breadth of the mental health needs of patients and family members affected by PICU treatment. Various factors related to the PICU environment itself and the subjective experience of critical illness and its treatment, such as high levels of patient acuity, uncertainty of prognoses, complex ethical dilemmas and decision-making, pain and discomfort associated with physical illness and its treatment, and limited communication abilities of patients all contribute to patient and family distress, which may in turn prompt mental health referrals (Colville, 2001; DeMaso & Meyer, 1996; Meert et al., 2008; Tunick & Meyer, 2010). Many mental health consultation requests in this setting present as unspecified “cries for help” to support patients and families during times of extreme crisis and traumatic stress (Meyer et al., 1996). Other common referral concerns include assessment, treatment and support for those evidencing changes in mental status (e.g., those associated with postsurgical delirium) or other behavioral, emotional, or cognitive abnormalities (e.g., depression, anxiety, or disruptive behavior) and nonaccidental injuries (e.g., suicide attempts and child abuse), as well as anticipatory bereavement and end-of-life support (Tunick & Meyer, 2010).

A growing literature documents the psychological impact of PICUs on young patients. Children hospitalized in PICUs find themselves subject to a barrage of aversive, invasive stimuli and interventions (Rennick et al., 2002), and factors related to an illness or injury itself, as well as its treatment, represent potential sources of traumatic stress (Bronfman et al., 1998). The traumatic stress that accompanies critical care hospitalization has been associated with both

acute stress disorder (ASD) and subsequent posttraumatic stress disorder (PTSD) at similar or higher rates relative to children hospitalized in general medical wards (e.g., Bronner et al., 2008; Muranjan et al., 2008; Rees et al., 2004). Following discharge from the PICU, many patients report remembering invasive procedures, delusional experiences including nightmares and hallucinations, and experiences of pain (e.g., Colville, 2008), and a recent meta-analysis of published records on children's mental health outcomes following PICU hospitalization (Rennick & Rashotte, 2009) suggested that critical care hospitalization often has associations with negative psychological sequelae in children up to a year postdischarge.

Family members of hospitalized, critically ill youth have long been recognized as vulnerable and present with a range of mental health needs of their own. May (1972) emphasized the importance of "treating the whole family" of critically ill hospitalized children, and Miles and Carter (1982) described a range of unique parental stressors inherent in the PICU setting, including altered appearance and behavior of one's child, prolonged separation from home and natural social support systems, disruptions to the accustomed parental role, and challenges that can arise with staff communication and behavior. Some have described family members as "second order patients" due to the pervasive nature of their own mental health needs (Ferrell & Coyle, 2008). The high stress level experienced by parents, siblings, and other PICU family members often warrants the need for brief crisis oriented supportive therapy (Hansen, Young, & Carden, 1986) and parents of PICU patients have demonstrated a risk of developing a range of psychological symptoms, including anxiety, depression, and symptoms of ASD as well as subsequent PTSD (for brief review, see Tunick & Meyer, 2010).

In addition to clinical interventions directed at patients and their families, pediatric psychology consultants may provide support for the PICU staff. This may include facilitation around the implementation of psychological interventions, psychoeducation regarding stress-related reactions, bereavement support, and general support for staff members themselves regarding the unrelenting emotional intensity of work in the PICU setting (e.g., Hansen et al., 1986; Meyer et al., 1996).

Other Relevant Mental Health Models

Several models of mental health care delivery have described roles for psychologists and other mental health practitioners in the adult critical care setting and other relevant contexts. Shulman and Shewbert (2000) purported that traditional psychiatric consultation services, which are based on a model of psychopathology, fail to adequately address the extensive mental health needs of critical care patients and their families. Rather, they proposed a holistic, systems-based, and comprehensive model of care delivery in which psychological services flow as a "standing consult" for all patients undergoing critical care treatment, as well as their families. This preventive and proactive model aims to address the entire scope of patient and family needs in a comprehensive and efficient manner by integrating the delivery of mental health services with other aspects of patient care (Shulman & Shewbert, 2000).

Similarly, Hazzard and Henderson (2004) described the integration of a counseling psychologist in an adult ICU setting over the course of three years. They identified a range of "psychological consequences of the ICU experience" for both adult patients and their families, and documented elevated risk for posthospitalization psychiatric symptomatology related to stressful experiences during the critical care course. The authors emphasized the need for a wide range of psychological interventions with patients in the ICU, as well as close interdisciplinary collaboration with other ICU staff (Hazzard & Henderson, 2004).

The Parenting at a Challenging Time (PACT) program (Swick, Martin, & Rauch, 2012) offers another relevant model. This program, situated within an adult oncology service, aims to provide support for the children of patients undergoing cancer treatment. This program is staffed by pediatric psychologists and psychiatrists and offers short-term (generally one or two visits) supportive and psychoeducational interventions for parents who are concerned about their children's adjustment and coping in the context of highly stressful circumstances. The program employs a "parent guidance" model of intervention and focuses on identifying and drawing on existing strengths within the family. The PACT program has support from institutional funding and charitable contributions, thus allowing ac-

cess to all referred families, regardless of insurance status (Swick et al., 2012).

Critical Care Consultation: A New Subspecialty of Pediatric Psychology

To our knowledge no systematic, prospective studies have documented the need for, utilization of, and nature of pediatric psychology consultation in the critical care setting. Hence, the current study aimed to provide such an analysis through the descriptive examination of psychological referrals requested in the PICU at our institution over a 4-year time period.

Our institution has implemented a full-time pediatric psychology consultation service in critical care. Across two pediatric critical care settings (the Medical-Surgical Intensive Care Unit, MSICU and the Cardiac Intensive Care Unit, CICU), a full-time pediatric psychologist works alongside a full-time postdoctoral psychology fellow, in affiliation with the hospital's inpatient psychiatry consultation service and in close collaboration with interdisciplinary unit staff. During the data collection period, pediatric psychology critical care consultation was embedded exclusively within the two units. Consultation requests could come from any member of a patient's interdisciplinary care team, and could target patients and family members alike. Referrals were free to vary based on perceived need rather than focusing exclusively on psychiatric questions. The pediatric psychology consultants regularly participated in didactics, rounds, and other day-to-day unit meetings. As such, the service delivery model aimed to fully integrate psychological care into overall medical-surgical care.

The current study examined the nature of psychological referral requests thus providing the first data-driven, systematic analysis of the utilization and nature of pediatric psychology consultation services in a PICU setting. This project, intended both as a needs assessment and a utilization review, sought to answer the following questions: What is the role of the pediatric psychology consultation team? What primary mental health needs exist in a PICU setting? How does this referred population compare with the PICU population as a whole?

Method

We tracked pediatric psychology referrals across the MSICU and CICU at our institution, a large metropolitan pediatric medical center in the northeast region of the United States, between January 2006 and December 2009. At the start of data collection the two units had a total of 48 beds, although the capacity had grown to include 55 beds by the close of the study. While a pediatric facility, our institution often treats patients with chronic pediatric illnesses into the adult years, and so referred patients included both children and adults. Referrals originated through both formal means (i.e., contacting the administrative coordinator for the psychiatry consultation service) and informal channels (via e-mail, telephone, electronic page, or face-to-face communication with the dedicated PICU psychology consultants), and came from critical care clinicians representing a range of disciplines. For this study, we included patient referrals generated in any manner. This project qualified as exempt from human subject review (Exempt Category 4; "Code of Federal Regulations," 2012).

We obtained background and descriptive information for all pediatric psychology consultations requested during this 4-year time period through medical chart review. Consultation requests were logged in a secure database on a prospective basis, and then full information regarding each referral was recorded following hospital discharge. These data included: 1) demographic information (patient age, gender, ethnicity, and any prior psychiatric history); 2) information regarding the psychological referral itself (referral source, target person in family named for referral, length of PICU admission prior to referral, nature of behavioral health concerns prompting referral, and number of pediatric psychology encounters required); and 3) information regarding patients' critical care hospitalization (medical/surgical reason for PICU hospitalization, whether or not the critical care admission occurred as part of a planned procedure, length of PICU hospitalization, length of total hospital course, and patient disposition following critical care hospitalization). While most of the data categories came directly from the medical record, a coding strategy was developed to categorize several variables (e.g., medical/surgical reason for PICU hospitaliza-

tion, pediatric psychology referral concerns). All data were generated by the lead author (R. T.) as the primary coder, as well as independently by the postdoctoral psychology fellow. Coded variables were examined on a case-by-case basis by the primary coder. When discrepancies arose, the two clinicians discussed the individual cases in order to come to consensus on the most appropriate coding.

Across each of these categories, we examined the data descriptively in order to better characterize the patients referred for pediatric psychology consultation, the types of services requested, and the nature of service delivery and utilization. Where relevant and feasible, we compared data regarding referred patients with general demographic information of the overall critical care patient population, in order to make additional inferences regarding the subset of patients referred for psychological services. Data regarding the MSICU came from the MSICU logbook, a database maintained by administrators, with links to electronic medical records, that allowed for examination of the critical care population in aggregate, and data regarding the CICU came from the Division of Cardiovascular Critical Care CICU administrative database.

Results

Over the study period, a total of 13,281 admissions to the combined PICUs (8195 in the MSICU, 5086 in the CICU) occurred. In total, there were 611 pediatric psychology referrals (4.6% of total admissions). Of these, 541 (89.5%) were for patients who had not been seen by the pediatric psychology critical care consultation service in the past, whereas the remaining 70 consultations (11.5%) were for patients who had been followed during a previous admission. Most requests (403, or 66.0%) were in the MSICU, and 208 (34.0%) were in the CICU.

Demographic Characteristics

The mean patient age was 10.6 years, yet age varied considerably ($SD = 8.3$ years, range = 0–51 years). On average referred patients were significantly older relative to the overall PICU population (PICU mean age = 7.6 years, $SD = 8.5$; $t(13887) = 8.55$, $p < .001$). Across the two units, 289 referred patients (47.3%) were fe-

male. Regarding race, we characterized patients by self-report information in the medical record (a general, categorical classification system utilized across the hospital). Eighteen (2.9%) referred patients self-identified as Asian, 37 (6.1%) as Black/African American, 418 (68.4%) as White/Caucasian, 24 (3.9%) as Hispanic/Latino, and 37 (6.1%) as “Other.” We had no information regarding race for the remaining 77 (12.6%) patients. Information regarding race was also unavailable for the overall PICU population. However, the racial make-up across the referred sample was found to be fairly comparable to that across inpatient hospital admissions during the study timeframe, with the exception that there were relatively fewer individuals who identified as Hispanic/Latino in the referred sample (3.9% in referred sample vs. 11.9% across all inpatient admissions).

When available in the record, we noted the prevalence of any previous psychiatric diagnoses in referred individuals. A (known) prior psychiatric diagnosis was noted in 53.1% of referred patients. Of the remaining referred patients, 33.0% did not have a documented psychiatric history, while we had no specific information regarding psychiatric history for the remaining 13.9% of these patients. When the referral focused on a parent as target, 41.3% carried a (known) prior psychiatric diagnosis, 22.2% did not report a significant psychiatric history, and prior psychiatric history was unknown for the remaining 36.5% of referred parents. Data regarding the specific psychiatric diagnoses were not available.

Information Regarding Patients’ Critical Care Hospitalization

Next, we examined data regarding the primary reason for admission to the PICU. As displayed in [Figure 1](#), the primary reasons for PICU admission involved congenital cardiac conditions, closely followed by acute illnesses related to chronic physical conditions (e.g., pneumonia in a child with muscular dystrophy). Injuries, acute illnesses, noncardiac surgeries, and self-harm each accounted for 8%–11% of referred patients.

Patients’ hospitalizations were further classified based upon whether the admission was planned in advance, or represented an unanticipated critical care course. Across the two units,

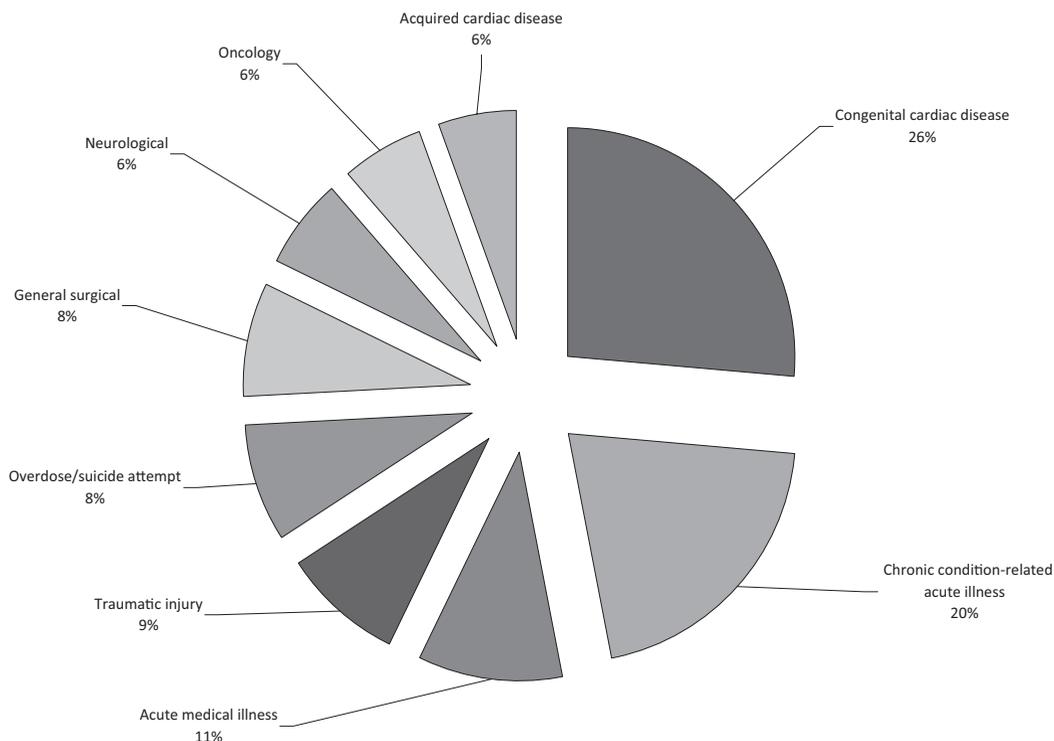


Figure 1. Reasons for pediatric intensive care (PICU) admission.

only about one-quarter (150; 24.5%) of the referrals for psychological consultation came from planned admissions, indicating that the majority of pediatric psychology referrals were for patients with unanticipated PICU hospitalizations. Of the referrals that came from planned admissions, 12 patients (8%) had previously been followed by the pediatric psychology critical care consultation service.

We next examined the duration of critical care and total hospital courses. Referred patients remained in the PICU for a mean of 20.8 days, with considerable variability ($SD = 33.5$ days, range = 1–246 days). We also compared average length of stay for referred patients with the overall PICU population. Patients referred for pediatric psychology consultation remained hospitalized in the PICU significantly longer relative to the PICU population as a whole (PICU mean length of stay = 5.8 days, $SD = 10.6$, range = 1 – 252 days), $t(13889) = 28.8$, $p < .001$. Similarly, referred patients tended to experience long total hospital courses (i.e., cumulative length of critical care course and any

additional time spent on another medical/surgical unit). The mean length of total hospital course for referred patients was 31.4 days ($SD = 43.8$ days, range = 1–389 days). Data regarding the length of total hospital course for the overall PICU population were not available.

Next, we examined information regarding disposition following PICU hospitalization. The majority of patients referred for pediatric psychology consultation were eventually transferred to a noncritical care medical/surgical unit and then ultimately discharged home (317; 51.9%). Of the remaining caseload, 69 (11.3%) patients were discharged directly to home, 94 (15.4%) transferred to another medical facility (a different hospital or a rehabilitation center), 34 (5.6%) transferred to a psychiatric facility, and 97 (15.9%) died during their PICU admission. The majority of deaths within the referred sample occurred following chronic illness courses ($n = 76$, or 78.3% of referred patients who died), while the remainder occurred in the context of new onset, unanticipated illnesses or

injuries. During the study period, 371 patients died across the overall PICU population (2.7%). Notably, the death rate of those patients referred for pediatric psychology services ran considerably higher relative to that across the entire PICU population, $\chi^2(1, N = 13892) = 303.1, p < .0001$.

Information Regarding Psychological Referrals

The final set of analyses examined information regarding the nature of the pediatric psychology consultation requests. First, we examined referral sources and found that the discipline that initiated the majority of referrals was social work (representing 34.4% of total referrals), followed by nursing staff (27.8%), physicians (16.5%), psychiatry (11.9%), and other disciplines (including child life, speech-language pathology, and chaplaincy, 8.7%). Parents initiated the referral in only 0.7% of the cases. The mean length of hospitalization prior to referral was 8.6 days ($SD = 19.0$, range = 0–221 days).

Pediatric psychology consultations were requested both for patients and family members. Just under half (294; 48.1%) of the total consultations were requested specifically for patients. Of the remaining consults, 167 (27.3%) were requested for parents, 42 (6.9%) for siblings, and 108 (17.7%) were more general consults requested for multiple members within a family.

We classified consults according to the three overlapping types of inpatient psychological consultation requests (diagnostic, management, disposition) first proposed by Meyer et al. (1996). One hundred twenty-two (20.0%) of the requested consultations involved diagnostic questions or considerations (e.g., concerns about psychiatric symptomatology, cognitive/neuropsychological functioning, psychopharmacological assessment, competency/capacity questions in adult patients or parents). There were 436 (71.4%) consultations involving management issues, such as adherence concerns, coping with new diagnoses, medical procedures, long hospitalizations, and/or chronic illness, sibling adjustment and coping, support around “difficult” families (e.g., family staff conflicts or communication difficulties, severe parental psychopathology), and end-of-life and

anticipatory bereavement issues. The remaining 53 (8.7%) consult requests involved mental health disposition planning needs.

Consultations were further characterized with regard to the primary referral concern. As indicated by Figure 2, the most common reasons for referral included assistance with child coping and adaptation to the traumatic stress of the PICU or to their illness, along with parent and family support surrounding having a critically ill child. Psychiatric symptomatology in pediatric patients and their parents were the next most common reasons for referral.

We next examined referral patterns descriptively by discipline. These analyses revealed primary referral concern differences depending on the discipline of the clinician initiating the pediatric psychology referral. In particular, social work staff was most likely to initiate referrals due to concerns regarding psychiatric symptoms in parents. In contrast, nursing staff tended to refer based upon parent and family support needs, followed closely by concerns regarding coping and adaptation in patients. Physicians were most likely to make referrals regarding concerns about psychiatric symptomatology in patients, and for patients following nonaccidental injury (e.g., suicide attempt). These findings suggest that the role of the critical care pediatric psychology consultation service was perceived somewhat differently across clinical disciplines.

The mean number of patient encounters required for psychological consultations was 3.9 ($SD = 5.8$). Interestingly, the modal number of encounters required was 1, revealing that much of the time, the psychologist met with the patient and/or family only once. The range, however, was quite wide (0 to 47 encounters), suggesting substantial variability in number of encounters. Psychopharmacological consultation (via referral to psychiatric colleagues) was required for 88 (14.4%) of the referred patients, and for 46 (7.5%) of the parents of referred patients. Finally, of the 396 referred patients who transferred from the PICU to general medical floors prior to leaving the hospital (64.8% of referred patients), nearly two-thirds (244, or 64.4% of those who transferred to a medical floor) continued to be followed by the psychiatric consultation service.

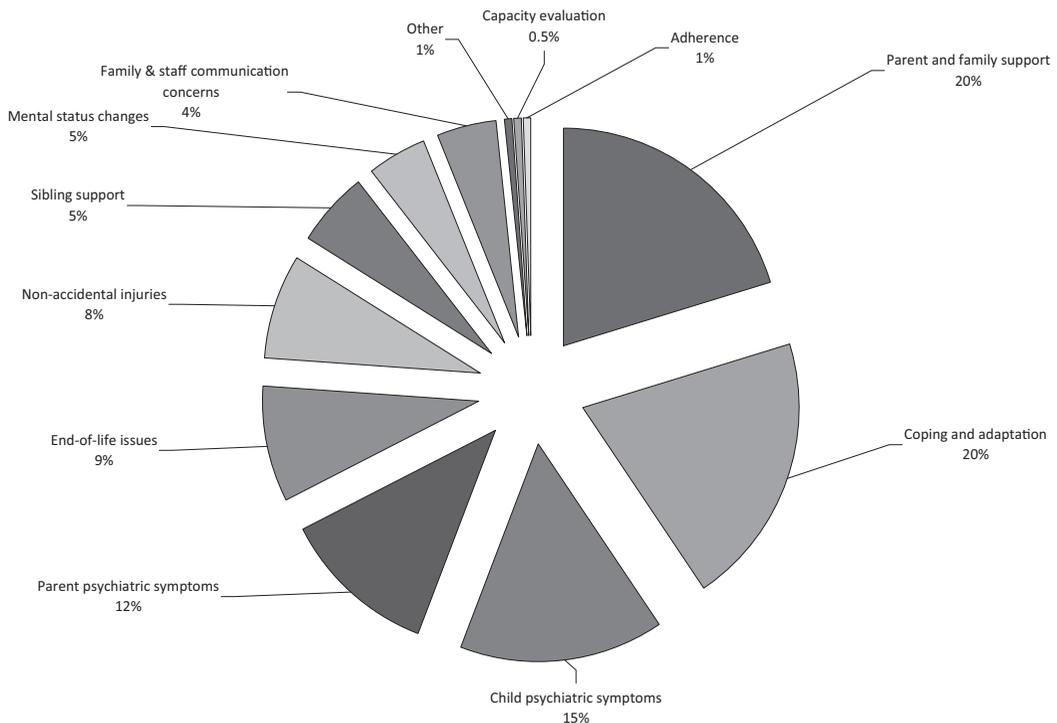


Figure 2. Reasons for referral.

Discussion

Consultation in the critical care setting holds promise as an important new subspecialty of pediatric psychology. Our findings suggest that mental health needs in the PICU are diverse and far-reaching, and the embedded consultation model seems to provide a promising fit for this unique setting. In a real sense, the successful PICU psychologist is a “jack of all trades” who is flexible, accessible, and resourceful. On any given day, the psychologist might be called upon to assess for depressive symptoms, assist with explaining leach therapy postsurgery, support parents during invasive procedures, counsel parents about sibling adjustment, provide psychoeducation around behavioral management in a patient with autism, and participate in end-of-life discussions and commemorative activities.

A number of factors were associated with increased need for pediatric psychology consultation, including longer than average hospital courses, unplanned PICU admissions, and certain medical conditions (e.g., accidental trauma

or acute new onset critical illness in previously healthy children). Individuals with more traditional psychiatric presentations (such as those hospitalized following a toxic ingestion or overdose, suicide attempt, or in the context of suspected child maltreatment) were also referred at high rates. Finally, the mortality rate within the referred sample was significantly higher than that across the overall PICU, suggesting high need for mental health services for patients and family members in the context of end-of-life.

Pediatric psychology consultations were requested for patients representing a wide age range (spanning from infancy to adulthood) with an average patient age that was slightly older relative to that of patients across the entire PICU. This finding was likely driven at least in part by the large subset of infants and young children admitted to the PICU, who may be less likely than their older counterparts to manifest concerns prompting pediatric psychology referral.

About half (48.1%) of pediatric psychology consultations were requested specifically for pa-

tients, and the remaining requests centered on matters regarding family members. This striking finding supports the need for a broad, systems-based approach to PICU consultation, wherein parental coping is often directly contingent upon the health status of the hospitalized child. Of note, most of the consultations for parents and other family members ultimately related to matters regarding the child's emotional functioning, albeit in an indirect manner. For example, many consultations requesting general "parent and family support" focused on concerns around how to best speak with one's child, upon his or her anticipated return to consciousness following a long and tenuous PICU course, about events that occurred while he or she was "asleep." Thus, such general support for family members may represent a chief component of holistic PICU care.

Consultation requests were generated freely from multiple disciplines (including social work, nursing, and medicine), underscoring the need for interdisciplinary education regarding the when, where and how of the referral process. It is interesting to note that the nature of consultation requests varied by referral source, suggesting that the role of the pediatric psychologist is perceived somewhat differently across disciplines. Consultation requests also spanned a wide range of behavioral health concerns. Most common were referrals centered on support for patients and/or family members around coping and adaptation in the midst of traumatic stress. Clinically, we observed that the recorded reason for referral did not always fully capture the multifaceted and wide-reaching range of mental health needs that presented over the course of the consultation. For example, while only 5% of referral concerns centered on changes in mental status, we have previously reported that about 15% of psychologically referred patients exhibited clinically significant symptoms of delirium at some point during their PICU hospitalization (Tunick, Hamilton, & Gavin, 2010). Similarly, 9% of referrals focused on end-of-life concerns, but ultimately nearly 16% of the referred patients died during their PICU course.

Pediatric psychology consultation spanned a wide range of encounters, extending most commonly from one single meeting to treatment delivered over the course of 47 clinical sessions. This finding underscores the need for flexible

assessment and treatment skills, ranging from the completion of comprehensive consultations under very time-limited circumstances, to the delivery of care with critically ill patients over a rather extended period of time. Of note, some referrals never came to fruition (i.e., a referral was made, but the consultation was not completed), as in the case of patients who transferred from the unit prior to the time that consultation could take place, the effective handling of referral concerns by interdisciplinary colleagues (e.g., social work, child life), and unfortunate circumstances in which the patient died prior to initiation of consultation. This finding highlights the role of triage, collaboration and more traditional liaison skills in the pediatric psychology critical care consultant. Also of note, many consultation requests resulted in just one clinical encounter with the patient and/or family. This finding is likely reflective of several factors related to both pragmatic constraints and clinical needs. For example, many patients were referred following a long and tenuous PICU course (during which time medical factors may have precluded psychological consultation) and just prior to being transferred to a noncritical care medical/surgical unit; so in spite of the finding that referred patients tended to have lengthy PICU hospitalizations, the window in which to provide consultation for patients was often quite limited. In addition, many consultation requests focused on the promotion of coping and adaptation in the midst of highly stressful medical circumstances. In such cases, a single encounter in which to identify and enhance existing strengths and supportive resources, provide psychoeducation, and help empower patients and families was often sufficient to address referral concerns.

Only a small proportion of patients on the PICU (4.6%) were referred for psychological consultation. Several factors likely accounted for this finding. First, social work plays a prominent role at our institution, and a strong and talented social work presence exists across both units examined in the present study. Across these units, social workers automatically do preliminary consultations to families of all patients hospitalized for longer than one night. These consultations often include clinical components that might be delivered by psychologists in other institutions, such as supportive interven-

tions for family members, psychoeducation regarding sibling support, and anticipatory bereavement support and guidance. Hence, it is likely that many prospective psychological problems were effectively managed by social work colleagues, precluding the need for psychological consultation. Similarly, child life specialists were available for sibling support, and this likely reduced the number of sibling referrals to our service. Furthermore, many PICU admissions were quite brief (average length of stay across PICU population = 5.8 days), and many patients, such as those recovering from minor surgical procedures (e.g., tonsillectomy) required only overnight stays. Such short hospital courses may be less associated with the need for pediatric psychology consultation. This is supported by the finding that patients tended to be on the unit for nearly 9 days, on average, prior to pediatric psychology referral.

Pediatric Psychology Critical Care Consultation: An Emerging Subspecialty

The referral patterns and service delivery approach described in this study differ in some fundamental ways from that commonly seen in traditional inpatient psychology or psychiatry consultation services. Most importantly, pediatric psychologists were integral PICU team members, rather than functioning as external consultants. This enabled referrals and service delivery to be securely embedded and integrated within the PICU. For example, psychologists regularly participated in team meetings for patients, attended and contributed to PICU staff didactics, and participated in weekly psychosocial rounds on each of the two units, together with staff from other disciplines. Pediatric psychology staff offices were located on or near the PICU, together with other interdisciplinary unit staff, thus further accentuating the consultants' presence and availability. As full-fledged members of the team, pediatric psychologists were familiar with the critical care culture, trusted, and readily accessible. Service delivery was characterized by close and regular communication and collaboration with interdisciplinary colleagues, including medical staff, other mental health and supportive disciplines (e.g., social work, child life, speech-language, and chaplaincy), as well as other consultation

services such as ethics and palliative care. For example, weekly psychosocial rounds were utilized as an opportunity to review the unit census, generate psychological referrals, brainstorm, plan, and ensure integration of the overall psychosocial care for patients and families. Such cooperative partnerships and interprofessional service delivery characterize this holistic approach.

The pediatric psychology critical care consultation model in this study is strengths-based, psychoeducational, and solution-focused. Inherent in this model is a strong developmental as well as systems-level approach, in order to support families in their efforts to themselves cope most effectively and thereby optimize their child's ability to manage the highly stressful aspects inherent in critical care. Consultation requests often regarded concerns that were preventive and proactive in nature, rather than reactive or based primarily in the context of psychopathology. This is illustrated by the finding that over 90% of consultation requests centered on diagnostic or management needs, as opposed to disposition-related concerns. Treatment tended toward supportive, strength- and resiliency-based interventions. For example, psychologists regularly provided consultation to parents around matters such as how to best support their child's coping, the provision of developmentally focused support when discussing difficult topics with their child, and ways for family members to support themselves in the midst of intense crises. As such, the focus of consults was often on pragmatic matters aimed at bolstering existing supports and enhancing depleted coping resources of hospitalized patients and family members.

Training Pediatric Psychologists as Pediatric Critical Care Consultants

The current findings have implications for the training of pediatric psychologists. Preliminarily, such training might be included within coursework in clinical graduate programs and then later incorporated into specialized pre- and postdoctoral fellowships and training rotations. Consultation within critical care calls for a blend of skills and experiences. Similar to professional practice in more traditional settings, consultants in the PICU must have a strong developmental background and fluency with

various treatment approaches. Similarly, given the high rates of psychiatric diagnoses in referred patients and parents, successful PICU practitioners also need a solid grounding in the evaluation and treatment of psychopathology.

In addition to these broad-based competencies, work in the PICU calls for some unique, specialized skills. Professional practice in this unorthodox setting often entails early treatment following traumatic experiences and in the context of new-onset medical symptomatology, calling for proficiency around recognition and treatment of acute traumatic stress and related presentations. Many consultation requests led to just one encounter with the patient and/or family, underscoring the need for consultants to be capable of completing a preliminary assessment, taking in adequate information to guide and provide appropriate treatment recommendations, in a time-limited manner (and in the midst of the high levels of “traffic,” crisis-driven pressure, and intrusive medical paraphernalia characteristic of the PICU). This ability to “think on one’s feet” is quite compatible with cross-disciplinary expectations and demands in this fast-paced, intense setting. Alternately, as many referred patients remained on the PICU for an extensive period of time, consultants optimally must also be well versed in the delivery of care for the uniquely “chronically acute” patient and family members. Across all consultations (brief or extended), the ability to remain calm and to think clearly, even in the midst of stress that is truly palpable, is a crucial professional (and personal) attribute for the pediatric psychology critical care consultant.

It is important to note that pediatric psychologists in critical care should also be well versed in (and at least reasonably comfortable with the prospect of) the delivery of supportive interventions in the context of end-of-life care. The current findings reveal that a disproportionately high percentage of the cases referred for psychological services in the pediatric critical care setting ultimately result in the death of the patient, compared with the overall population of children hospitalized in the critical care setting. Deaths in referred patients occurred most often in the context of chronic medical illnesses, but a sizable minority of the deaths in referred patients were associated with unanticipated, acute illnesses or injuries. These findings underscore the need for specialized training in end-of-life

care and anticipatory bereavement concerns when working with patients and their families in this setting.

Limitations and Future Directions

In charting the largely unexplored territory of pediatric psychology consultation in the critical care milieu, it will likely be necessary to take steps to establish the role of the psychological consultant and the stature of psychology as a consultation service. The critical care culture is defined by unparalleled levels of medical and surgical complexity/severity, cutting edge technologies and a hierarchical staffing structure, and is often one that subscribes to a traditional medical model. It is important to note, however, our experience over the course of the implementation of the pediatric psychology critical care consultation model reviewed in the current study suggested that the integration of this holistic approach was a highly valued, complementary addition to PICU care.

The current study did not explicitly examine the nature of the staff support roles of the consultant, although the consultation program presently reviewed did regularly entail such work, such as facilitating bereavement support groups, promoting good self-care among staff, and providing psychoeducation to bedside nurses. As the role of pediatric psychology takes root in PICUs, it will be important to better characterize the nature of such services. Further, the specific interventions and treatment approaches employed by pediatric psychology consultants with patients and family members were not systematically reviewed in the current undertaking. This is a clear limitation of the current study, and closer examination of this material will be warranted in order to further motivate the development of such programs. Other limitations exist around the potential generalizability of the findings, as the current study was generated in one northeastern urban pediatric academic institution, and with a largely Caucasian, non-Hispanic sample. Future studies might seek to examine mental health needs and referral patterns across other PICU settings and samples, in order to better speak to the generalizability of the current results.

Notably, in the context of the current economic climate, issues around reimbursement for mental health services are a universal contem-

porary consideration. In the model reviewed, the services were supported by the hospital, thus allowing a broad-based practice scope relative to most traditional psychiatry consultation services. In today's fiscal environment, this aspect of the current model represents a significant reality-based constraint. Moving forward, in order to most effectively implement models such as the one described, pediatric psychologists will need to pursue various types of funding arrangements and opportunities (e.g., direct billing, hospital/department support) as well as explore outcome measurements that demonstrate the impact of their work.

In a setting characterized by medical and emotional experiences of the utmost intensity and uncertainty, wherein children and their families are at their most vulnerable and face levels of stress rarely elsewhere encountered, there are ripe opportunities for pediatric psychologists to make invaluable professional contributions. The work of pediatric psychology critical care consultation is emotionally penetrating and existentially meaningful, as well as deeply valued and appreciated, thus holding great promise for professionals in our field.

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