A SYSTEMATIZED LITERATURE REVIEW ON PEDIATRIC HOSPITALIZATION IMPACT ON MENTAL HEALTH OUTCOMES IN YOUTH

by

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A THESIS

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This review explores pediatric hospitalization as a potential stressor capable of impacting mental health in pediatric patients. The Adaptive Calibration Model (ACM) supports the categorization of hospitalization as a stressor due to the low resource availability, extrinsic morbidity-mortality cues, and unpredictable and uncontrollable nature of the hospitalization experience. An established literature (Del Guidice et al., 2011 & Del Guidice et al., 2013) links stress with poor mental health outcomes; therefore, a basic premise of this literature review is that if hospitalization is a stressor, it should be linked with poor mental health outcomes. Children and adolescents are particularly vulnerable to the negative effects of unpredictable environments; thus, it's necessary to understand how experiencing hospitalization contributes to psychological outcomes in the pediatric population, and thus the present study examines pediatric populations.

A systematized review was conducted using the PubMed, APA PsycNet, and Web of Science databases to reveal existing literature on pediatric hospitalization and mental health outcomes. Utilizing Covidence to apply relevant inclusion and exclusion criteria, fourteen articles were identified. The main inclusion criteria were: 1) literature focusing on the pediatric patient population; 2) hospitalization being an identified or inferred stressor, and 3) mental

health, or psychological, outcomes being assessed as a potential result of stress responses to the hospitalization environment. The articles were analyzed using the following variables: age of patient, reason for hospitalization, duration of hospitalization, severity of treatment, and caregiver/family presence during hospitalization.

The literature supports the notion that experiencing hospitalization impacts mental health in pediatric patients. Younger age and severity of treatment (increased exposure to invasive procedures and medical technology) were the most frequently identified factors resulting in worse negative mental health outcomes, including anxiety, intrusive thoughts, post-traumatic stress, and depression. Therefore, pediatric hospitalization is a stressor capable of impacting youth mental health.

As a secondary aim, this review also attempts to identify gaps in research on pediatric hospitalization and mental health. Based on the fourteen included articles, it can be inferred that there is a lack of standardized, longitudinal studies effectively assessing the specific impact of hospitalization on mental health. Additionally, there is a lack of examination of hospitalization as a stressor, and the components necessary to quality it as such. This indicates a clear need for continued research on hospitalization and how it impacts pediatric patients' mental health. Additional research may reveal novel strategies for providing pediatric patients with effective resources and support to help mitigate harmful mental health outcomes.

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Introduction

Project Description and Research Questions

This thesis explores pediatric hospitalization as a potential stressor that is capable of impacting pediatric patients' mental health. Through conducting a systematized literature review, this report aims to examine how hospitalization is a stressor in pediatric patients, and whether current literature has identified any effects on former patients' mental health associated with this stressor.

Primary Research Question

1. How does experiencing inpatient hospitalization as a pediatric patient impact mental health outcomes?

Secondary Research Question

2. What does the existing literature reveal about significant gaps in current research on pediatric hospitalization?

Research Aims & Significance

Conducting a literature review involves exploring and analyzing what has and hasn't been successful within prior research comparing hospitalization experiences with mental health outcomes in pediatric patients. The data collected from the systematized review illustrates what methodology previous research has utilized, the factors identified to have significant impacts, and which populations have been studied. This thesis aims to synthesize the current body of existing literature on pediatric hospitalization, stress, and mental health, to determine common themes and results and discern potential future directions for investigation and experimental research. Ultimately, the data surmised from the systematized review may reveal significant gaps

within this field of research, providing an opportunity to guide ideas for exploration within future research.

Background

The Adaptive Calibration Model (ACM) describes an evolutionary-developmental framework for conceptualizing individual differences in the functioning of the stress response system, identifying how certain physical and social environmental factors may affect the development, regulation, and adaptation of behavioral responses (Del Guidice et al., 2011 & Del Guidice et al., 2013). This review posits that hospitalization functions as a stressor, which can elicit a stress response in pediatric patients; thus, it is necessary to explore whether hospitalization experiences contain the elements necessary to qualify as a stressor, as well its relationship to mental health outcomes. The ACM aims to provide a context for understanding individual differences in stress responsivity to environmental conditions (Del Guidice et al., 2013). The primary research question in this review focuses on hospitalization, a specific environmental condition, and how that environmental condition may impact pediatric patients' responses (and associated mental health outcomes) as a stressor; thus, the ACM will be the guiding theory used to understand the connection between hospitalization and mental health outcomes.

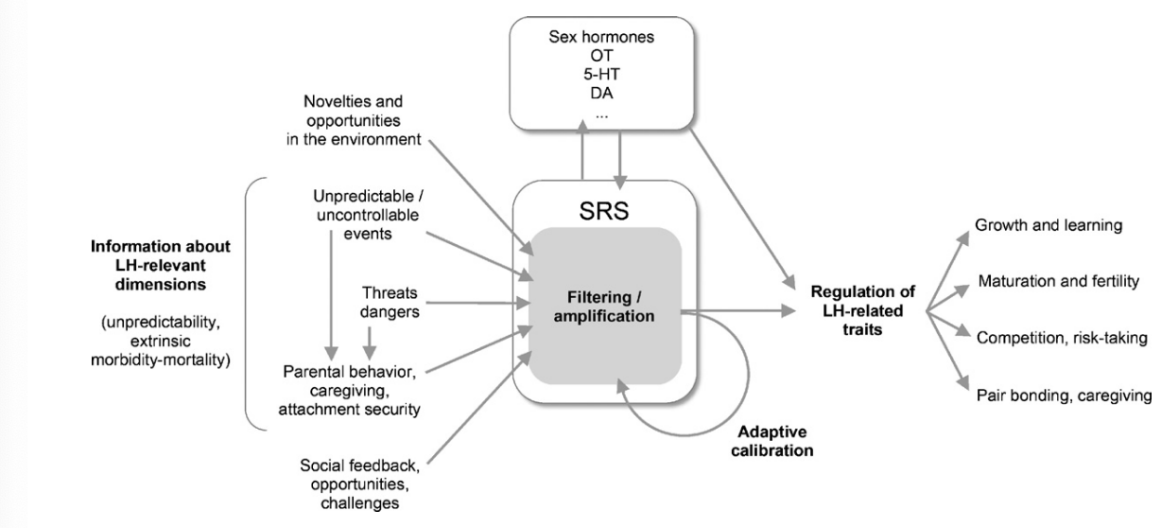

Figure 1: Conceptual structure of the Adaptive Calibration Model (Del Giudice et al., 2011)

Left side: Inputs to be encoded and filtered (environmental threats or opportunities); Middle: Information encoded and filtered during long-term SRS adaptive calibration; Right: Regulation and integration of physiological/behavioral traits (outputs)

SRS: stress response system; LH: life history; OT: oxytocin; 5-HT: serotonin; DA: dopamine.

It is important to outline the distinction between the terms *stressor* and *stress* in order to establish continuity for this review. *Stressors* (input) are salient demands placed upon humans, and *stress*, or *stress response* (output) describes humans' response as a result of exposure to a stressor (Shirtcliff et al., 2024). Described concisely, stressors cause stress responses.

Life history (LH) theory describes how organisms (including humans) allocate their time and energy to daily activities and overall functioning (Del Guidice et al., 2011 & Del Guidice et al., 2013). Given that humans are limited by their finite access to available energy and time, there exists a constant trade-off between the usage (and depletion) of these resources and the benefits gained in utilizing them (Del Guidice et al., 2011 & Del Guidice et al., 2013). Thus, humans strive to optimize their resource allocation decisions in order to identify which activities result in the smallest cost (resource depletion) and the largest benefits. Del Guidice et al. argues that humans' stress response system is an integrative mechanism contributing to the regulation of LH

strategy-related behaviors, and impacts one's ability to utilize environmental inputs to help develop alternative strategies (2011 & 2013). The stress response system (SRS) has evolved over time through natural selection, developing several distinct and essential biological functions in humans. These are the coordination of one's allostatic response to physical and psychosocial challenges, encoding and filtering information about the social and physical environment, and the regulation of one's physiology and behavior in domains related to evolutionary fitness: defensive behaviors, competitive risk-taking, learning, attachment, affiliation, and reproductive functioning (Del Guidice et al., 2011 & Del Guidice et al., 2013). An activated SRS coordinates the intake of social and physical environmental threats and opportunities (e.g., dangers, unexpected or novel events), encoding information about the likelihood of threats/opportunities, their type and severity (Del Guidice et al., 2011 & Del Guidice et al., 2013). This information is cycled through adaptive calibration as the SRS encodes continuous information over time based on the nature of environmental opportunities or threats; an individual's perception of their environment causes their SRS to elicit a life-theory strategy/stress response adapted to their environmental perception (Del Guidice et al., 2011 & Del Guidice et al., 2013).

The present review aims to describe how stressors, such as hospitalization, impact mental health outcomes. The ACM theorizes that the development and effectiveness of LH strategies in the ACM is largely dependent on three environmental factors—**resource availability**, **extrinsic morbidity-mortality**, and **unpredictability/uncontrollability** (see Figure 1)—indicating that LH strategies vary between individuals and environmental contexts, thus accounting for differences in behavioral responses (Del Guidice et al., 2011 & Del Guidice et al., 2013). Thus, these three environmental factors can be considered the essential components of an environmental stressor within the context of this review article. The development of LH

strategies, or LH outcomes, is dependent on how these factors are present within an environmental context. Different patterns of SRS activation and responsivity to these factors in early development impact one's sensitivity to environmental influences and resulting LH outcomes, such as individual differences in learning self-regulation skills (Del Guidice et al., 2011 & Del Guidice et al., 2013). Furthermore, a highly responsive SRS is associated with high physiological costs; the associated LH outcome is a decreased ability to deal with stressors due to already-overwhelmed physiological resources (Del Guidice et al., 2011 & Del Guidice et al., 2013). LH outcomes are the byproduct of the body's stress response to a stressor. Since LH outcomes resulting from environmental stressors impact the development of self-regulation and physiological skills to cope with stressors, it can be inferred that mental health outcomes result from LH outcomes based on the ACM. Therefore, this guiding theory establishes that mental health outcomes are impacted by stressors, as posited by the primary research question.

A premise of this current literature review is that experiencing hospitalization may contain the components of a stressor as defined by the ACM. Based on this conceptual model, experiencing hospitalization contains all the elements of a stressor. The hospitalization environment contains components related to resource availability, extrinsic morbidity-mortality, and unpredictability/uncontrollability.

Resource availability refers to the physiological, psychological, or external resources available to a person and how accessible these resources are. Low resource availability is present in patients' bodies fighting illness or injury; this results in less available physical energy as a resource. The presence of support systems contributes to resource availability, providing resources in both emotional and practical support; thus, the presence or absence of family members, caregivers, or guardians during hospitalization impacts resource availability.

Extrinsic morbidity-mortality cues, factors contributing to illness and death, are another component of hospitalization experiences. Being hospitalized because of conditions necessitating medical care directly indicates the presence of morbidity-mortality cues (the medical condition itself being the morbidity-mortality cue). Conversely, hospitalized patients are often surrounded by other sick or dying patients, contributing to the presence of morbidity-mortality cues.

Hospitalization is a consistently unpredictable and uncontrollable environment. Patients admitted to the hospital experience a distinct change in routine; patients are unable to engage in their familiar routines, such as sleeping in their own beds or eating their usual meals. Instead, they are exposed to, and must engage with, unfamiliar people (including their medical care team), food, noise, and sleeping conditions. During hospitalization, patients undergo treatments and procedures not typically present in their everyday lives. Furthermore, patients are unable to predict or control the outcome of their medical condition, nor the efficacy of their treatment or procedure. Patients engage with hospitalization when they're experiencing illness and/or injury; thus, patients in this environment are inevitably exposed to the unpredictable nature of illness and injury. The authority that a medical care team has over a patient may also be interpreted as an uncontrollable loss of bodily autonomy. Even if a patient's hospitalization is not characterized by low resource availability or extrinsic morbidity-mortality, this environment reliably contains unpredictable and/or uncontrollable elements. Therefore, the unpredictable nature of the hospitalization environment categorizes hospitalization as a potential stressor.

Based on the ACM's guiding theory and its established elements of a stressor, my thesis posits that hospitalization is a stressor because it contains all of the elements of a stressor described in the ACM. While outside the scope of this review, it is reasonable to suggest that hospitalization has the capability to activate the SRS and be encoded as a threatening or

dangerous environment. The ACM illustrates how the development of LH outcomes is affected by experiencing an environmental stressor; because it can be inferred that mental health outcomes result from LH outcomes, it is also reasonable to suggest that hospitalization, as a stressor, impacts mental health outcomes. The exploration of this impact is the primary focus of this literature review.

Conceptual Model

The conceptual model for this review (Figure 2) aims to illustrate the relationship between hospitalization and mental health outcomes and establish plausibility for the primary research question, which explores how hospitalization impacts mental health outcomes. It was developed based on the guiding theory within the ACM.

The left side of the model describes the environmental components of a stressor, as defined by the ACM: low resource availability, uncontrollability/unpredictability, and extrinsic morbidity-mortality cues (Del Guidice et al., 2011 & Del Guidice et al., 2013). Beneath the components lists examples of the aspects of hospitalization that correlate with each component in order to establish plausibility that hospitalization does contain these elements and, therefore, can be categorized as a stressor. Low resource availability (green) lists *caregiver availability for support* and *body fighting illness or injury* as two ways in which the hospitalization environment contains low resource availability. Uncontrollability/unpredictability (orange) lists *changes in routine*, *undergoing unfamiliar procedures or treatments*, and *engaging with unfamiliar people* as three ways in which the hospitalization environment contains uncontrollability/unpredictability. Extrinsic morbidity-mortality cues (pink) lists *being surrounded by sick or dying hospital patients* and *being a patient* as two ways in which the hospitalization environment contains extrinsic morbidity-mortality cues. These examples clearly

establish plausibility that hospitalization contains all the elements of a stressor as defined by the ACM, and therefore determines that hospitalization is a stressor.

The center of the conceptual model connects the stressor, hospitalization, to eliciting a stress response. The ACM establishes that stressors activate the stress response system (SRS), prompting the encoding and filtering of environmental information and threats based on the presence of the three aforementioned stressor components (Del Guidice et al., 2011 & Del Guidice et al., 2013).

The right side of the conceptual model connects stress responses to mental health outcomes. Life History (LH) theory informs the ACM in illustrating how the SRS directly impacts the development of LH outcomes (Del Guidice et al., 2011 & Del Guidice et al., 2013). Given that the SRS responds according to the presence of the three stressor components, the resulting LH outcomes are ultimately determined by the stressor itself. LH outcomes include learning self-regulation skills and one's ability to cope with stressful events; thus, it can be reasonably inferred that mental health outcomes result from LH responses.

This conceptual model directly establishes plausibility for the primary research question, which asks how hospitalization impacts mental health outcomes. Because hospitalization can be categorized as a stressor, and stressors affect the LH outcomes that impact mental health outcomes, there is a clear association between hospitalization and mental health, allowing for an exploration of *how* hospitalization impacts mental health.

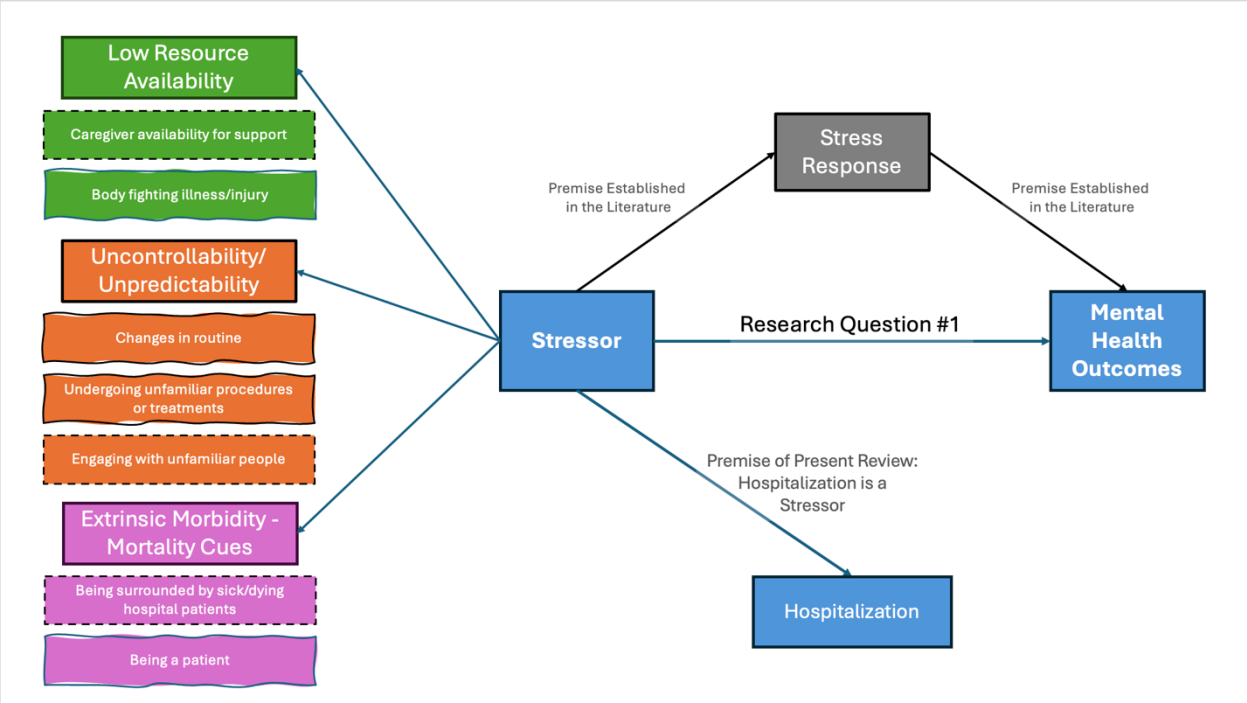

Figure 2: Conceptual model for present review

Hospitalization operates as a stressor following the ACM's identified components (low resource availability, uncontrollability/unpredictability, extrinsic morbidity/mortality cues). Mental health outcomes result from LH strategies responding to the stressor. Thus, hospitalization, as a stressor, may elicit mental health outcomes as a form of stress response.

Explanation of Target Population

Hospitalization may be a particularly salient stressor for pediatric patients. Children and adolescents are more affected by changes in environment or routine; there is a large body of evidence supporting the notion that change in environment and routine have a higher risk of eliciting a stress response in young people (Bsiri-Moghaddam et al., 2011). Given that hospitalization operates as a stressor due, in part, to its unpredictable and uncontrollable nature, it is necessary to see how this applies to hospitalized youth, who are vulnerable to exhibiting increased stress responses. Furthermore, research indicates that children and adolescents are less likely to have fully developed effective and appropriate coping strategies and emotional regulation skills (Bsiri-Moghaddam et al., 2011). Enduring unfamiliar, strange, or abnormal

circumstances may elicit stress in anyone, regardless of age; however, this impact is uniquely different—and typically heightened—in children and adolescents (Coyne, 2006 & Lerwick, 2016). This evidence indicates a clear need to understand how hospitalization specifically can impact pediatric patients' mental health outcomes.

Explanation of Review Methods

A systematized literature review process is suitable for the outlined research questions. A systematized review aims to include elements of the systematic review process, without fully meeting the qualifications necessary for an extensive, proper systematic review (Grant & Booth 2009). The goal of a systematic review is to search for and synthesize existing research while adhering to a specific set of guidelines that allow reproducibility by other researchers or peer reviewers. This review process directly aligns with the outlined research questions; a systematized review would aim to reveal the full breadth of existing literature on pediatric hospitalization and its associated mental health outcomes. Additionally, understanding what research currently exists reveals what aspects *haven't* been explored within this field, allowing the opportunity to identify the gaps in existing research. Given constraints on the research timeframe, in addition to conducting this research individually without peer reviewers, and a limit of 500 article able to be synthesized using Covidence's free trial, it makes sense to conduct a systematized literature review, which follows more flexible guidelines than a systematic review. However, this review uses the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Flowchart typically used in systematic reviews to help guide the systematized literature review process.

This review will be utilizing three databases: PubMed, APA PsycNet, and Web of Science. All three databases are widely reputable sources for literature within the medical and

mental health fields. The PRISMA guidelines describe several steps to screen the results provided by these three databases. Covidence facilitated the implementation of these steps. The Covidence software automatically removes duplicate articles found on multiple databases. Then, the remaining articles undergo the Title/Abstract Screening to exclude materials that do not align with the outlined inclusion and exclusion criteria based on the information given in article titles and abstracts. Finally, the remaining articles undergo a full text review in order to thoroughly apply inclusion and exclusion criteria. The materials that pass both screening reviews are included in the final review.

Scoping reviews are useful tools for identifying the size and scope of a scientific area of interest. A scoping review is defined as a "preliminary assessment of potential size and scope of available research literature," with the goal of identifying the "nature and extent of research evidence" (Grant & Booth 2009). Conducting an initial scoping review assists in identifying the keywords and search terms most commonly associated with the outlined research questions. This ultimately helps to identify the search terms, inclusion criteria, and exclusion criteria utilized in the systematized review.

The primary research question for this review asks: *how does experiencing inpatient hospitalization as a pediatric patient impact mental health outcomes?* This question is addressed through conducting a systematized review to identify current literature focusing on mental health impacts on pediatric patients due to hospitalization. The publications are assessed based on their identified mental health outcomes and relevant moderating variables (see Methods). The literature as a whole is evaluated to see what kind of impact hospitalization has on pediatric patients' mental health, and what factors affect the level of impact.

The secondary research question asks: *what does the existing literature reveal about significant gaps in current research on pediatric hospitalization?* Gaps in literature are assessed based on the quantity and quality of research on mental health outcomes in pediatric patients. These gaps will be mainly inferred based on lack of results within particular aspects of mental health and pediatric hospitalization.

Methods

Preliminary Scoping Review

The initial scoping review was conducted throughout the months of March and April 2025. The databases used were PubMed, APA PsycNet, and Web of Science. All three databases used in the scoping review are longstanding, reliable, well-known sources for medicine- and/or psychology-related literature. Given the interdisciplinary nature of this research, it was found necessary to use multiple databases to attempt to cover a more robust, diverse range of existing literature.

The first search term, *pediatric hospitalization*, was taken directly from the outlined research questions. Conducting this search produced 752,073 results on PubMed. To narrow the search results, quotation marks were utilized to produce exact string searches, rather than all literature containing either the term *pediatric* or *hospitalization.* Searching "*pediatric hospitalization"* produced 269 results in PubMed, 247 results in Web of Science, and 55 results in APA PsycNet, narrowing the search to produce only literature containing that exact string of terms. This search, in combination with utilizing the MeSH term database, informed the initial set of search terms used for this review.

A significant portion of the initial searches was comprised of results focusing on administrative aspects of medical care, such as cost, common diagnoses or reasons for hospitalization, and immunizations. Caregiver/guardian perspectives on pediatric hospitalizations were also common. Adding the search term, "mental health," alleviated many of the administratively focused articles, but significantly decreased the results as to not encompass the full body of literature (PubMed produced ten results; Web of Science and APA PsycNet

produced nine each). Utilizing the keywords and MeSH terms found in the relevant articles from these searches informed the finalized search terms for the systematized review.

The scoping review also helped in determining the specific moderating variables to be assessed within the final set of articles:

1. Reason for Hospitalization
2. Duration of Hospitalization
3. Severity of Treatment
4. Caregiver/Family Presence During Hospitalization
5. Age of Patient

Systematized Literature Review

Utilizing the defined search terms, all results from each database were saved to Zotero, an open-source reference management software. They were then exported to Covidence, an online software tool used to guide systematic reviews.

PRISMA Guidelines

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines aim to facilitate transparency and standardization for systematic reviews (Page et al., 2021). This systematized review utilizes these guidelines to provide a similar level of structure and brevity in reporting retrieved articles.

Databases

The databases used for the systematized review were PubMed, APA PsycNet, and Web of Science. These databases remain consistent with those utilized in the scoping review.

Search Terms

The following is the string of search terms utilized in all databases, the only change being the removal of [MeSH Terms] for APA PsycNet and Web of Science, as MeSH terms are only utilized in PubMed:

> (("pediatr*"[All Fields] OR "child*"[All Fields] OR "adolescent*"[All Fields]) AND ("hospitaliz*"[All Fields] OR "inpatient"[All Fields] OR "hospitalized child*"[All Fields]) AND ("healthcare-induced trauma"[All Fields] OR "psychological impact"[All Fields] OR "psychological outcome"[All Fields] OR "psychiatric outcome"[All Fields] OR "patient experience"[All Fields] OR "medical trauma"[All Fields] OR "medical anxiety"[All Fields])) NOT ("adult*"[All Fields] OR "geriatric*"[All Fields] OR "outpatient*"[All Fields] OR "ambulatory care"[All Fields] OR "primary care"[All Fields] OR "emergency department"[All Fields] OR "neonatal"[All Fields] OR "NICU"[All Fields] OR "newborn"[All Fields] OR "infan*"[All Fields] OR "prenatal"[All Fields] OR "antenatal"[All Fields] OR "perinatal"[All Fields] OR "postpartum"[All Fields] OR "toddler*"[All Fields] OR "preterm"[All Fields] OR "COVID-19"[MeSH Terms] OR "Feeding and Eating Disorders"[MeSH Terms] OR "residential program*"[All Fields] OR "psychiatric hospital*"[All Fields] OR "psychiatric setting*"[All Fields] OR "psychiatric inpatient"[All Fields] OR "psychiatric unit"[All Fields] OR "mental health inpatient"[All Fields] OR "incarcerat*"[All Fields] OR "prison*"[All Fields])

Criteria for Inclusion

The first main criterion for inclusion was the population; the articles must focus on pediatric (child or adolescent) hospitalized patients. The second was that the articles must identify or infer that the hospitalization environment is a stressor. The final main criterion was that mental health or psychological outcomes are evaluated as potential stress responses elicited from the hospitalization experience.

The articles must be written or available in English. They must also be published in a peer-reviewed journal, conference abstract, or dissertation. The articles must be published prior to April 29th, 2025.

Criteria for Exclusion

While literature focusing on adults' experiences with hospitalization and its effects on mental health may be helpful in informing how this applies to children, the goal of this research is to reveal the gaps in existing literature regarding pediatric hospitalizations. Thus, it is essential to limit the scope of this review so that it may properly attempt to examine how hospitalization in childhood specifically affects one's mental health, regardless of whether the effects themselves are observed later in childhood or throughout adulthood. Similarly, research relating to infants is excluded, as well as prenatal and perinatal periods. Given that the goal of this research is to identify impacts on mental health, it would be difficult to determine whether one's mental health was affected by hospitalization so early in life, as humans typically aren't yet capable of forming strong memories.

Research that uses injury as a measure of results is excluded, as the focus of this review is on the impacts that hospitalization has on mental health, rather than the impacts of the physical reason for hospitalization. Additionally, research focusing only on "patient experience" measures on quality of care while hospitalized (i.e. communication with healthcare team, discharge instructions, overall satisfaction) is excluded, unless psychological outcomes are addressed.

Literature that focuses on non-traditional hospital environments is also excluded, especially those that pose their own complex set of stressors, such as incarcerated youth receiving treatment at a federal medical center; this may introduce factors to consider (environmental differences, for example) that are not applicable to the general youth population being treated in a hospital. Data from psychiatric hospitalization experiences is also excluded, as it may be difficult to distinguish between preexisting mental health conditions and one's mental health outcome as a specific result of hospitalization.

Results

PRISMA Flow Diagram

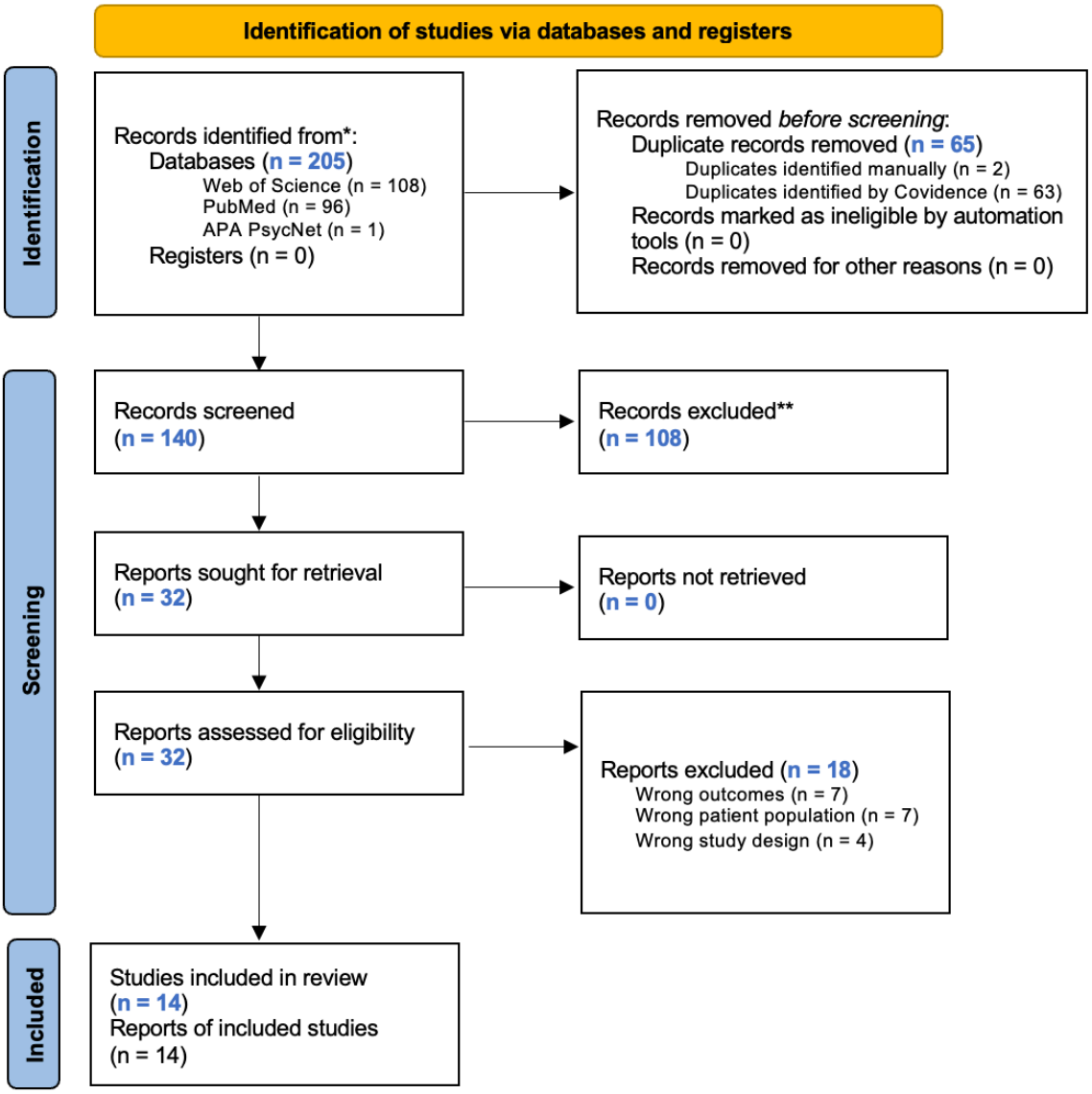

Figure 3: PRISMA Flow Diagram describing the literature search process

Conducting the systematized literature review search produced 205 results from all databases (Web of Science: 108 results; PubMed: 96 results; APA PsycNet: 1 result). In total, 65

duplicate articles were removed, 63 of which were automatically removed by Covidence, and 2 were manually removed. 140 results underwent Title/Abstract screening; 108 results were excluded based on the Title/Abstract screening. The 32 remaining results underwent full text reviews. 18 reports were excluded based on full text reviews: 7 articles focused on the wrong outcome (*not* psychological/mental health outcomes); 4 articles utilized the wrong study design, all of which were reviews of methodologies for assessing patient experience; 7 articles included the wrong patient population (typically adult patients). A total of 14 articles were included in the final review.

Summary of Collected Data

Please see supplemental materials for a full summary of data collected from 32 full text reviews (Table 1), as well as a table of the 14 articles included in the final review (Table 2).

Manual Entries

Two articles (Coyne, 2006 & Ko et al., 2022) were individually manually added to Covidence for screening. Both articles meet all inclusion and exclusion criteria and were found on the PubMed database during the initial scoping review. However, neither article was produced using the defined search terms. After trialing different combinations to expand the search terms to encompass these two articles, they still did not populate, despite aligning with the search terms. Because these articles meet all inclusion and exclusion criteria, and their content adds valuable insight to the research questions, they were manually included in this report. These outliers did not seem to indicate that the search terms excluded a large body of relevant results.

APA PsycNet Paywall

There were 27 results found on APA PsycNet that were inaccessible due to paywalls. 24 of these results were blocked by the PsycInfo paywall. The three other results were blocked by the PsycExtra paywall.

Systematized Literature Review

The primary research question asks how hospitalization impacts mental health outcomes in pediatric patients. The following results summarize findings from the literature review exploring this question.

Identification of Hospitalization as a Stressor

All articles operated under the assumption that hospitalization elicits psychological impacts without providing a conceptual model to understand why. None of the articles identified hospitalization as a *stressor*. Hospitalization was then inferred to be a stressor based on the conceptual model utilized in this review.

Seven studies focused on general pediatric hospitalization as a stressor (Coyne, 2006, Jurdi et al., 2018, Lerwick, 2016, Nabors & Liddle, 2017, Rennick et al., 2002, Sillero et al., 2024, & Xu & Huang, 2024). Jurdi et al. focused on pediatric hospitalization involving the use of gaming technology (2006). Lerwick focused on a wider range of healthcare experiences, with hospitalization included (2006.) Nabors & Liddle focused on pediatric patients residing long-term in the local Ronald McDonald House, a home-like facility for children and families undergoing treatment at a nearby hospital (2017). Xu & Huang explored the specific impacts made by noise levels during hospitalization (2024).

Six studies explored the specific impact of Pediatric Intensive Care Unit (PICU) admissions as a stressor (Ko et al., 2022, Kyösti et al., 2019, Muranjan et al., 2008, Rennick, 2015, Rennick et al., 2002 & Rennick et al., 2021)

One of these studies compared mental health outcomes in pediatric patients who experienced general hospitalization versus PICU admission (Rennick et al., 2022).

Two studies focused on hospital admissions specifically for surgery as a stressor (Hrutkay & Eilert, 1990 & Lumley et al., 1992). Hrutkay & Eilert explored femoral and tibial limb lengthening surgery specifically (1990).

It is likely that studies listed as focusing on general hospitalization included both PICU and surgery admissions.

Overall, the literature focused on general hospitalization, PICU admissions, and surgery-related hospital admissions as stressors.

Examination of Hospitalization Through the ACM

None of the studies examined hospitalization specifically through the elements of a stressor identified by the ACM (low resource availability, uncontrollability/unpredictability, and extrinsic morbidity-mortality cues). Conversely, the literature identified aspects of hospitalization that could be categorized as examples of these elements occurring within the hospitalization environment.

Quantification of the Severity of Hospitalization as a Stressor

Studies attempted to quantify the severity of hospitalization as a stressor using a wide range of methodologies, assessing mental health outcomes through various measures and moderating variables. The following sections summarize these quantifications.

Variance in Targeted Mental Health Outcomes

Due to a wide range of methodologies used to assess mental health outcomes across the articles, there was large variance in which mental health outcomes were evaluated.

Anxiety was the most frequent outcome from experiencing hospitalization, appearing in ten studies (Coyne, 2006, Hrutkay & Eilert, 1990, Jurdi et al., 2018, Ko et al., 2022, Kyösti et al., 2019, Lerwick, 2016, Lumley et al., 1992, Rennick, 2015, Sillero et al., 2024, & Xu & Huang, 2024). Five of these studies focsed on generalized hospitalization (Coyne, 2006, Jurdi et al., 2018, Lerwick, 2016, Sillero et al., 2024, & Xu & Huang, 2024); three focused on PICU admissions (Ko et al., 2022, Kyösti et al., 2019, Rennick et al, 2015); two focused on surgery-related admissions (Hrutkay & Eilert, 1990 & Lumley et al., 1992).

Nine studies observed the presence of, or increase in, anxiety when assessed during or post-hospitalization (Coyne, 2006, Hrutkay & Eilert, 1990, Jurdi et al., 2018, Kyösti et al., 2019, Lerwick, 2016, Lumley et al., 1992, Rennick, 2015, Sillero et al., 2024, & Xu & Huang, 2024). Coyne, for example, found that anxiety was most associated with patients feeling uncertainty about treatment and an unfamiliar environment, and may have exasperated feelings of lost self-determination (2006). Lumley found that both presurgical anxiety and post-discharge separation anxiety were heightened (1992). Rennick et al. discussed studies reporting ongoing anxiety associated with going back to the hospital post-admission (2021). Xu & Huang found correlations between medical anxiety and hospitalization, anxiety increasing in higher-noise environments (2024).

Notably, Ko et al., found that levels of both strait and trait anxiety were lower in girls six years post-PICU admission than the control group, with no significant differences found in boys (2022).

Intrusive thoughts were observed in two studies (Muranjan et al., 2008 & Rennick et al., 2002). Muranjan et al. noted that 43% of pediatric patients in their study reported intrusive thoughts while hospitalized, but seemed to significantly decrease one month post-discharge (2008).

Post-traumatic stress disorder (PTSD) was evaluated in two studies, both focusing on PICU admissions (Ko et al., 2022 & Rennick, 2015). In their systemic review, Ko et al. found that 10%-30.4% of children met the criteria for PTSD three to six after PICU admission; 12.9%-18.4% met the criteria after six to twelve months (2022). Rennick's review discussed one study indicating that 26% of patients met the criteria for PTSD four to seven weeks post-PICU admission; caregiver-reported anxiety and depression were found to mediate this (2015).

Depression and other affective disorders were identified in four studies (Hrutkay & Eilert, 1990, Ko et al., 2022, Kyösti et al., 2019 & Rennick, 2015). Ko et al. evaluated one study that reported lower levels of depression in children admitted to the PICU post-hospitalization in comparison to the control group (2022). Another study reported the rate of depression to be 0-6% post-PICU admission (Kyösti et al., 2019). Depression was observed in pediatric patients hospitalized for their limb lengthening surgeries, but was reported to have decreased significantly one month post-discharge (Hrutkey & Eilert, 1990). Hrutkey & Eilert also reported a similar timeline for patients observed to experience suicidal ideations, but did not provide a standardized data collection methodology (1990). Lower self-esteem and concerns with body image were observed in one study focused on general hospitalization (Coyne, 2006) and one study focused on PICU admissions (Rennick et al., 2021).

In sum, anxiety, intrusive thoughts, post-traumatic stress disorder, and depression were the most frequently reported mental health outcomes within the literature.

Moderating Variables

Please see Table 2: Included Articles Variable Assessment in supplemental materials for an in-depth description of the results for each variable in the final fourteen articles.

Reason for Hospitalization

Reason for hospitalization was initially categorized into acute versus chronic conditions in order to help quantify the severity of illness in hospitalized pediatric patients. Some studies identified patients' acute versus chronic distinction, but others required inference based on their reported diagnoses. One study focused on children hospitalized for pneumonia, an acute condition (Xu & Huang, 2024). One study focused on patients requiring limb lengthing surgery, which is necessitated by chronic conditions (Hrutkay & Eilert, 1990). Lumley et al. focused on patients who underwent elective ear, nose and throat (ENT) elective surgeries, but did not report their associated conditions, so their reason for hospitalization was undetermined (1992). Two studies did not identify reasons for hospitalization (Lerwick, 2016 & Rennick, 2015).

All other studies focused on a range of conditions necessitating hospitalization, varying amongst their patient population (Coyne, 2006, Jurdi et al., 2018, Ko et al., 2022, Kyösti et al., 2019, Muranjan et al., 2008, Rennick et al., 2002, Rennick et al., 2021 & Sillero et al., 2024). Coyne specifically focused on eight children with chronic conditions, and three with acute conditions (2006). Examples of reported acute conditions were cellulitis, constipation, and deep vein thrombosis. Examples of reported chronic conditions were asthma, cancer, liver failure, pancreatitis, and autoimmune disorders.

Correlations between reason for hospitalization and mental health outcomes were only assessed in three studies (Kyösti et al., 2019, Muranjan et al., 2008, & Rennick et al., 2002). One study found that poor psychological outcomes six years post-admission correlated with chronic

conditions (Kyösti et al., 2019). Another study found that a higher severity of disease was correlated with patients experiencing a lower sense of control, potentially contributing to anxiety (Rennick et al., 2002). One article found no correlation between reason for hospitalization and mental health outcomes (Muranjan et al., 2008).

Overall, most studies assessed pediatric patient populations with high variation in reason for hospitalization; few studies evaluated the relationship between reason for hospitalization and mental health, but those that did suggested chronic conditions predicted worse mental health outcomes.

Duration of Hospitalization

Eight studies identified the patients' duration of hospitalization (Hrutkay & Eilert, 1990, Kyösti et al., 2019, Lumley et al., 1992, Muranjan et al., 2008, Rennick et al., 2002, Rennick et al., 2021, Sillero et al., 2024, & Xu & Huang, 2024). The duration of hospitalization ranged from 24 hours to 116 days. Three studies included patients who were hospitalized for at least 24 hours, with the exception of Lumley et al., who included patients either hospitalized for 1 night or late same day discharge (Lumley et al., 1992, Rennick et al., 2002, & Rennick et al., 2021). Four studies included durations up to fifteen days long (Kyösti et al., 2019, Muranjan et al., 2008, Sillero et al., 2024, & Xu & Huang, 2024). Hrutkay & Eilert included the population with the longest duration of hospitalization, due to multiple surgeries and complications present with limb lengthening surgery, ranging from 25 to 116 days (1990).

The systematic reviews included in this review both studied wide ranges of different hospitalization durations (Jurdi et al., 2018 & Ko et al., 2022). Four studies did not identify duration of hospitalization (Coyne, 2006, Lerwick, 2016, Nabors & Liddle, 2017 & Rennick, 2015).

Two studies found minimal to no effect of duration of hospitalization on mental health outcomes (Muranjan et al., 2008 & Rennick et al., 2002). One study found that children hospitalized post-surgery exhibited worse psychological outcomes than children who were discharged post-surgery, indicating some correlation between increased time spent in hospital and mental health outcomes (Lumley et al., 2016).

The literature overall assessed pediatric patients with hospital admissions ranging from one to 116 days in length; the relationship between duration of admission and mental health was rarely examined, but studies that did suggest little to no impact on mental health outcomes.

Severity of Treatment

Given the wide range of medical conditions associated with reason for hospitalization included in the studies, nine articles exhibited varied severities in treatment and exposure to invasive procedures (Coyne, 2006, Jurdi et al., 2018, Ko et al., 2018, Kyösti et al., 2019, Muranjan et al., 2008, Nabors & Liddle, 2017, Rennick et al., 2002, Rennick et al., 2021 & Sillero et al., 2024) This included blood tests, injections, and use of invasive medical technology for treatment or observation. Two studies described focusing on specifically invasive treatments: limb lengthening surgery and ear, nose, and throat elective surgery (Hrutkay & Eilert, 1990 & Lumley et al., 1992). One study focused specifically on pediatric pneumonia patients; treatment was not specified, but assumed to be consistently non-invasive among patients with the shared diagnosis (Xu & Huang, 2024). Two studies did not identify severity of treatment (Lerwick, 2016 & Rennick, 2015).

The publications assessing treatment received all found that increased exposure to invasive treatments during hospitalization is associated with negative mental health outcomes

(Coyne, 2006, Muranjan et al., 2008, Nabors & Liddle, 2017, Rennick et al., 2002, Sillero et al., 2024, & Xu & Huang, 2024).

In sum, severity of treatment examined across the literature generally varied within each study's target population; all studies evaluating severity of treatment suggested increased exposure to invasive treatments predicted worse mental health outcomes.

Caregiver/Family Presence During Hospitalization

Only three studies identified caregiver/family presence as a specific variable (Rennick, 2015, Rennick et al., 2002 & Sillero et al., 2024). Sillero et al. addresses identified feelings of loneliness and isolation due to missing family members during hospitalization, but it is unclear if this is due to partial or total absence of family members (2024). Rennick et al. found no significant correlations between family visits and mental health outcomes (2002). Rennick described a study that found associations between caregiver-reported observations of child acute stress disorder symptoms and parent PTSD symptoms post-hospitalization, but not child PTSD symptoms (2015).

Six other studies utilized caregiver-reported measures during hospitalization, allowing the assumption of some degree of caregiver presence (Coyne, 2006, Hrutkay & Eilert, 1990, Lumley et al., 1992, Nabors & Liddle, 2017, Rennick et al., 2021 & Xu & Huang, 2024). The frequency or length of visitation was not identified.

The remaining five studies did not identify caregiver presence or absence during hospitalization (Jurdi et al., 2018, Ko et al., 2018, Kyösti et al., 2019, Lerwick, 2016 & Muranjan et al., 2008).

Caregiver presence was the least reported variable among the literature overall; the studies that did evaluate caregiver presence reported conflicting results, suggesting caregiver

visits to have either no impact on mental health, or the absence of caregivers to predict worse mental health outcomes.

Age of Patient

Nine studies assessed pediatric patients between three and seventeen years old (Coyne, 2006, Hrutkay & Eilert, 1990, Muranjan et al., 2008, Lumley et al., 1992, Nabors & Liddle, 2017, Rennick, 2015, Rennick et al., 2002, Rennick et al., 2024, & Sillero et al., 2024).

One longitudinal study focuses on a population age range of birth to sixteen years old; however, the data was collected six years post-hospitalization, so an exception was made to keep this study included (Kyösti et al., 2019). Another study focused on children aged one to five years old, but due to the inclusion of children ages three, four, and five (which are within the included age-range), as well as the strong internal validity and relevance of this study, a second exception was made (Xu & Huang, 2024).

From these eleven studies, ages nine and ten were most frequently observed, included in ten studies. Ages seven, eight, and eleven were observed in nine studies. Frequency of age observed consistently decreased in ages twelve to seventeen, and younger than six. For a full table of each study and their age range, please refer to Table 2.

Lerwick, 2016, examined mental health outcomes in pediatric patients without identifying the specific age range; this may indicate the inclusion of patients younger or older than this review's identified range. Jurdi et al. and Ko et al. were systematic reviews comprised of literature containing the *pediatric patient* age distinction (2018 & 2022). Jurdi et al. reported ages 6-12 years old to be the most common among studies that reported ago, and Ko et al. reported the mean age to be 7.3 years old (2018 & 2022).

Four of these studies found correlations between age during hospitalization and mental health outcomes; all four found that younger age at admission was associated with worse psychological outcomes post-hospitalization (Ko et al., 2022, Kyösti et al., 2019, Lumley et al., 1992, & Rennick et al., 2002). In one study, younger age was found to be a predictor for experiencing medical fear and intrusive thoughts six weeks post-hospitalization, and remained a predictor at six months post-hospitalization when interacting with presence of invasive procedures (Rennick et al., 2002).

In sum, the age range of patients examined across studies was highly variable with most studies including a very wide range of ages; few studies tested if age during hospitalization impacted mental health, but those that did suggested younger age predicted worse mental health outcomes.

Additional Variables Identified and Assessed Post-Full Text Review

Measure of Mental Health Outcome

A wide range of methodologies were used to measure mental health outcomes across the literature. Four studies used patient interviews, including the ground theory method (Coyne, 2006), play interviews (Nabors & Liddle, 2017), family interviews (Rennick et al., 2021) and interpretation of patient drawings relating to their time during hospitalization (Sillero et al., 2024). Two studies used patient observations from hospital staff to measure mental health outcomes, including qualitative observations from nursing staff or psychology service (Hrutkay & Eilert, 1990) and the Operating Room Behavior Scale (Lumley et al., 1992).

Six different patient-report questionnaires were used across the literature. One was used in two different studies; Muranjan et al. utilized the Impact of Event Scale, and Rennick et al. used the Children's Impact of Events Scale (2008 & 2002). The other questionnaires were each

only used in one study: Strengths and Difficulties Questionnaire (Kyösti et al., 2019); Birleson Depression Self-Rating Scale (Muranjan et al., 2008); Self-Esteem Scale (Muranjan et al., 2008); Locus of Control Scale (Rennick et al., 2002); Child Medical Fear Scale (Rennick et al., 2002).

Three different caregiver-report questionnaires were included, each only used in one study: Child Behavior Checklist (Lumley et al., 1992); Post-Hospital Behavior Questionnaire (Lumley et al., 1992 & Rennick et al., 2002); Brief Illness Perception Questionnaire (Xu & Huang, 2024).

In sum, studies utilized questionnaires, interviews, or observations to measure mental health outcomes as a result of hospitalization; the methodology and measure used generally differed between each study, creating challenges in assessing common themes in results across the literature.

Time of Assessment for Mental Health Outcome

The point in time at which mental health outcomes were assessed with respect to when hospitalization occurred varied throughout the literature.

Three studies conducted assessments during hospitalization or at the time of discharge, and focused on mental health outcomes present during admission, mainly anxiety and intrusive thoughts (Hrutkay & Eilert, 1990, Nabors & Liddle, 2017, & Xu & Huang, 2024).

Three studies conducted assessments post-hospitalization: Kyösti et al. conducted assessments an average of 6.33 years post-hospitalization (2019); Rennick et al. conducted assessments 12 – 15 months post-hospitalization (2021); Sillero et al. conducted assessments within six months post-hospitalization (2024). These studies focused on assessing long-term mental health outcomes, including anxiety, depression, and post-traumatic stress.

Three included articles utilized a longitudinal design, conducting assessments both during and post-hospitalization; Lumley et al. conducted assessments on the day prior to surgery, day of surgery prior to induction, and two weeks post-surgery (1992); Muranjan et al. conducted assessments within 24 hours of discharge, and one-month post-hospitalization (2008); Rennick et al. conducted assessments just before discharge, six weeks post-hospitalization, and six months post-hospitalization (2002). These studies identified pediatric patients experiencing anxiety and intrusive thoughts and generally found outcomes to decrease in severity over time.

Two studies did not identify a time of assessment (Coyne, 2006 & Lerwick, 2016).

Overall, the literature varied in the timing of mental health assessments relating to hospitalization, including three longitudinal studies; assessments during hospitalization identified more immediate mental health outcomes, such as anxiety and intrusive thoughts, and post-hospitalization assessments included identified long-term anxiety, intrusive thoughts, post-traumatic stress, and depression.

Sample Size

Jurdi et al., a systematic review, included 75 studies (2018). Ko et al., the other systematic review, included 31 studies, identifying a total of 7786 participants (2022). Lerwick did not study a specific sample (2016). Sample size ranged from 9 – 1105 participants in the remaining eleven papers.

Two reviews included nine pediatric patients (Nabors & Liddle, 2017, & Rennick et al., 2021). Six reviews included a range of 10 – 50 pediatric patients (Coyne, 2006, Hurtkay & Eilert, 1990, Lumley et al., 1992, Muranjan et al., 2008, Rennick, 2015, & Sillero et al., 2024). Kyösti et al. included 1105 pediatric patients, the largest sample size, an outlier compared to the other studies (2019).

Overall, the literature was comprised of a wide range of sample sizes. Studies with smaller sample sizes generally utilized qualitative measures to assess mental health, resulting in a more personal, less standardized measurement of mental health outcomes; studies with larger sample sizes generally utilized quantitative, standardized questionnaires to measure mental health outcomes, resulting in more specific outcome measurements.

Publication Details

All publications were published between 1990 – 2024. All reviews were published in different journals, with the exception of two articles published in Pediatric Critical Care Medicine (Kyösti et al., 2019 & Rennick, 2015). Journal impact scores ranged from 1.3 to 26.1. The journals with the lowest impact score, 1.3, were Journal of Child Health Care and Noise & Health (Coyne, 2006, & Xu & Huang, 2024). The journal with the highest impact score, 26.1, was JAMA Pediatrics (Ko et al., 2018). The next highest impact score was 7.0, received by Computers in Biology and Medicine (Jurdi et al., 2018). For a full summary of all publication dates, journals, and journal impact score, please refer to Table 2.

Discussion

Summary of Results

The primary research question asks how hospitalization impacts mental health outcomes in pediatric patients. The literature generally placed more focus on the stress responses (psychological outcomes) elicited by hospitalization, while operating under the assumption that hospitalization is a stressor. The conceptual model guiding this review, the Adaptive Calibration Model (ACM), supports the notion that hospitalization acts as a stressor due to its unpredictable and uncontrollable nature. Thus, it can be determined that hospitalization impacts mental health outcomes by operating as a stressor, playing a role in eliciting poor psychological outcomes.

In exploring the primary research question, this review found that all fourteen studies identified the hospitalization experience to have a negative impact on mental health outcomes in pediatric patients. Of the included articles, anxiety was the most frequent mental health outcome observed in hospitalized pediatric patients, followed by intrusive thoughts, post-traumatic stress disorder (PTSD), and depression. It is absolutely clear from this review that hospitalization operates as a stressor, given the prevalence of poor mental health outcomes resulting from the experience.

The literature focused on pediatric patients who experience general hospitalization, surgical hospitalization, and PICU admissions. The number of studies focusing on general hospitalization versus PICU admissions differed only by one, indicating an almost equal amount of research dedicated to each environment. This focus on PICU admissions may be due to the high intensity often associated with the PICU, given that patients admitted to that unit receive intensive care. It is logical, then, to assume that the current literature prioritizes research on more

high-stress environments to investigate mental health outcomes in pediatric patients, given their increased exposure to objectively "intense" settings.

Aside from the exceptions outlined above, most articles focused on pediatric patients aged three to seventeen, with the most frequent ages studied being nine and ten years old. Four of these studies found younger age during hospitalization to be correlated with worse mental health outcomes (Lumley et al., 1992, Ko et al., 2022, Kyösti et al., 2019 & Rennick et al., 2002). One article found no correlation between age and mental health outcomes (Muranjan et al., 2008). While the inclusion criteria determined the target population to be pediatric patients, the range of ages included generally spanned across several different age groups (preschooler, elementary, and adolescent), resulting in challenges with assessing age as a moderator. Conclusions relating to certain age groups, such as younger children experiencing worse mental health outcomes, were garnered from specific findings from individual studies, rather than an overall assessment. This may indicate a need for age-group specific populations in further research conducted on mental health outcomes in pediatric patients.

The literature explored patient populations with a wide range of reasons for hospitalization, including both chronic and acute conditions; however, correlations between the nature of patients' conditions and mental health outcomes was rarely explored. Studies that did assess this generally found chronic conditions to be associated with worse mental health. This association could be confounded by a number of other factors. Patients with chronic, ongoing conditions may experience more lasting physical effects from their condition, which could serve as a continuous reminder of any negative hospitalization experiences. Additionally, patients with chronic conditions may need to be hospitalized multiple times throughout the duration of their condition, increasing exposure to the effects of hospitalization as a stressor. Furthermore, it's

possible that their chronic condition has already impacted pediatric patients' mental health within other aspects of their life, such as school participation or ability to engage with peers; hospitalization could exacerbate any of these pre-existing mental health challenges. It's also possible that pediatric patients with chronic conditions experience negative mental health outcomes due to these confounding factors and *not* hospitalization, where hospitalization is simply a commonality shared amongst this population.

The studies measuring duration of hospitalization generally included patients who had been admitted for at least twenty-four hours; admissions ranged from one to 116 days long. Two studies found minimal to no effect of duration of hospitalization, and one study implicitly indicated a correlation between longer admission durations and worse mental health outcomes. Duration is a particularly interesting variable within the context of research on stressors, as this review presents an opportunity to assess long-term exposure to stressors. Similar to the challenges faced when evaluating patient age, the wide range and variability of admission duration within and across the literature made it difficult to assess as a moderating variable. However, duration within this long-term stressor context is an incredibly valuable measure to assess. Cumulative experience with stress exerts wear and tear on physiological symptoms, resulting in allostatic load (Shirtcliff et al., 2024). This altered stress physiology characterizes significant symptoms of poor mental health, such as anxiety and depression (Shirtcliff et al., 2024). Thus, it is reasonable to suggest that continuous exposure to a stressor like hospitalization throughout the duration of admission can result in allostatic load and associated negative mental health symptoms. In contrast, the studies evaluating admission duration found little to no correlation with mental health impact. It's possible that pediatric patients hospitalized over longer durations habituate to the environment, lessening their stress response. But, given that

hospitalization includes all the necessary elements of a stressor, it's plausible that hospitalization would contribute to the continuous, ongoing culmination of allostatic load. These findings indicate the need for further research on the specific associations between duration of hospitalization and mental health impacts.

Severity and nature of treatment received while hospitalized was the most frequently observed variable correlating with mental health outcomes. This literature strongly suggested that increased exposure to invasive treatments during hospitalization was associated with worse mental health outcomes. Aspects of treatment including needles (blood draws, injections), operations, physical pain experienced during treatment, and use of medical equipment correlated with increased anxiety and intrusive thoughts. Altered body image and decreased self-esteem was a secondary impact of invasive procedures that leave scars or other noticeable physical changes. It is relevant to note that while PICU admissions often include a higher quantity of invasive treatments, children admitted to the PICU are often sedated and are therefore not "exposed" to seeing the treatment, whereas generally hospitalized children are often more frequent witnesses of their invasive treatments. This may indicate the need for research directly comparing experiences of pediatric patients hospitalized in both settings, specifically taking note of the severity and frequency of invasive treatments they're exposed to.

Caregiver presence during hospitalization was explicitly discussed in three studies (Rennick et al., 2002, Rennick, 2015, & Sillero et al., 2024). One study found no significant correlation between caregiver visitations and mental health outcomes (Rennick et al., 2002). Feelings of loneliness and isolation due to missing family members was noted in one study, but it is unclear whether this correlates with a partial or total caregiver absence (Sillero et al., 2024). Increased parent-reported observations of child stress were associated with parent PTSD

diagnoses, but not in their children (Rennick, 2015). Caregiver presence was assumed in six other studies that included assessments during hospitalization necessitating caregiver consent, but caregiver presence was not evaluated. Caregiver presence as a moderating variable posed some challenges in determining whether it moderates the stressor, hospitalization, or the mental health outcomes. The presence or absence of a caregiver may moderate the hospitalization experience overall, as it would characterize more about how the stressor is experienced overall (hospitalization *with* caregiver as a stressor versus hospitalization *without* caregiver as a stressor). However, pediatric patient reports of loneliness or separation anxiety due to caregiver absence would indicate a moderation of the mental health outcomes, rather than the stressor. Caregiver presence would need to be isolated as a specific measured variable in order to help clarify that distinction.

Analysis of Conceptual Model Elements

This review aims to assess how hospitalization impacts mental health outcomes in pediatric patients. The literature included in this review overwhelmingly supports the notion that hospitalization has a negative impact on mental health outcomes, most strongly associated with increased experiences of anxiety, intrusive thoughts, post-traumatic stress, and depression. The outlined conceptual model for this review illustrates how hospitalization operates as a stressor through several components: low resource availability, unpredictability/uncontrollability, and extrinsic morbidity-mortality cues (see Figure 2). These components are only implicitly present within the literature.

Because the literature assumed hospitalization to be a stressor, rather than examining its specific elements to validate this assumption, this review may be limited in its validity in accordance with the outlined conceptual model. Specific details about the hospitalization

experiences in each study did not explicitly outline what qualified them to be stressors. However, because each of the components of a stressor were found within the hospitalization experience, it does not take away much credibility from the findings of this review. While it may be true that not every hospitalization experience included in this review contained all of the relevant stressor elements, hospitalizations generally involve elements and settings similar to the aspects described to be examples of these elements, such as being a patient (extrinsic morbidity-mortality), engaging with unfamiliar people and treatments (uncontrollability/unpredictability), and body fighting illness/injury (low resource availability). Therefore, this review maintains the general validity of its results.

Extrinsic morbidity-mortality cues were the least frequently examined aspect of hospitalization, typically only evaluated within qualitative interviews where patients were given the chance to freely discuss their hospitalization experience. While pediatric patients did not directly indicate the presence of other sick or dying patients to contribute to their hospitalization experience, their overall "patient" status did, attributing their experiences with anxiety or loneliness to the broader hospitalization experience (Nabors & Liddle, 2017, & Sillero et al., 2024). This indicates that the extrinsic morbidity-mortality cues associated with hospitalization was an understudied component of the conceptual model.

Resource availability was assessed primarily through three variables: age, reason for hospitalization, and caregiver presence during hospitalization. The Cognitive Development Piaget Theory was introduced in one study to understand how age may impact pediatric patients' hospitalization experience (Sillero et al., 2024). Through this lens, it can be understood that younger children may engage more in "magical thinking," leading to potential misconceptions and unrealistic expectations surrounding hospitalization, whereas older children and adolescents

may struggle more with perceived loss of control, or fear of pain. In this way, it can be understood that age is correlated with different levels of understanding and skills needed to cope with hospitalization. The majority of literature assessing age indicates that younger children are at higher risk of exhibiting worse mental health outcomes; following the conceptual model, this may be due, in part, to younger children having lower resources available to understand and cope with the hospitalization experience.

Pediatric patients' reason for hospitalization, the nature and severity of their condition, contributes directly to the patients' resource availability, as their available energy largely depends on the physical capabilities and limitations of their bodies due to illness or injury. However, there was a stark lack of research directly assessing the relationship between the patients' condition and mental health outcomes. Some studies noted that patients with chronic conditions are more likely to experience negative mental health outcomes; this may be attributed to the increased necessity of follow-up visits, more persistent physical pain, and overall continuation of hospitalization experiences associated with chronic conditions. Thus, the literature examines patients' reason for hospitalization through its subsequent implications for further treatment, rather than the condition itself.

Evaluation of caregiver presence during hospitalization was also lacking within the literature. While several studies identified separation anxiety or feelings of missing family members in patients during hospitalization, it remained unclear whether this was due to a partial or total caregiver absence. This, in combination with one study reporting no correlation between caregiver presence and mental health outcomes, doesn't seem to indicate any significant correlations. Despite caregivers being a significant resource for children seeking support,

comfort, and stability, this aspect of hospitalization lacked standardization as a potential variable impacting experiences of negative mental health outcomes.

The unpredictable and uncontrollable aspects of hospitalization were undoubtedly the most significant components contributing to mental health outcomes. These were assessed through the severity of treatment variable. Several components of treatment during hospitalization were identified to increase the risk for negative mental health outcomes, including but not limited to: needing an operation, exposure to invasive procedures, blood draws, infections, physical pain felt during treatment, and the use of medical equipment. Pediatric patients are unable to control these procedures, having been conducted by hospital staff, nor predict the outcome of their treatment. Furthermore, pediatric patients were affected by the possibility of scarring or visible reminders of their treatment. The degree, invasiveness, and exposure to treatment interventions are clear indicators for potential mental health outcomes. A large focus of this research was placed on pediatric intensive care unit (PICU) admissions, which are inherently associated with greater exposure to invasive treatments and medical technology.

The duration of hospitalization variable was initially considered to fall under extrinsic morbidity-mortality cues, relating to the amount of time one spends as a "patient" or surrounded by other sick or dying patients. But ultimately, it was determined that duration was not associated with any of the three elements of a stressor, as amount of time exposed to an environmental stressor seems to be a category of its own. Although the literature did not present strong evidence for a relationship between admission duration and mental health outcomes, given the large body of established research on the impact of allostatic load on mental health, it would make sense to consider exposure time as an additional component of a stressor. Therefore, this review posits that the ACM is missing a potential component of stressors, and it is necessary

to research this connection further in order to consider a more robust set of criteria for environmental stressors.

Addressing the Secondary Research Question: Identified Gaps in Research

The largest gap within research on mental health outcomes in pediatric patients was due to the lack of establishing hospitalization as a stressor. While this review posits one method for categorizing an environmental stressor, and was effective in determining hospitalization as a stressor in the included publications, it is likely that the ACM and the present conceptual model are missing other elements of stressors to consider, such as the amount of time exposed to the stressor. The literature was widely based on the assumption that hospitalization is stressful, rather than justifying it. Furthermore, the literature refrains from examining the specific elements of a stressor, ACM or otherwise. Although the aspects of hospitalization described in the literature typically fell under one of the three elements of a stressor, this somewhat detracts from the basis of why these studies chose to study their specific moderating variables.

Due to the high variance of measures used to assess mental health outcomes across the literature, it is difficult to compare results from studies utilizing different evaluation tools. It may be necessary to develop and/or define valid and reliable measurements for assessing mental health outcomes due to hospitalization, especially ones that evaluate the components of hospitalization that qualify the experience as a stressor.

Only one study focused on evaluating stressors not directly related to the health condition or treatment: Xu & Huang's research on the impact of noise during hospitalization (2024). The remaining studies relied on patient-report questionnaires, interviews, or observations to determine other possible aspects of hospitalization contributing to its capacity to be a stressor.

This indicates that there's a gap in empirical research on other environmental or non-medical stressors present during hospitalization.

Ko et al. discusses the lack of studies within this field evaluating patients' reason for hospitalization as a potential variable affecting mental health outcomes (2022). The results from this review absolutely indicate a need for further evaluation of how the nature of a patient's condition impact their risk of negative mental health outcomes, given the association identified within this review's conceptual model. In addition, only one study utilized the Locus of Control scale to assess feeling in- or out-of-control throughout the hospitalization experience, and found that pediatric patients may experience a loss of self-determination and autonomy (Rennick et al., 2002). This review largely focuses on how the unpredictable and uncontrollable aspects of hospitalization contribute to its capacity to be a stressor, and therefore elicit a stress response. Thus, research within this field should more frequently assess patients' perception of control within the hospitalization environment in order to create a stronger association between lack of control and mental health responses due to hospitalization.

In further exploring gaps in patient evaluation, I posit that there is merit in pursuing research that illuminates any potential positive impacts that hospitalization has on mental health. Generally, the questionnaires utilized in these studies tend to focus on evaluating the amount of negativity or harm to mental wellbeing experienced by patients, i.e., assessing for the presence or absence of behaviors and symptoms correlating with poor mental health. For example, the two versions of the Impact of Event Scale questionnaire used by Muranjan et al., 2008, and Rennick et al., 2002, aim to assess the level at which the patient experienced distress after a traumatic event. The self-report questionnaire asks participants to rate *how much* they've experienced various challenges, such as irritability or sleep troubles, on a scale from 0 (not at all) to 4

(extremely). This scale, among others, only allows a patient to express whether there was a neutral (0) or negative (4) impact, with no way to assess the presence of any positive impacts. Using just this type of scale would completely negate the possibility of identifying any benefits to mental health. Although hospitalization as a stressor has a generally negative connotation, lower levels of distress or anxiety may lead to a positive stress response, which is associated with increased energy and motivation but does not yet overwhelm or negatively impact the SRS. Finding ways to take advantage of the aspects of hospitalization that result in positive stress, or simply benefit mental health, may allow medical professionals to promote resilience in their pediatric patients, rather than contributing to their risk factors. The first step for this would be to identify the "positive" aspects of hospitalization, which would mean expanding the evaluations used to have neutral-tone questions about the hospitalization experience (*How did [this experience] make you feel?)* with a scale including negative, neutral, and positive response options. Qualitative studies utilizing interviews also allow for an exploration of these positive experiences, which often produce responses beyond the typical restraint of a rigid scale. One example of this is the play interviews conducted in Nabors & Liddle, 2017, where pediatric patients described their interactions with hospital staff to be a positive factor of their experience; this metric is likely not captured within the current method of evaluating mental health impacts in pediatric patients.

Studies varied in their collected patient demographics, inconsistently describing patient race, socioeconomic status, and other household demographics. Three studies noted no correlation between socioeconomic status and mental health outcomes (Kyösti et al., 2019, Muranjan et al., 2008, & Xu & Huang, 2024). However, given the association between vulnerability to experiencing stress and holding certain identities, it is necessary to explore how

bias, stereotypes, and differences in background between the pediatric patient and their care team impacts level of stress response, including further exploration of race, ethnicity, and cultural background.

Additionally, there were far fewer longitudinal studies that explored long-term outcomes than studies measuring psychological outcome during, or soon after, discharge. As discussed in the previous section, studies focusing primarily on outcomes assessed only during hospitalization, or only post-hospitalization, provide no baseline for mental health outcomes to compare with, making it difficult to accurately identify hospitalization as the reason for these outcomes.

Overall, the high variation of moderating variables assessed in this review, most notably age and duration, made it challenging to make overall comparisons between results, instead relying heavily on individual findings described in the publications. Thus, it would be beneficial to conduct further research on more narrow patient populations, such as focusing on specific pediatric age groups (preschool, elementary, adolescent) or conducting longitudinal studies that specifically compare different durations of hospitalization with mental health outcomes.

Ultimately, given that the systematized literature search produced only fourteen included sources, there is an undeniable need for increased research in every domain related to pediatric hospitalization and psychological outcomes.

Quality of Research Assessment

Due to the high variance of measures used to assess mental health outcomes across the literature, it is difficult to assert that studies utilizing different evaluation tools reliably reached comparable outcomes

There was an inconsistent use of a control or comparison group throughout the literature, with some studies examining healthy children, and another comparing general hospitalization versus PICU admissions. Furthermore, there was great variance in the timing of mental health evaluations; given that several studies noted changes in the frequency of mental health outcomes based on how much time had passed since hospitalization, studies that evaluated patients solely during hospitalization or post-hospitalization may not reveal a full picture of mental health outcomes overall. The studies utilizing a longitudinal design, assessing pediatric patients both during and post-hospitalization, provided the most reliable measure of mental health outcomes and their changes as a result of the hospitalization experience. The studies collecting data through qualitative interviews included family member interviews, which provided differing perspectives on the pediatric hospitalization experience but did not help to distinguish differences in mental health outcomes due to hospitalization. One study relied on hospital staff observations to assess psychological outcomes in patients, and did not name a standardized measure used during assessments, which detracts from the reliability of this study (Hrutkay & Eilert, 1990).

Differences between patient-reported outcomes and caregiver-reported outcomes may also be a significant factor in how mental health were reported. Although both perspectives are important in assessing the degree of mental health outcomes, and caregiver reports allow for the assessment of pediatric patients too young to complete evaluations themselves, it may impact the degree to which mental health outcomes were reported as present, and creates challenges in comparing results with patient-reported outcomes. Additionally, questionnaires were mailed to families in two studies, which may have led to biases such as social desirability and other caregiver influences (Lumley et al., 1993 & Rennick et al., 2002).

Finally, four of the included articles were reviews, rather than empirical studies directly evaluating mental health outcomes. Ko et al. conducted a systematic review assessing mental health outcomes related to PICU admissions, providing robust, relevant evidence for this review (2022). Jurdi et al. also conducted a systematic review, but instead focused on the impact of gaming technology in the hospitalization experience, and indicated gaming technology to decrease anxiety in patients, without providing data on levels of anxiety without gaming technology (2018). The remaining two articles reviewed pediatric hospitalization experiences and related mental health outcomes based on the existing literature, and proposed ideas for further exploration; these articles did not provide evidence for how hospitalization impacts mental health outcomes, but instead evaluated the significance of these outcomes within the larger context of pediatric hospitalization (Lerwick, 2016 & Rennick, 2015).

Summary of Results

The primary research question investigates how hospitalization impacts mental health outcomes in pediatric hospitalization. The evidence from this literature review supports the argument that hospitalization has a negative impact on mental health outcomes in pediatric hospitalizations. Pediatric patients reported anxiety, intrusive thoughts, post-traumatic stress, and depression as mental health outcomes resulting from hospitalization, with younger children, chronic conditions, and exposure to invasive treatments predicting worse outcomes.

The conceptual model for this study determined the elements of a stressor to be present within the hospitalization experience, which greatly assisted in evaluating whether the literature contained hospitalization as a stressor, given that this categorization was only assumed in the literature. The conceptual model also illustrated the relationship between hospitalization as a stressor and mental health outcomes, allowing the justification of mental health outcomes as a

result of hospitalization throughout literature that lacked this connecting piece. However, the ACM seems to be missing a fourth stressor component, duration of exposure, negating the established impacts of allostatic load; thus, this component was also missing from the present review's conceptual model.

Limitations

Exclusion of Marginalized and Vulnerable Populations

Given the nature and specificity of the research questions, it was necessary to exclude several marginalized and vulnerable populations from this review. However, several of these populations, such as children who utilize psychiatric or on-site prison medical services, are most at risk for negative outcomes associated with prolonged experience of chronic stress. The information found within this research can, and should, be adapted to a wider population range with varying circumstances, in which these differing factors are properly considered.

Review Methodology

There are significant limitations associated with conducting a systematized review, rather than a systematic review. The flexibility allowed with a systematized review indicates a large margin of human error during the screening process. This could be alleviated by collaborating with a second reviewer to participate in the literature search process—a necessary component of a systematic review—helping to increase confidence in including or excluding material, as well as decrease the risk of bias. Additionally, this review utilizes only three databases; in order to understand the full breadth of literature available within this field, it would be necessary to conduct this search in more databases. This review does not claim to be comprehensive.

Technical Limitations

The free version of Covidence only allows up to 500 articles to be imported for review. This barrier significantly limited the scope of this review; the search terms likely produced a narrower breadth of results to fit within Covidence's limit. Additionally, 27 articles were blocked by APA PsycNet paywalls, making those materials inaccessible and excluded from review.

Conclusions

This review posits that the literature in this field generally agrees that hospitalization is a stressor—aligning with the present conceptual model—and that various aspects of hospitalization correlate with the necessary components of a stressor. Hospitalization was found to negatively impact pediatric mental health outcomes. However, given that this review produced only fourteen included results, and that the literature did not justify or examine the components of hospitalization as a stressor, it is clear that further research be conducted to more thoroughly scrutinize the relationship between hospitalization and mental health outcomes in pediatric patients.

Implications

Several studies note that positive interactions with medical care teams (nurses, doctors, child life specialists) were bright spots for hospitalized children (Nabors & Liddle, 2017 & Sillero et al., 2024). One study utilized art and play as tools to increase comfort for pediatric patient interviewees (Nabors & Liddle, 2017); if medical care teams are able to implement similar techniques, it may help to mitigate stress responses in pediatric patients, allowing them to more freely express their medical fears. Similarly, gaming technologies seemed to reduce levels of anxiety and distress, help pediatric patients to regulate and cope with their stress, and alleviate feelings of loneliness or isolation (Jurdi et al., 2018).

Given that age, among other factors, can help to predict the severity of a pediatric patient's stress responses, it's clear that individualized care is necessary when considering each patient's perspectives and needs during hospitalization. Employing child-centered care strategies, such as the CARE (Choices, Agenda, Resilience, Emotion) method, may provide pediatric

patients a less stressful hospitalization experience, potentially allowing medical care teams to identify patients' resilience factors (Lerwick, 2016 & Sillero et al., 2024).

The present systematized review clearly illustrates a lack of striving toward evidence-based conclusions about the stressor of hospitalization. In assuming that hospitalization is a stressor, rather than applying evidence-based models or theories (such as the ACM) to hospitalization and identify the specific ways it operates as a stressor, there is no way to draw a direct relationship between the stressor and its outcomes. This inferred connection does not allow any opportunity to reveal what specific aspect or characteristic of the stressor, hospitalization, is contributing to patients' outcomes; instead, hospitalization as a whole is deemed to be the cause, leaving no chance to identify (and potentially eliminate) the actual source.

Ultimately, it's clear that hospitalization is a stressor for pediatric patients, age and intensity of treatments being the major components of hospitalization eliciting negative mental health outcomes in this population. The major implication of these findings is that it's necessary to employ strategies during and post-hospitalization to help mitigate these outcomes. Further, more standardized research is necessary to explore how other components of hospitalization explicitly impact mental health.

Opportunities for Further Research

This research clearly indicates a need for additional mental health resources for pediatric patients to cope with hospitalization. To address identified gaps in research, it's necessary to explore ways to distinguish between psychological reactions due to the illness/injury, treatment received, and traumatic events during/after hospital to identify specific hospitalization stressors. This may allow medical teams to learn strategies to reduce the prevalence of specific stressors.

Another opportunity for further research is to explore ways to standardize hospital-specific psychological outcome measures. Most studies included in this review utilized different methods and questionnaires to assess mental wellbeing post-hospitalization. Implementing a standardized measure would allow future studies to more easily compare pediatric patient data, identifying similarities and differences between experiences with varied stress responses.

Additionally, it would be beneficial to conduct studies comparing different interventions such as art, play, or gaming therapy. This may reveal significantly successful strategies for mitigating stress responses in pediatric patients, and discover which methods work best for different populations based on age, gender, background, or type of hospitalization experience. This also applies to trauma informed care practices that may be utilized by a medical care team. Given that hospitalization is a stressor, trauma informed care design may be able to reduce its impacts by targeting each component of a stressor. Facilitating a safe, trustworthy environment may reduce the unpredictability/uncontrollability of hospitalization, for example, by establishing stability and repour with patients. In this way, trauma informed care can directly target and attempt to eliminate the elements of a stressor, therefore increasing the likelihood of reducing LH responses and mental health outcomes.

Reference List

Aamer, I., Liaqat, S., Malik, S., & Imran, N. (2020). A Qualitative Study of Psychological Impact on Mothers of Children with COVID-19 in Hospital Setting. ANNALS OF KING EDWARD MEDICAL UNIVERSITY LAHORE PAKISTAN, 26, 126–134.

Adkins-Hepler, M. A. (1999). The gap between research and practice: Implementing successful pediatric and presurgical counseling (PQDT:65137258).

Al Sherim, M., & Al Hamidi, S. A. (2024). Exploring the Significance of Nurse Introduction for Positive Patient Experience in Saudi Arabia. Journal of Patient Experience, 11, 23743735241273576. https://doi.org/10.1177/23743735241273576

Almosallam, A., Qureshi, A. Z., Alzahrani, B., AlSultan, S., Alzubaidi, W. I., & Alsanad, A. (2024). Caregiver Knowledge, Attitude, and Behavior toward Care of Children with Cerebral Palsy: A Saudi Arabian Perspective. Healthcare (Basel, Switzerland), 12(10), 982. https://doi.org/10.3390/healthcare12100982

Al-Qudimat, A. R., Al-Zoubi, R. M., Elaarag, M., Nashwan, A. J., Hamze, A. K., Bawadi, H., Yassin, A., Assim, A., Aboumarzouk, O. M., Zarour, A., & Al-Ansari, A. A. (2022). Clinical outcomes of Pfizer-BioNTech COVID-19 vaccine in children and adolescents: A systematic review. Health Science Reports, 5(4), e740. https://doi.org/10.1002/hsr2.740

Alsabri, M., Yeluru, A., & Basak, R. B. (2020). Ancillary Services in Pediatric Departments of USA. Indian Pediatrics, 57(11), 999–1003.

Ang, F. J. L., Finkelstein, E. A., & Gandhi, M. (2022). Parent-Reported Experience Measures of Care for Children With Serious Illnesses: A Scoping Review. PEDIATRIC CRITICAL CARE MEDICINE, 23(9), E416–E423. https://doi.org/10.1097/PCC.0000000000002996

Austad, K., Thai, C., Zavatti, A., Nguyen, N., Bautista-Hurtado, D., Kenney, P., Lugo, N., Lee, J. H., Lanney, H., Xuan, Z., Cordova-Ramos, E. G., Drainoni, M.-L., & Jack, B. (2025). Tools to improve discharge equity: Protocol for the pilot TIDE trial. Contemporary Clinical Trials Communications, 43, 101419. https://doi.org/10.1016/j.conctc.2024.101419

BAI L. (n.d.). Mobile infusion device suitable for children, has chassis that is connected with fixed end of air pressure rod and bottom is provided with multiple rotating wheels (Patent Nos. CN218900421-U).

Barber, J. M., Pringle, C. J., Raffalli-Ebezant, H., Pathmanaban, O., Ramirez, R., & Kamaly-Asl, I. D. (2017). Telemetric intra-cranial pressure monitoring: Clinical and financial considerations. British Journal of Neurosurgery, 31(3), 300–306. https://doi.org/10.1080/02688697.2016.1229752

Braet, C. (2006). Patient characteristics as predictors of weight loss after an obesity treatment for children. Obesity (Silver Spring, Md.), 14(1), 148–155. https://doi.org/10.1038/oby.2006.18

Bsiri-Moghaddam, K., Basiri-Moghaddam, M.B., Sadeghmoghaddam, L., & Ahmadi, F. (2011). The Concept of Hospitalization of Children from the View Point of Parents and Children. Iranian Journal of Pediatrics, 21(2), 201–208. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3446164/

Burrowes, S. A., Jones, K. C., Williams, C. J., Neri, C. M., Klings, E. S., Walkey, A. J., Drainoni, M.-L., & Cohen, R. T. (2024). SNAP: Supportive Non-Invasive Ventilation for Acute Chest Syndrome Prevention in Hospitalized Children with Sickle Cell Disease: Facilitators, Barriers, and Contextual Factors Related to Implementation. BLOOD, 144, 3617–3618. https://doi.org/10.1182/blood-2024-201870

Burrowes, S. A., Williams, C. J., Neri, C. M., Klings, E. S., Jones, K. C., Walkey, A. J., Drainoni, M.-L., & Cohen, R. T. (2023). SNAP: Supportive Non-Invasive Ventilation for ACS Prevention in Hospitalized Children with Sickle Cell Disease: Perceptions of Patients, Caregivers, and the Health Care Team. BLOOD, 142. https://doi.org/10.1182/blood-2023-178222

Chen, J. G., Lee, S., & Khallouq, B. B. (2020). Association of Demographics and Hospital Stay Characteristics With Patient Experience in Hospitalized Pediatric Patients. Journal of Patient Experience, 7(6), 1077–1085. https://doi.org/10.1177/2374373520925251

Chen, X., Yuan, J., Zhao, W., Qin, W., Gao, J., & Zhang, Y. (2024). Which aspects of patient experience are the "moment of truth" in the healthcare context: A multicentre cross-sectional study in China. BMJ Open, 14(2), e077363. https://doi.org/10.1136/bmjopen-2023-077363

Chiang, C.-Y., Lin, H.-M., & Liu, S.-T. (2023). [Healing Through Art and Play for Hospitalized Children With Medical Trauma]. Hu Li Za Zhi The Journal of Nursing, 70(3), 19–25. https://doi.org/10.6224/JN.202306_70(3).04

Chua, I. S., Bogetz, A. L., Long, M., Kind, T., Ottolini, M., Lineberry, M., & Bhansali, P. (2021). Medical student perspectives on conducting patient experience debrief interviews with hospitalized children and their families. Medical Teacher, 43(4), 421–427. https://doi.org/10.1080/0142159X.2020.1854707

Clark, M. E., Carleton, M. E., Cummings, B. M., & Noviski, N. (2019). Children's Drawings With Narratives in the Hospital Setting: Insights Into the Patient Experience. Hospital Pediatrics, 9(7), 495–500. https://doi.org/10.1542/hpeds.2018-0170

Colizzi, M., Bortoletto, R., Silvestri, M., Mondini, F., Puttini, E., Cainelli, C., Gaudino, R., Ruggeri, M., & Zoccante, L. (2020). Medically unexplained symptoms in the times of COVID-19 pandemic: A case-report. Brain, Behavior, & Immunity - Health, 5, 100073. https://doi.org/10.1016/j.bbih.2020.100073

Cotgrove, A., & Northover, G. (2021). Debate: The future of inpatient units - do we need them? Child and Adolescent Mental Health, 26(2), 178–179. https://doi.org/10.1111/camh.12466

Cox, C. M., Kenardy, J. A., & Hendrikz, J. K. (2008). A meta-analysis of risk factors that predict psychopathology following accidental trauma. JOURNAL FOR SPECIALISTS IN PEDIATRIC NURSING, 13(2), 98–110. https://doi.org/10.1111/j.1744-6155.2008.00141.x

Craig, S., Xu, Y., Robas, K., Iramain, R., Yock-Corrales, A., Soto-Martinez, M. E., Rino, P., Belen Alvarez Ricciardi, M., Piantanida, S., Mahant, S., Ubuane, P. O., Odusote, O., Kwok, M., Johnson, M. D., Paniagua, N., Benito Fernandez, J., Ong, G. Y., Lyttle, M. D., Gong, J., … Pediatric Emergency Research Networks (PERN). (2023). Core outcomes and factors influencing the experience of care for children with severe acute exacerbations of asthma: A qualitative study. BMJ Open Respiratory Research, 10(1). https://doi.org/10.1136/bmjresp-2023-001723

Creating a PRISMA flow diagram: PRISMA 2020. (2025). The University of North Carolina (UNC) Health Sciences Library. https://guides.lib.unc.edu/prisma

Cutshall, S. M., Rodgers, N. J., Dion, L. J., Dreyer, N. E., Thomley, B. S., Do, A., Wood, C., Pronk, S. C., & Bauer, B. A. (2015). A decade of offering a Healing Enhancement Program at an academic medical center. Complementary Therapies in Clinical Practice, 21(4), 211–216. https://doi.org/10.1016/j.ctcp.2015.07.004

Dad, T., Tighiouart, H., Fenton, J. J., Lacson, E., Meyer, K. B., Miskulin, D. C., Weiner, D. E., & Richardson, M. M. (2018). Evaluation of non-response to the In-Center Hemodialysis Consumer Assessment of Healthcare Providers and Systems (ICH CAHPS) survey. BMC Health Services Research, 18(1), 790. https://doi.org/10.1186/s12913-018-3618-4

De Rosis, S., Bonciani, M., Spataro, V., Corazza, I., Conti, E., Sibbles, B., Hazelzet, J. A., Lahdenne, P., Gehrmann, K., Menegazzo, F., Sica, M., Šteina, V., Esenberga, G., Chapin, E. M., Solare, S., & Vainieri, M. (2023). Value of Including the Children's Experience for Improving Their Rights During Hospitalization: Protocol for the VoiCEs Project. JMIR Research Protocols, 12, e42804. https://doi.org/10.2196/42804

Del Giudice, M., Ellis, B. J., & Shirtcliff, E. A. (2011). The adaptive calibration model of stress responsitivity. Neuroscience and Biobehavioral Reviews, 35, 1562-1592. https://doi.org/10.1016/j.neubiorev.2010.11.007

Del Giudice, M., Ellis, B. J., & Shirtcliff, E. A. (2013). Making sense of stress: An evolutionary-developmental framework. Adaptive and Maladaptive Aspects of Developmental Stress, 3, 23-43. https://doi.org/10.1007/978-1-4614-5605-6_2

Drapeaux, A., Jenson, J. A., & Fustino, N. (2021). The Impact of COVID-19 on Patient Experience Within a Midwest Hospital System: A Case Study. Journal of Patient Experience, 8, 23743735211065298. https://doi.org/10.1177/23743735211065298

Ehwerhemuepha, L., Schultz, S., & Feaster, W. (2018). Clinical and Psychosocial Factors Associated With Patient Experience in Pediatrics. Clinical Pediatrics, 57(8), 937–944. https://doi.org/10.1177/0009922817737078

Fairthorne, J., de Klerk, N., & Leonard, H. (2016). Brief Report: Burden of Care in Mothers of Children with Autism Spectrum Disorder or Intellectual Disability. JOURNAL OF AUTISM AND DEVELOPMENTAL DISORDERS, 46(3), 1103–1109. https://doi.org/10.1007/s10803-015-2629-9

Freeman, A., Golding, E., Gardner, J., & Berger, Z. (2024). Paediatric Post-Traumatic Stress Risk for Young People and Parents following Acute Admission for Paediatric Multisystem Inflammatory Syndrome: Retrospective Analysis of Psychological Screening and Support. CHILDREN-BASEL, 11(7). https://doi.org/10.3390/children11070858

Galliot, G., Very, E., Schmitt, L., Rouch, V., & Salles, J. (2019). [Post-traumatic stress disorder in reaction to psychotic experience: A systematic revue]. L'Encephale, 45(6), 506–512. https://doi.org/10.1016/j.encep.2019.07.006

Gandhi, H. (2024). An Exploration and Confirmation of the Measurement of Healthcare Experiences of Children With Autism: Analysis of the 2019 and 2020 National Survey of Children's Health (PQDT:88778200).

Gavana, M., Papageorgiou, D. I., Stachteas, P., Vlachopoulos, N., Pagkozidis, I., Angelopoulou, P., Haidich, A. B., & Smyrnakis, E. (2023). The psychological impact of COVID-19 pandemic on primary health care professionals in Greece. Psychiatrike = Psychiatriki, 34(3), 181–192. https://doi.org/10.22365/jpsych.2023.008

Gkentzi, D., Mhliordos, K., Karatza, A., Sinopidis, X., Dimopoulou, D., Eleftheriou, E., Tsolia, M., Mavridi, A., Miliara, E., Papaevangelou, V., Vergadi, E., Galanakis, E., Dimitriou, G., & Fouzas, S. (2022). The Psychological Impact of COVID-19 Admission on Families: Results from a Nationwide Sample in Greece. Children (Basel, Switzerland), 9(12), 1933. https://doi.org/10.3390/children9121933

Glazebrook, C. P., & Sheard, C. E. (1994). A prospective study of factors associated with delayed discharge in school-aged children undergoing ward-based minor surgery. International Journal of Nursing Studies, 31(6), 487–497. https://doi.org/10.1016/0020-7489(94)90059-0

González Villanueva, P., Ferrer Cerveró, V., Agudo Gisbert, E., & Medina Moya, J. L. (2011). Index de Enfermería, 20(3), 151–154. https://doi.org/10.4321/s1132-12962011000200003

Grant, M.J. and Booth, A. (2009). A typology of reviews: an analysis of 14 review types and associated methodologies. Health Information & Libraries Journal, 26: 91-108. https://doi.org/10.1111/j.1471-1842.2009.00848.x

GRIFFITH, J. J. (1985). COMMUNICATION DEVIANCE IN CHILDREN AT HIGH RISK FOR SCHIZOPHRENIA (PQDT:65475344).

Hamlett, K. W., Walker, W., Evans, A., & Weise, K. (1994). Psychological development of technology-dependent children. Journal of Pediatric Psychology, 19(4), 493–503. https://doi.org/10.1093/jpepsy/19.4.493

Hargreaves, D. S., Sizmur, S., Pitchforth, J., Tallett, A., Toomey, S. L., Hopwood, B., Schuster, M. A., & Viner, R. M. (2018). Children and young people's versus parents' responses in an English national inpatient survey. Archives of Disease in Childhood, 103(5), 486–491. https://doi.org/10.1136/archdischild-2017-313801

Hausmann, J. S., Kennedy, K., Surangiwala, S., Larche, M. J., Sinha, R., Durrant, K., Foster, G., Levine, M., Thabane, L., Costello, W., Robinson, P. C., Liew, J. W., Yazdany, J., & Sirotich, E. (2022). Early impacts of the COVID-19 pandemic on children with pediatric rheumatic diseases. European Journal of Rheumatology, 9(4), 185–190. https://doi.org/10.5152/eujrheum.2022.21133

Hawkins, L. (2017). Parental Adjustment Following Paediatric Burn Injury (PQDT:67484805).

Hawkins, L. M., Sinha, C. B., Ross, D., Yee, M. E. M., Quarmyne, M.-O., Krishnamurti, L., & Bakshi, N. (2020). Patient and family experience with chronic transfusion therapy for sickle cell disease: A qualitative study. BMC Pediatrics, 20(1), 172. https://doi.org/10.1186/s12887-020-02078-w

Holm, L., Smidt, S., & Michaelsen, K. F. (1998). [The sociopsychological importance of food in hospital. Evaluation of a new meal system in a children's cancer ward]. Ugeskrift for Laeger, 160(30), 4415–4418.

Hover, W. J., Krein, A. D., Kallet, J., Kinney, G. L., Speiser, P. W., Witchel, S. F., Donegan, D., Ahmet, A., Anthony, J., Llahana, S., Majka, S. L., Slovick, M. F., Stilley, J. D., Margulies, P. L., McDermott, M. T., Foley, E. A., & Regan, E. A. (2025). People With Adrenal Insufficiency Who Are in Adrenal Crisis Are Frequently Unable to Self-Administer Rescue Injections. Endocrine Practice: Official Journal of the American College of Endocrinology and the American Association of Clinical Endocrinologists, S1530-891X(25)00064-3. https://doi.org/10.1016/j.eprac.2025.02.017

Hrutkay, J. M., & Eilert, R. E. (1990). Operative lengthening of the lower extremity and associated psychological aspects: The Children's Hospital experience. Journal of Pediatric Orthopedics, 10(3), 373–377. https://doi.org/10.1097/01241398-199005000-00015

Hu, M., & Alexander, A. (2021). Response to: Medical student perspectives on conducting patient experience debrief interviews with hospitalized children and their families. Medical Teacher, 43(10), 1220–1221. https://doi.org/10.1080/0142159X.2021.1881466

Ishii, L. E., Tollefson, T. T., Basura, G. J., Rosenfeld, R. M., Abramson, P. J., Chaiet, S. R., Davis, K. S., Doghramji, K., Farrior, E. H., Finestone, S. A., Ishman, S. L., Murphy, R.

X., Park, J. G., Setzen, M., Strike, D. J., Walsh, S. A., Warner, J. P., & Nnacheta, L. C. (2017a). Clinical Practice Guideline: Improving Nasal Form and Function after Rhinoplasty. Otolaryngology--Head and Neck Surgery: Official Journal of American Academy of Otolaryngology-Head and Neck Surgery, 156(2_suppl), S1–S30. https://doi.org/10.1177/0194599816683153

Ishii, L. E., Tollefson, T. T., Basura, G. J., Rosenfeld, R. M., Abramson, P. J., Chaiet, S. R., Davis, K. S., Doghramji, K., Farrior, E. H., Finestone, S. A., Ishman, S. L., Murphy, R. X., Park, J. G., Setzen, M., Strike, D. J., Walsh, S. A., Warner, J. P., & Nnacheta, L. C. (2017b). Clinical Practice Guideline: Improving Nasal Form and Function after Rhinoplasty Executive Summary. Otolaryngology--Head and Neck Surgery: Official Journal of American Academy of Otolaryngology-Head and Neck Surgery, 156(2), 205–219. https://doi.org/10.1177/0194599816683156

Jakhar, K., Lone, K. Y., Gupta, R., Srivastava, A., & Solanki, H. K. (2022). A Cross-Sectional Study on the Psychological Impact of Stress, Anxiety and Depressive Symptoms in COVID-19 Patients. Cureus, 14(8), e27724. https://doi.org/10.7759/cureus.27724

JOHN R MCGUIRE; SCHEIDT, R. A. (2022). Addressing arm non-use by encouraging idle-time activity during early recovery from stroke (GRANTS:15598478).

Jones, K. C., Austad, K., Silver, S., Cordova-Ramos, E. G., Fantasia, K. L., Perez, D. C., Kremer, K., Wilson, S., Walkey, A., & Drainoni, M.-L. (2023). Patient Perspectives of the Hospital Discharge Process: A Qualitative Study. Journal of Patient Experience, 10, 23743735231171564. https://doi.org/10.1177/23743735231171564

Juli, M. R., Juli, R., Juli, G., & Juli, L. (2023). Adolescents and the Consequences of COVID-19. Psychiatria Danubina, 35(Suppl 2), 263–265.

Jurdi, S., Montaner, J., Garcia-Sanjuan, F., Jaen, J., & Nacher, V. (2018). A systematic review of game technologies for pediatric patients. Computers in Biology and Medicine, 97, 89–112. https://doi.org/10.1016/j.compbiomed.2018.04.019

Kellett, M., Baek, H., & Sewell, T. B. (2024). Pediatric Care Volunteerism: Lessons from the COVID-19 Pandemic. Journal of Patient Experience, 11, 23743735241259549. https://doi.org/10.1177/23743735241259549

Kelsey, J., Abelson-Mitchell, N., & Skirton, H. (2007). Perceptions of young people about decision making in the acute healthcare environment. Paediatric Nursing, 19(6), 14–18. https://doi.org/10.7748/paed.19.6.14.s25

Kemp, K. A., Fairie, P., Steele, B. J., & Santana, M. J. (2022). How to analyze and link patient experience surveys with administrative data to drive health service improvement—Examples from Alberta, Canada. International Journal of Population Data Science, 7(4), 1763. https://doi.org/10.23889/ijpds.v7i4.1763

Kemp, K. A., Fairie, P., Steele, B., & Santana, M. J. (2023). Variation in parental experiences with their child's hospitalization over the COVID-19 pandemic. Journal of Patient-Reported Outcomes, 7(1), 114–114. https://doi.org/10.1186/s41687-023-00626-3

Kemp, K. A., Norris, C. M., Steele, B., Fairie, P., & Santana, M. J. (2021). Sex Differences in the Care Experiences of Patients Hospitalized Due to Ischemic Heart Disease in Alberta, Canada. CJC Open, 3(12 Suppl), S36–S43. https://doi.org/10.1016/j.cjco.2021.08.011

Kim, E., Lee, B., & Cucchiaro, G. (2017). Perioperative Surgical Home: Evaluation of a New Protocol Focused on a Multidisciplinary Approach to Manage Children Undergoing Posterior Spinal Fusion Operation. Anesthesia and Analgesia, 125(3), 812–819. https://doi.org/10.1213/ANE.0000000000002030

Kosack, A., Carson, S. L., Montenegro, E. Y. B., Owen, M., Dodge, S., Sim, M., Cagigas, X., Ahumada-Mocorro, L., Kamzan, A., Acuna Hernandez, E., Lopez, G., Guzman, E., Sanchez Gomez, D., Islas, Z., Walker, V. P., Lerner, C., & Lloyd, J. (2022). Improving Patient Experience Scores Using Simultaneous Interpretation on Family-Centered Rounds. Hospital Pediatrics, 12(12), 1019–1035. https://doi.org/10.1542/hpeds.2022-006696

Kotchick, B., Summers, P., Forehand, R., & Steele, R. (1997). The role of parental and extrafamilial social support in the psychosocial adjustment of children with a chronically ill father. BEHAVIOR MODIFICATION, 21(4), 409–432. https://doi.org/10.1177/01454455970214002

Kyösti, E., Ala-Kokko, T. I., Ohtonen, P., Peltoniemi, O., Ebeling, H., Spalding, M., Rautiainen, P., Kataja, J., & Liisanantti, J. H. (2019). Strengths and Difficulties Questionnaire Assessment of Long-Term Psychological Outcome in Children After Intensive Care Admission. Pediatric Critical Care Medicine: A Journal of the Society of Critical Care Medicine and the World Federation of Pediatric Intensive and Critical Care Societies, 20(11), e496–e502. https://doi.org/10.1097/PCC.0000000000002078

Lankin, K., LaFond, C. M., & Yost, A. (2023). Nurses' Experiences Caring for Children With Neuroblastoma Receiving 131I-Metaiodobenzylguanidine Therapy: A Qualitative Descriptive Study. Journal of Pediatric Hematology/Oncology Nursing, 40(2), 82–90. https://doi.org/10.1177/27527530221140070

Lantz, P. M., Rubin, N., & Mauery, D. R. (2015). Hospital leadership perspectives on the contributions of Ronald McDonald Houses. Results from an international survey. Journal of Health Organization and Management, 29(3), 381–392. https://doi.org/10.1108/JHOM-09-2013-0194

Lapp, V., Fowler, S. B., & Miller, H. D. (2021). The voice of adolescents: Perceptions of isolation during hospitalization. Nursing, 51(12), 51–56. https://doi.org/10.1097/01.NURSE.0000800128.35559.81

Leonard, M. S., Foster, B., & Biondi, E. A. (2015). Proportional Distribution of Patient Satisfaction Scores by Clinical Service: The PRIME Model. Journal of Patient Experience, 2(2), 18–22. https://doi.org/10.1177/2374373515615958

Lerret, S. M., Johnson, N. L., Polfuss, M., Weiss, M., Gralton, K., Klingbeil, C. G., Gibson, C., Garnier-Villarreal, M., Ahamed, S. I., Adib, R., Unteutsch, R., Pawela, L., White-Traut, R., & Sawin, K. (2020). Using the Engaging Parents in Education for Discharge (ePED) iPad Application to Improve Parent Discharge Experience. Journal of Pediatric Nursing, 52, 41–48. https://doi.org/10.1016/j.pedn.2020.02.041

Lerwick, J. L. (2016). Minimizing pediatric healthcare-induced anxiety and trauma. World Journal of Clinical Pediatrics, 5(2), 143–150. https://doi.org/10.5409/wjcp.v5.i2.143

Li, A. W., Prindaville, B., Bateman, S. T., Gibson, T. E., & Wiss, K. (2017). Inpatient management of children with recessive dystrophic epidermolysis bullosa: A review. Pediatric Dermatology, 34(6), 647–655. https://doi.org/10.1111/pde.13276

Loo, T. H., Arvinder-Singh, H. S., Ang, Y. C., Kong, Y. H., Vikram Suarn, S., & Rakesh, S. (2022). Psychological impact amongst patients with COVID-19 in Perak state. The Medical Journal of Malaysia, 77(6), 643–649.

Low, J., & Wilder-Smith, A. (2005). Infectious respiratory illnesses and their impact on healthcare workers: A review. ANNALS ACADEMY OF MEDICINE SINGAPORE, 34(1), 105–110.

Lumbard, D. C., Nygaard, R. M., Richardson, C. J., Liao, L. F., Stewart, R. M., Eastridge, B. J., & Nicholson, S. E. (2023). Burden of unintentional pediatric firearm injury: An examination of the Nationwide Readmission Database. The Journal of Trauma and Acute Care Surgery, 95(3), 419–425. https://doi.org/10.1097/TA.0000000000003930

Lumley, M. A., Melamed, B. G., & Abeles, L. A. (1993). Predicting children's presurgical anxiety and subsequent behavior changes. Journal of Pediatric Psychology, 18(4), 481–497. https://doi.org/10.1093/jpepsy/18.4.481

Marsac, M. L., Kassam-Adams, N., Delahanty, D. L., Ciesla, J., Weiss, D., Widaman, K. F., & Barakat, L. P. (2017). An initial application of a biopsychosocial framework to predict posttraumatic stress following pediatric injury. Health Psychology, 36(8), 787–796. https://doi.org/10.1037/hea0000508

Massoni, G. (2024). Implementation of the Teach-Back Method in an Inpatient Pediatric Department (PQDT:91815756).

Max, J. E., Drake, I., Vaida, F., Hesselink, J. R., Ewing-Cobbs, L., Schachar, R. J., Chapman, S. B., Bigler, E. D., Wilde, E. A., Saunders, A. E., Yang, T. T., Tymofiyeva, O., & Levin, H. S. (2023). Novel Psychiatric Disorder 6 Months After Traumatic Brain Injury in Children and Adolescents. The Journal of Neuropsychiatry and Clinical Neurosciences, 35(2), 141–150. https://doi.org/10.1176/appi.neuropsych.21120301

Max, J. E., Robin, D. A., Lindgren, S. D., Smith, W. L., Sato, Y., Mattheis, P. J., Stierwalt, J. A., & Castillo, C. S. (1997). Traumatic brain injury in children and adolescents: Psychiatric disorders at two years. Journal of the American Academy of Child and Adolescent Psychiatry, 36(9), 1278–1285. https://doi.org/10.1097/00004583-199709000-00021

Max, J. E., Smith, W. L., Sato, Y., Mattheis, P. J., Castillo, C. S., Lindgren, S. D., Robin, D. A., & Stierwalt, J. A. (1997). Traumatic brain injury in children and adolescents: Psychiatric disorders in the first three months. Journal of the American Academy of Child and Adolescent Psychiatry, 36(1), 94–102. https://doi.org/10.1097/00004583-199701000-00022

Mezgebu, E., Addis, A., Challinor, J., Deribe, L., & Malahlela, D. (2023). Predictors of Depressive Symptoms Among Parents of Children With Cancer in Ethiopia. Journal of Pediatric Hematology/Oncology Nursing, 40(5), 286–294. https://doi.org/10.1177/27527530231193974

Mimmo, L. (2022). Optimising Quality and Safety Experiences and Outcomes for Inpatient Children and Young People With Intellectual Disability Using a Strengths-Based Approach (PQDT:121710780).

Mimmo, L., Hodgins, M., Samir, N., Travaglia, J., Woolfenden, S., & Harrison, R. (2022). "Smiles and laughter and all those really great things": Nurses' perceptions of good experiences of care for inpatient children and young people with intellectual disability. Journal of Advanced Nursing, 78(9), 2933–2948. https://doi.org/10.1111/jan.15256

Mimmo, L., Woolfenden, S., Travaglia, J., & Harrison, R. (2019). Partnerships for safe care: A meta-narrative of the experience for the parent of a child with Intellectual Disability in hospital. Health Expectations: An International Journal of Public Participation in Health Care and Health Policy, 22(6), 1199–1212. https://doi.org/10.1111/hex.12968

Mimmo, L., Woolfenden, S., Travaglia, J., & Harrison, R. (2020). Creating equitable healthcare quality and safety for children with intellectual disability in hospital. Child: Care, Health and Development, 46(5), 644–649. https://doi.org/10.1111/cch.12787

Moro, C., Iudici, A., & Turchi, G. P. (2025). Parents of Children with Congenital Heart Disease (CHD): A Narrative Study of the Social and Clinical Impact of CHD Diagnosis on Their Role and Health. Behavioral Sciences (Basel, Switzerland), 15(3), 269. https://doi.org/10.3390/bs15030269

Muranjan, M. N., Birajdar, S. B., Shah, H. R., Sundaraman, P., & Tullu, M. S. (2008). Psychological consequences in pediatric intensive care unit survivors: The neglected outcome. Indian Pediatrics, 45(2), 99–103.

Nabors, L., & Liddle, M. (2017). Perceptions of Hospitalization by Children with Chronic Illnesses and Siblings. JOURNAL OF CHILD AND FAMILY STUDIES, 26(6), 1681–1691. https://doi.org/10.1007/s10826-017-0688-6

Niemelä, B. J., Tjernström, B., Andersson, G., & Wahlsten, V. S. (2007). Does leg lengthening pose a threat to a child's mental health?: An interim report one year after surgery. Journal of Pediatric Orthopedics, 27(6), 611–617. https://doi.org/10.1097/BPO.0b013e31814256c6

Onen, A., Subasi, M., Arslan, H., Ozen, S., & Basuguy, E. (2005). Long-term urologic, orthopedic, and psychological outcome of posterior urethral rupture in children. Urology, 66(1), 174–179. https://doi.org/10.1016/j.urology.2005.01.056

Ozono, S., Saeki, T., Inada, H., Nakagawa, S., Ueda, K., Okamura, H., Ogata, A., & Yamawaki, S. (2008). Psychological impact of hospitalization for parents of childhood cancer patients. PSYCHO-ONCOLOGY, 17, S213–S213.

Packman, W. (1999). Psychosocial impact of pediatric BMT on siblings. Bone Marrow Transplantation, 24(7), 701–706. https://doi.org/10.1038/sj.bmt.1701997

Page M J, McKenzie J E, Bossuyt P M, Boutron I, Hoffmann T C, Mulrow C D et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews BMJ 2021; 372 :n71 https://doi.org/10.1136/bmj.n71

Palmer, J. (1996). Exploring the psychological effects of intensive care on paediatric patients: Issues from the literature. Nursing in Critical Care, 1(1), 26–30.

Pandian, V., Hopkins, B. S., Yang, C. J., Ward, E., Sperry, E. D., Khalil, O., Gregson, P., Bonakdar, L., Messer, J., Messer, S., Chessels, G., Bosworth, B., Randall, D. M., Freeman-Sanderson, A., McGrath, B. A., & Brenner, M. J. (2022). Amplifying patient voices amid pandemic: Perspectives on tracheostomy care, communication, and connection. AMERICAN JOURNAL OF OTOLARYNGOLOGY, 43(5). https://doi.org/10.1016/j.amjoto.2022.103525

Peebles, I., Cronje, J.-L., Clark, L., Sharpe, H., & Duffy, F. (2023). Experiences of inpatient eating disorder admissions: A systematic review and meta-synthesis. EATING BEHAVIORS, 50. https://doi.org/10.1016/j.eatbeh.2023.101753

Pei, C., Han, X., Liu, Q., & Hu, G. (2023). Case-mix adjustment of patient-reported experience measures in National Regional Center for Pediatric. Pediatric Research, 94(4), 1562–1569. https://doi.org/10.1038/s41390-023-02488-3

POSTER, E. C. (1981). RATIONALE AND GUIDELINES FOR A PRE-CRISIS CURRICULUM TO PREPARE HEALTHY PRESCHOOL CHILDREN FOR HOSPITALIZATION (PQDT:65675077).

Prieto-Centurion, V., Basu, S., Bracken, N., Calhoun, E., Dickens, C., DiDomenico, R. J., Gallardo, R., Gordeuk, V., Gutierrez-Kapheim, M., Hsu, L. L., Illendula, S., Joo, M., Kazmi, U., Mutso, A., Pickard, A. S., Pittendrigh, B., Sullivan, J. L., Williams, M., & Krishnan, J. A. (2019). Design of the patient navigator to Reduce Readmissions (PArTNER) study: A pragmatic clinical effectiveness trial. Contemporary Clinical Trials Communications, 15, 100420. https://doi.org/10.1016/j.conctc.2019.100420

Quigley, D. D., Slaughter, M. E., Gidengil, C., Palimaru, A., Lerner, C., & Hays, R. D. (2021). Usefulness of Child HCAHPS Survey Data for Improving Inpatient Pediatric Care Experiences. Hospital Pediatrics, 11(10), e199–e214. https://doi.org/10.1542/hpeds.2020-004283

Quigley, D. D., Slaughter, M. E., Qureshi, N., Gidengil, C., & Hays, R. D. (2023). Associations of pediatric nurse burnout with involvement in quality improvement. Journal of Pediatric Nursing, 70, e9–e16. https://doi.org/10.1016/j.pedn.2022.11.001

Rennick, J. E. (2015). Advancing Our Understanding of the Psychological Impact of PICU Hospitalization: Is It Time to Pause and Reflect? Pediatric Critical Care Medicine: A Journal of the Society of Critical Care Medicine and the World Federation of Pediatric Intensive and Critical Care Societies, 16(4), 387–388. https://doi.org/10.1097/PCC.0b013e31823db226

Rennick, J. E., Johnston, C. C., Dougherty, G., Platt, R., & Ritchie, J. A. (2002). Children's psychological responses after critical illness and exposure to invasive technology. Journal of Developmental and Behavioral Pediatrics: JDBP, 23(3), 133–144. https://doi.org/10.1097/00004703-200206000-00002

Rennick, J. E., Knox, A. M., Treherne, S. C., Dryden-Palmer, K., Stremler, R., Chambers, C. T., McRae, L., Ho, M., Stack, D. M., Dougherty, G., Fudge, H., & Campbell-Yeo, M. (2021). Family Members' Perceptions of Their Psychological Responses One Year Following Pediatric Intensive Care Unit (PICU) Hospitalization: Qualitative Findings From the Caring Intensively Study. Frontiers in Pediatrics, 9, 724155. https://doi.org/10.3389/fped.2021.724155

Rethlefsen, M.L. & Page, M.J. (2022). PRISMA 2020 and PRISMA-S: common questions on tracking records and the flow diagram. Journal of the Medical Library Association, 110(2), 253-257. https://doi.org/10.5195/jmla.2022.1449

Reynolds, K. A., Zelazny, S. M., Grob, R., Parker, A. M., Schlesinger, M., & Martino, S. C. (2025). Family Experience with Hospital Care Teams: A Qualitative Investigation. Hospital Pediatrics, e2023007721. https://doi.org/10.1542/hpeds.2023-007721

Rezapour, M., Ferraro, F. R., & Alsubaiei, S. (2022). Behavioral and emotional adaptations of obese and underweight students in response to the COVID-19 pandemic. HUMANITIES & SOCIAL SCIENCES COMMUNICATIONS, 9(1). https://doi.org/10.1057/s41599-022-01334-x

Rodriguez, K. E., Bibbo, J., & O'Haire, M. E. (2022). Perspectives on facility dogs from pediatric hospital personnel: A qualitative content analysis of patient, family, and staff outcomes. COMPLEMENTARY THERAPIES IN CLINICAL PRACTICE, 46. https://doi.org/10.1016/j.ctcp.2022.101534

Roessler De Angulo, N., Postier, A. C., Purser, L., Ngo, L., Sun, K., & Friedrichsdorf, S. (2024). Assessment and Treatment of Pain in Hospitalized Children at a Tertiary Children's

Hospital: A Cross-Sectional Mixed Methods Survey. Children (Basel, Switzerland), 11(7), 874. https://doi.org/10.3390/children11070874

Rook, J. M., Lee, L. K., Wagner, J. P., Sullins, V. F., Lee, S. L., Shekherdimian, S., DeUgarte, D. A., Dichter, C. E., & Jen, H. C. (2025). Six Years of Quality Improvement in Pectus Excavatum Repair: Implementation of Intercostal Nerve Cryoablation and ERAS Protocols for Patients Undergoing Nuss Procedure. Journal of Pediatric Surgery, 60(2), 161634. https://doi.org/10.1016/j.jpedsurg.2024.07.019

Rosati, A., Fedele, C., Fagotti, A., Lafuenti, L., Gioè, A., Chieffo, D. P. R., Vizzielli, G., D'Ippolito, G., Salutari, V., Paris, I., Marchetti, C., Scambia, G., & Gueli Alletti, S. (2022). Needleoscopic-assisted risk-reducing bilateral salpingo-oophorectomy in BRCA1/2 mutation carriers: Peri-operative outcomes and psychological impact. European Journal of Obstetrics, Gynecology, and Reproductive Biology, 273, 1–6. https://doi.org/10.1016/j.ejogrb.2022.03.040

Rosenberg, M., Mehta, N., Rosenberg, L., Ramirez, M., Meyer, W. J., Herndon, D. N., Andersen, C. R., & Thomas, C. (2015). Immediate and long-term psychological problems for survivors of severe pediatric electrical injury. Burns: Journal of the International Society for Burn Injuries, 41(8), 1823–1830. https://doi.org/10.1016/j.burns.2015.06.006

Rosenthal, B., Aulakh, S., Patel, P. V., Wong, J. T., & Ali, S. (2024). Direct transition from rapid-infusion originator to rapid-infusion biosimilar tumor necrosis factor inhibitor in children with inflammatory bowel disease: A case series. American Journal of Health-System Pharmacy: AJHP: Official Journal of the American Society of Health-System Pharmacists, 81(2), 61–65. https://doi.org/10.1093/ajhp/zxad217

Røyset, B., Talseth-Palmer, B. A., Lydersen, S., & Farup, P. G. (2019). Effects of a fall prevention program in elderly: A pragmatic observational study in two orthopedic departments. Clinical Interventions in Aging, 14, 145–154. https://doi.org/10.2147/CIA.S191832

Russo, K., Greenhill, J., & Burgess, S. (2021). Home (Level 2) polysomnography is feasible in children with suspected sleep disorders. Sleep Medicine, 88, 157–161. https://doi.org/10.1016/j.sleep.2021.10.024

Schuh, J. M., Georgeades, C., Schleusner, T., Bergner, C., Leonard, S., Marik, P., Jandrisevits, M., Gourlay, D., & Flynn-O'Brien, K. (2024). The Initial Experience After Pediatric Firearm Injury: A Multifaceted Qualitative Approach. The Journal of Surgical Research, 303, 519–531. https://doi.org/10.1016/j.jss.2024.09.057

Shirtcliff, E. A., Finseth, T. T., Winer, E. H., Glahn, D. C., Conrady, R. A., & Drury, S. S. (2024). Virtual stressors with real impact: What virtual reality-based biobehavioral research can teach us about typical and atypical stress responsivity. Translational Psychiatry, 14(441). https://doi.org/10.1038/s41398-024-03129-x

Sillero Sillero, A., Ayuso Margañon, R., Marques-Sule, E., & Gil Poisa, M. (2024). Child-Centered Care: A Qualitative Study Exploring Pediatric Hospitalization Through

Children's Perspectives. Nursing Reports (Pavia, Italy), 14(4), 3138–3149. https://doi.org/10.3390/nursrep14040228

Silva, T. L., Ray-Barruel, G., Ullman, A., Takashima, M., Kusahara, D. M., de Souza, S., da Silva Moura, J. W., de Souza Bitencourt, A., & Rocha, P. K. (2024). Impact of the I-DECIDED Tool to Improve Peripheral Intravenous Catheter Care in Paediatrics: Interrupted Time-Series Study. Journal of Advanced Nursing. https://doi.org/10.1111/jan.16458

Smith, V., Warty, R. R., Sursas, J. A., Payne, O., Nair, A., Krishnan, S., Costa, F. da S., Wallace, E. M., & Vollenhoven, B. (2020). The Effectiveness of Virtual Reality in Managing Acute Pain and Anxiety for Medical Inpatients: Systematic Review. JOURNAL OF MEDICAL INTERNET RESEARCH, 22(11). https://doi.org/10.2196/17980

Spataro, V., Corazza, I., Hazelzet, J. A., Bonciani, M., & De Rosis, S. (2025). A systematic literature review on initiatives to involve children and adolescents in evaluating their hospitalization experience. BMC Health Services Research, 25(1), 429. https://doi.org/10.1186/s12913-025-12486-2

Srivastava, R., & Homer, C. J. (2003). Length of stay for common pediatric conditions: Teaching versus nonteaching hospitals. Pediatrics, 112(2), 278–281. https://doi.org/10.1542/peds.112.2.278

Stargatt, R., Davidson, A. J., Huang, G. H., Czarnecki, C., Gibson, M. A., Stewart, S. A., & Jamsen, K. (2006). A cohort study of the incidence and risk factors for negative behavior changes in children after general anesthesia. Paediatric Anaesthesia, 16(8), 846–859. https://doi.org/10.1111/j.1460-9592.2006.01869.x

Steele, B. J., Fairie, P., Kemp, K., & Santana, M.-J. (2022). Drivers of paediatric inpatient experience: Retrospective analysis of casemix factors for the Alberta Paediatric Inpatient Experience Survey in Alberta, Canada. BMJ Open, 12(5), e048207. https://doi.org/10.1136/bmjopen-2020-048207

Stjernqvist, K., & Kockum, C. C. (1999). Bladder exstrophy: Psychological impact during childhood. The Journal of Urology, 162(6), 2125–2129. https://doi.org/10.1016/S0022-5347(05)68139-6

Todorow, S. (1975). Recovery of children after severe head injury. Psychoreactive superimpositions. Scandinavian Journal of Rehabilitation Medicine, 7(3), 93–96.

Townsend, A. N., Batra, N., Lilenfeld, L., Maurin, E., Inverso, H., Burd, R. S., & Tully, C. B. (2023). Parent Traumatic Stress After Minor Pediatric Burn Injury. JOURNAL OF BURN CARE & RESEARCH, 44(2), 329–334. https://doi.org/10.1093/jbcr/irac055

van Balen, F., & Verdurmen, J. (1999). Medical anxiety and the choice for treatment: The development of an instrument to measure fear of treatment. PSYCHOLOGY & HEALTH, 14(5), 927–935. https://doi.org/10.1080/08870449908407357

Vessey, J. A., & Difazio, R. (2010). NONMEDICAL OUT-OF-POCKET EXPENSES: A HIDDEN CONSEQUENCE OF HOSPITALIZATION. PEDIATRIC RESEARCH, 68, 652–652. https://doi.org/10.1203/00006450-201011001-01319

Waibel, S., Wu, W. L., Smith, M., Johnson, L. K., & Janke, R. D. (2022). Selection of Pediatric Mental Health Quality Measures for Health System Improvement in British Columbia Based on a Modified Delphi Approach. Frontiers in Pediatrics, 10, 866391. https://doi.org/10.3389/fped.2022.866391

Wallek, S., Senn-Malashonak, A., Katharina, S., Jarisch, A., Soerensen, J., Klingebiel, T., Banzer, W., & Bader, P. (2017). Inpatient exercise therapy vs relaxation and mental training in pediatric stem cell transplantation: Results of the RCT BISON. BONE MARROW TRANSPLANTATION, 52, S128–S128.

Webb, B. J., Peltan, I. D., Jensen, P., Hoda, D., Hunter, B., Silver, A., Starr, N., Buckel, W., Grisel, N., Hummel, E., Snow, G., Morris, D., Stenehjem, E., Srivastava, R., & Brown, S. M. (2020). Clinical criteria for COVID-19-associated hyperinflammatory syndrome: A cohort study. The Lancet. Rheumatology, 2(12), e754–e763. https://doi.org/10.1016/S2665-9913(20)30343-X

Winkler, C., Schober, E., Ziegler, A.-G., & Holl, R. W. (2012). Markedly reduced rate of diabetic ketoacidosis at onset of type 1 diabetes in relatives screened for islet autoantibodies. PEDIATRIC DIABETES, 13(4), 301–306. https://doi.org/10.1111/j.1399-5448.2011.00829.x

Wong, M. S., Gregory, K. D., Spiegel, B. M. R., & Khalil, C. (2022). Patient perceptions of virtual reality for pain relief in labor: A qualitative study. Frontiers in Pain Research (Lausanne, Switzerland), 3, 1063751. https://doi.org/10.3389/fpain.2022.1063751

Woolgar, F. A., Wilcoxon, L., Pathan, N., Daubney, E., White, D., Meiser-Stedman, R., & Colville, G. A. (2022). Screening for Factors Influencing Parental Psychological Vulnerability During a Child's PICU Admission*. PEDIATRIC CRITICAL CARE MEDICINE, 23(4), 286–295. https://doi.org/10.1097/PCC.0000000000002905

Wu, Y., & Harrison, A. (2019). "Our daily life was mainly comprised of eating and sitting:" a qualitative analysis of adolescents' experiences of inpatient eating disorder treatment in China. Journal of Eating Disorders, 7, 20. https://doi.org/10.1186/s40337-019-0250-6

Xie, M., Zou, X., Xie, Y., Hu, L., Tang, Y., Cai, J., Kuang, Y., Zhu, L., Zou, M., & Wang, Q. (2023a). Childhood trauma and suicide risk in hospitalized patients with schizophrenia: The sequential mediating roles of pandemic related post-traumatic stress symptoms, sleep quality, and psychological distress. Frontiers in Psychiatry, 14, 1221529. https://doi.org/10.3389/fpsyt.2023.1221529

Xie, M., Zou, X., Xie, Y., Hu, L., Tang, Y., Cai, J., Kuang, Y., Zhu, L., Zou, M., & Wang, Q. (2023b). Table_1_Childhood trauma and suicide risk in hospitalized patients with schizophrenia: The sequential mediating roles of pandemic related post-traumatic stress

symptoms, sleep quality, and psychological distress.docx [Dataset]. In Figshare (DRCI:DATA2023173027974322). https://doi.org/10.3389/fpsyt.2023.1221529.s001

Xu, J., & Huang, S. (2024). Impact of Noise on Medical Anxiety in Hospitalized Children with Pneumonia: A Retrospective Study. Noise & Health, 26(123), 495–500. https://doi.org/10.4103/nah.nah_78_24

Zub, D., Berkenbosch, J. W., & Tobias, J. D. (2005). Preliminary experience with oral dexmedetomidine for procedural and anesthetic premedication. Paediatric Anaesthesia, 15(11), 932–938. https://doi.org/10.1111/j.1460-9592.2005.01623.x