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This is an Accepted Manuscript for *Disaster Medicine and Public Health Preparedness*
as part of the Cambridge Coronavirus Collection
DOI: 10.1017/dmp.2023.183

Child Mental Health Services Access and Efficacy Post-Disaster: A Scoping Review

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Short Title: Child Mental Health Service Post Disaster

Support Acknowledgements: Thank you to the University of Kentucky College of Public Health Librarian Liaisons for their incredibly gifted and supportive roles.

Contribution:

GIR: Project Lead, Designed Implemented, Wrote Manuscript

EA: Participated equally in manuscript writing

JH: Participated equally in project implementation. Provided medical expertise.

JL: Provided scientific expertise.

Abstract

Introduction: The increased threat of natural disasters makes understanding the relationship between community resources and children's mental health critical. Mental health care efficacy and access are crucial to assessing the quality of community mental health care availability.

Objectives: The primary objective of this scoping review is to investigate the relationship between children's mental health and community mental health resource efficacy and accessibility after a major disaster

Methods: Conducted a systematic search to identify epidemiologic and health service utilization studies assessing the relationship between disasters and subsequent health service utilization amongst children and adolescents.

Results: The research returned 1682 potentially relevant studies and 31 articles were selected based on identified criteria from pre-selected databases.

Conclusion: The studies conclude a gender and age-based disparity in access and efficiency of children's mental health services. The studies also identify the need for greater resource distribution and organizational structure.

https://doi.org/10.1017/dmp.2023.183 Published online by Cambridge University Press

Scoping Review Background

In 2005, Hurricane Katrina made landfall along the U.S. Gulf Coast and became the costliest natural disaster in U.S. history ($172.5 Billion) (Muhlbaum, 2021). Katrina had a devastating impact, and the U.S. government's infrastructure and disaster response systems were unprepared to respond, which led to changes to the disaster response infrastructure. From 1980 to 2020, the cumulative cost of 310 federally declared major disasters exceeded 2.15 trillion dollars, 53% of that costs occurred between 2005 to 2019 (Smith, 2020). Climate scientists predict that the frequency and severity of natural disasters will continue increasing due to climate change. Research has highlighted the significant impact of the pandemic on children's mental health. In 2020, a survey found that 71% of parents reported that the pandemic had negatively affected their children's mental health. Another study of high schoolers found that approximately 30% of students felt much more unhappy and depressed than usual, and we have seen a 24% increase in mental health-related emergency department visits for children ages 5 to 11 and 31% for those aged 12 to 17 compared to 2019 (Abramson, 2022).

Amongst U.S. children aged 2 – 8 years, 17.4% were diagnosed with a mental, behavioral, or developmental disorder (Ghandour et al., 2019). The likelihood of diagnoses increases with age for diagnoses of attention deficit hyperactivity disorder (ADHD), anxiety, and depression (Cree et al., 2018). Socioeconomics, family factors, healthcare, race, and adverse childhood events (ACEs) are associated with children's health (Hutchins et al., 2022). Unfortunately, only an estimated 20% of children with mental health disorders receive treatment (Martini, 2012) highlighting the critical importance of understanding children's mental health needs and service access and utilization.

Most post-disaster mental healthcare research focuses on adults, and those assessing children generally focus on the prevalence and incidence of diagnoses[6-11]. Access to health services are different for children in comparison to adults because of issues such service funding, cognitive awareness of needs, and legal barriers (CDC, 2020). There exists a critical research gap in the efficacy and access to children's mental health services. This review characterizes the state of literature about the efficacy and access to children's access in post-disaster settings. Defining the state of child and adolescent mental health care systems can promote future research endeavors that address gaps in the current research.

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Disadvantaged communities have historically suffered due to socioeconomic inequities, legislative oppression, and structural systems of discrimination; these groups are often racial minorities, women, and the economically depressed(Harris et al., 2009). Biological differences do not drive these inequities; instead, they are driven by socioeconomic disparities and socio-structural influences (Neumayer & Plümper, 2007) and impacting children's health (Kousky, 2016). Disasters exacerbate the existing socioeconomic inequities , leaving vulnerable populations more affected by crisis events(Neumayer & Plümper, 2007). Communities that experience disasters have lasting disparities in mental health outcomes(Zotti, Williams, Robertson, Horney, & Hsia, 2013), and disadvantaged communities experience slower recovery and poorer outcomes post-disaster. Children's mental health needs are a strong proxy for community health because their health reflects the disparity in resource availability(Poulton et al., 2002).

Mental Health Efficacy & Utilization

Health outcomes research methods are a tool to assess the impact of therapy, and a priori knowledge will help identify the latent community infrastructure variables. Mental health service utilization and access directly measure community resources and organizational factors critical to mental health care. Access and utilization research focuses on the role of variables, including funding, organizational structure, and resource distribution disparities. These fundamental issues address a longstanding bias in ignoring the availability of critical care services by incorporating the impact of healthcare access.

Efficacy and service access are vital components of measuring mental health services, and our project seeks to collect and examine related research. We limited our review to peer-reviewed qualitative or experimental papers. To our knowledge, there is no review paper examining child and adolescent mental health service utilization and access after disasters. A scoping review will allow the collection of research including those with qualitative methods and results, to answer broad research questions and map critical concepts, primary sources, and types of evidence. A scoping review helps identify gaps, summarize findings, and encourage hypothesis-generating work.

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Our project investigated the relationship between children's mental health and service access and efficacy. We define efficacy as an assessment of treatment approaches, including mental health services defined by community-integrated methods with mixed-method interventions. The broader definition of efficacy allows a comprehensive understanding of service utilization and service use in disaster-affected communities.

Methods

We evaluated empirical research assessing child and adolescent mental health care utilization post-disasters and defined disasters as destructive climate events such as hurricanes. We described children and adolescents as people ages 5 to 19. We utilized the scoping review guide by Levac and colleagues(Levac, Colquhoun, & O'Brien, 2010). We targeted studies conducted after 2005 because the Bush administration enacted the Post-Katrina Emergency Management Reform Act in 2006 which overhauled the emergency and disaster response structure of the United States. The changes to FEMA significantly restructured FEMA which also influenced the U.S. global disaster response strategy as well. We did not conduct the optional consultation stage in the review process.

Search phrase development

We conducted a systematic search to identify epidemiologic and health services utilization studies assessing the relationship between disasters and mental health services utilization among children and adolescents.

In consultation with research librarians, the search was developed and conducted in PudMed using Boolean phrases and Medical Subject Headings (MeSH; the National Library of Medicine's controlled vocabulary thesaurus used to index articles in PubMed(Medicine, 2021)) search phrases. We selected MeSH terms after an exhaustive review where each MeSH term related to disasters, counseling, and services was examined. Additional search terms were added using a priori knowledge. We translated the search terms and logic to the PsycInfo and Web of Science databases (Table 2). The searches were conducted from May through June 2021.

Exclusion criteria

Articles selected for inclusion were abstracted by the first author. We defined our exclusion criteria as follows: (1) whether the study wasn’t an assessment of the *efficacy* of

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mental health services or *access* to mental health services; (2) wasn't a natural disaster (3) grey literature (4) the study population wasn't children. Efficacy studies evaluate the treatment effects of children's and adolescents' utilization of mental health services after a natural disaster. Access studies investigate the impact of disasters on access to mental health services.

After developing and refining the search terminology for PubMed and translating the search phrase for PsycInfo and Web of Science, we obtained references for 1682 articles. After applying all inclusion and exclusion criteria, 31 articles were retained (Figure 2). Twenty articles explored questions related to access to mental health services, and 11 articles focused on the efficacy of mental health service utilization.

Article Results

We presented the characteristics of the 31 included studies in Table 1 and details in Table 3. Most studies examined responses to hurricane events (41%), with earthquakes being the second most common (25%). Eleven studies assessed efficacy, and 20 evaluated mental health services access. Thirteen studies were cross-sectional, of which 11 focused on seeking help or access to mental health care services. Clinical trial designs accounted for ten studies, of which 7 addressed mental health service efficacy.

Gender

The findings were mixed, and some studies indicate that gender plays a differential role in service efficacy, but others found no meaningful difference. Girls tended to need more care and reported the least posttreatment improvements. Graham et al. examined results from students who received school-based services after Hurricane Katrina and found that girls were more likely to report higher PTSD and anxiety scores. A repeated-measures ANOVA compared girls' and boys' mean scores using the Trauma Symptom Checklist for Children (TSCC) and found that school-based services significantly decreased PTSD, depression, and anxiety TSCC scores six months after the intervention ($F = 17.1$, $p<.001$; $F =18.12$, $p <.001$; $F = 13.04$, $p < .001$). Salloum assessed the efficacy of community-based grief and trauma intervention for children post-Katrina using the UCLA PTSD Index and found that younger girls showed the least improvement after treatment (Mean=36.7, SD=4.4; ANCOVA). Trentini studied eye movement desensitization and reprocessing (EMDR) Integrative Group Treatment Protocols on child survivors of the 2016 Italy

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earthquakes and found that girls had better improvement than boys on the Anxiety Thermometer scores (ANOVA, $F = 3.54$, $p < .03$). Jaycox compared trauma-focused cognitive-behavioral therapy and cognitive-behavioral intervention trauma in schools. Jaycox found that children with either therapy had reduced PTSD at similar levels via Fischer's exact test (2-tailed $p = .22$); there were no apparent differences in treatment response by gender.

One study evaluated Medicaid claims data for sex-specific utilization of psychiatric medication following Hurricane Katrina by assessing utilization from 2004 to 2006 among children with pre-existing anxiety and obsessive-compulsive disorders. Storch compared children from the Louisiana disaster-affected areas, Louisiana non-disaster affected areas and Texas children. There was a significant difference in utilization (Storch, Gregory, Salloum, & Quast, 2018), with females having on average 20.4 fewer days' supply on hand, indicating either efficacy or access-related concern ($p < .01$).

These contrasting findings suggest that while gender-linked differences in treatment responses or therapeutic utilization may not always be present, the best practice is to evaluate sex-specific results, given that there are often disparities.

Age

Older children consistently reported less adverse mental health outcomes and better responses to all therapies. Klontz reported a similar reduction in adverse mental health outcomes due to the Mokihana Program but noted that adolescents were more likely to have less severe and more treatable forms of mental illness than younger children. Salloum found that younger children had higher TSCC scores than older children after a community-based trauma treatment (Mean =9.6, SD = 4.8, ANCOVA).

Trentini's assessment of EMDR Integrative Group Treatment using the Distress Thermometer test found that older children showed a reduction in distress and anger, but younger children had an increase; older children also showed a more significant reduction in anxiety than children. Storch et al. found that older children were more likely to receive psychopharmacologic medication, with children ages 10-14 having higher odds of receiving medication than children under 10 ($OR = 1.54$, $p < .01$)(Storch et al., 2018).

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All studies identified reported older children had the lowest number of diagnosed mental health issues and the most significant reduction in mental health needs. Younger children reported a higher incidence of mental health diagnoses and the least decline. These studies imply a greater need for investigations into effective treatment for younger children.

Therapies

The studies describe five types of therapy: (1) cognitive-behavioral therapies (Jaycox et al., 2010; Salloum & Overstreet, 2008; Shooshtary, Panaghi, & Moghadam, 2008; Taylor & Weems, 2011); (2) school-based therapy models (Goldman et al., 2015; Graham, Osofsky, Osofsky, & Hansel, 2017; Klontz, Bivens, Michels, DeLeon, & Tom, 2015; Okuyama, Funakoshi, Tomita, Yamaguchi, & Matsuoka, 2017; Powell & Bui, 2016; Vijayakumar, Kannan, Kumar, & Devarajan, 2006); (3) psychopharmacologic (Storch et al., 2018); (4) group treatment (Trentini et al., 2018); and (5) non-traditional therapies (Catani et al., 2009; Qi, Yang, Tan, Wu, & Zhou, 2020). We note that these therapies are not mutually exclusive or equivalent strategies; however, these terms were used to describe the therapies included in these studies.

Cognitive-Behavioral Therapies

Jaycox et al. evaluated two cognitive-behavioral therapies: trauma-focused cognitive behavioral therapy (TF-CBT) and cognitive-behavioral intervention therapy (CBIT). TF-CBT was offered in schools, while CBIT was conducted in a local family center. After ten months of treatment, 67% of children in the CBIT group remained in the at-risk mental health illness category, while 43% remained at-risk in the TF-CBT group. Salloum conducted a 10-session cognitive-behavioral and narrative treatment intervention that showed a significant decrease in depression ($F = (2,86) = 25.92$, $p.<001$), with follow-up demonstrating a significant reduction from pre-assessment to immediate posttreatment. Shooshtary found an overall decrease in posttraumatic stress symptoms among children treated with CBT, which attributed to an overall reduction in all PTSD symptom categories (intrusion, avoidance, and hyperarousal). After receiving cognitive behavioral therapy, Taylor found that 50% of children who received treatment no longer met the criteria for a mental health diagnosis.

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School-based Therapy Models

Okuyama evaluated high school students 2-3 years after the Great Japan Earthquake using the Quick Inventory of Depressive Symptomatology and found significantly lower levels in those who were less affected by the disaster (Kruskal-Wallis, df = 2, p = 029) but no significant change in those more severely impacted by the disaster (Kruskal-Wallis, df=2, p = .769).

Graham assessed posttraumatic stress in students exposed to Hurricane Katrina (N=112) using the TSCC and found a significant decrease after treatment in PTSD scores (ANOVA: F=17.1, p <.001) and depressive symptoms (ANOVA: F=18.12, p <.001). One year after Hurricane Katrina, Goldman implemented a set of school-based interventions that included adaptation and implementation of evidence-based treatments for at-risk youth. The study evaluated 11,861 middle and high school students with the Strengths and Difficulties Questionnaire (SDQ) for behavioral and emotional difficulties at the start and end of the academic school year. Students with a score above a high threshold were referred for an evaluation session and, if they met the criteria, were entered into the STEP intervention program. The study found that 986 students were found to have significant depression or disruptive disorder systems and received treatment from the School Therapeutic Enhancement Program (STEP). Using the Beck Depression Index-youth score, Goldman found scores decreased on average by 18 points amongst high-need intervention students compared to pre-treatment levels (p <.001) after using the intervention program.

Powell studied the impact of a school-based psychosocial curriculum intervention (Journey of Hope), an eight-session program from 2014 to 2015, amongst children impacted by the EF5 tornado that struck Moore, Oklahoma. Powell found an improvement in prosocial scores after treatment (ANOVA: F (1, 107) = 16.9, p =0).

Vijayakumar developed an intervention program to evaluate 65 children's mental health compared to 70 children who did not receive the intervention after a tsunami event in Chennai, India. The study used the Youth Self Report (YSR), and Child Behavior Checklist (CBCL) and only found a decrease in hyperactivity but found no significant decline in PTSD and anxiety.

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Group Therapy

Trentini assessed the efficacy of EMDR Integrative Group Treatment Protocols on children after the 2016 Italy earthquake. Older children had a reduction in distress and anger and a more significant reduction than children in anxiety.

Non-Traditional Therapy

Catani assessed the mental health of Sri Lankan children after acute treatment 1 month after the 2004 tsunami, after Narrative Exposure Therapy for children or six sessions of meditation-relaxation; both therapies significantly improved mental health as assessed by the Emotion Thermometer (ET-5) and the Children's Revised Impact of Event Scale (CRIES-13) (ANOVA: $F(2, 56) = 54.15$, $p < .001$).

All five therapies reported a reduction in symptoms and mental health needs. The studies highlight a need to assess the most efficacious and logistically feasible acute and longitudinal treatments. Several studies highlighted similarly effective in-school therapy models, which offer the most cost-effective solution to mental health access and quality care.

Access

There is a significant gap in literature examining mental health service access after a disaster. This project defines access as the ability of children to seek and receive mental health care. Access and utilization research focuses on the role of variables, including telehealth services, displacement, duration of service needs, and funding.

Telehealth

Four studies examined telehealth services after a disaster. Yuen developed a web-based self-help application (app) for disaster-affected families and assessed its usability and the importance of various features needed for a viable telehealth service. The study focused on development obstacles such as deadlines, usability testing, and financial resources. Yuen reported that 71% of users said being interested in using the app in the future. The study concluded that web-based telehealth requires a multi-disciplinary team of mental health and web development experts (Yuen et al., 2016).

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Bunnell developed a web-based adolescent mental health intervention to examine potential differences in access and completion of the intervention between rural and urban areas. The study found that geographical category did not predict completion rate of the intervention, which was less than 40% in both groups (urban/suburban [n = 485; 36.7%]; rural [n=223; 33%]). However, they did find some different barriers to access by geographical location, although the most common reason was adolescents reporting being too busy (urban = 75.9%; rural = 72.4%) or the intervention was not relevant for their current conditions (urban = 27.8%; rural = 24%) (Bunnell, Davidson, Dewey, Price, & Ruggiero, 2017).

Stasiak evaluated the feasibility of a 6-month telehealth cognitive behavioral therapy service after the Canterbury earthquakes (Australia, 2010-2011) by comparing changes in mental health diagnosis over time in 42 children (BRAVE-Online) (Stasiak, Merry, Frampton, & Moor, 2018). At follow-up, 55% of young people who returned for a clinical interview no longer met the criteria for a DSM-IV diagnosis. There was an average completion rate of 4.88 modules (SD=1.8) out of 6 sessions; the authors noted technical challenges that significantly reduced completion rates.

Ravindran examined the role of telehealth services during the pandemic and the feasibility of using Psychological First Aid (PFA) services via phone and reported that in the first two weeks, the helpline received over ten thousand calls, and just over 50% were related to mental health needs. Ravindran concluded that services were sound, but more structured research was needed(Ravindran et al., 2020).

Overall, the research identifies the potential for telehealth and web services as a possible tools for mental health needs. Due to migration and financial difficulties, mental health service access is a critical concern, but the current studies offer possible service tools that will encourage consistent and cost-effective services.

Displacement

Four papers evaluated relations between displacement and children's mental health and wellbeing after a disaster. Osofsky evaluated 7,258 children and adolescents from Louisiana parishes affected by Hurricane Katrina and found that displaced students were 1.8 times more likely to be referred for services than students who were not. Students separated from their

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parents were more than 1.6 times more likely to be referred to mental health services (Osofsky, Osofsky, Kronenberg, Brennan, & Hansel, 2009).

Rosen evaluated 703,000 crisis counseling encounters and found that referrals were predicted by clients' losses, age (adults more than children), and urbanicity. Approximately 58.4% of meetings resulted in referrals to disaster relief or social services (such as food, clothing, shelter, support groups, and community gatherings); however, only 6.6% resulted in referrals for specific mental health services (Rosen, Matthieu, & Norris, 2009).

Kataoka assessed nine focus groups of school-based mental health counselors after a two-day youth trauma intervention post-Hurricane Katrina. Study participants highlighted the importance of displacement compounding with other post-disaster obstacles and health service needs (Kataoka et al., 2009). In contrast to most studies, one study found that mental health service availability at school was not significantly associated with the frequency of behavioral problems (Tuicomepee & Romano, 2008).

A retrospective pharmacological study evaluated Medicaid claims data for 101,950 children from 2004 to 2006. The assessment compared children from Louisiana displaced by the disaster and multiple non-displaced groups. Quast found a disparity in medicine dispensation after a disaster with more significant decreases in disrupted communities than non-disrupted communities. There was an increase in psychiatric services from 2005 to 2006. Still, the increase was much smaller in disaster-affected counties in Texas (15.7%) versus non-disaster-affected counties in Louisiana (114.3%) (Quast, Gregory, & Storch, 2018). The displacement studies highlight children with heightened needs and suggest possible preparedness plans to reduce the severity of mental health concerns after a disaster event.

Duration of Access Needs

Beaglehole (Beaglehole et al., 2020) compared psychiatric medication dispensing in children before and after the 2010-2011 Canterbury earthquakes and found no significant changes in medication dispensing. In contrast, Storch examined the impact of Katrina exposure on medication utilization amongst children with pre-existing mental health diagnoses and found that Louisiana children had an average of 16.6 fewer days of needed medications. Similarly,

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children with PTSD diagnoses had an average of 7 days fewer supplies than non-disaster-affected children from Texas.

A New Zealand study examined rates of self-harm as related by the proportion of patients having had contact with specialist services indicative of severity and found that non-Māori rates were higher than Māori (527 vs. 116 per 100,000). Still, after the disaster, non-Māori were relatively stable (595 per 100,000), but Māori was significantly higher (1106 per 100,000)(Ferguson, Moor, Frampton, & Withington, 2019).

Two papers investigated the impact of mental health organizational structure on service access and use (Dell'Aringa, Ranzani, Bierens, & Murray, 2018; Jia et al., 2010); Jia conducted a population survey of children between 8 and 16 after the Sichuan earthquake and found that children who did not use services were four times more likely to suffer from PTSD. Dell'Aringa assessed aggregate data from Brazil's Serrana region public access database and saw a spike in visits immediately after the event but did not find a lasting longitudinal impact on service use.

Olteanu reviewed pediatric charts for mental health patients affected by Hurricane Katrina and found 92% of patients had unstable housing, and half were referred to mental health services due to disruptive behavior. In 2009, 82% of adolescent referrals from primary doctors were due to externalizing behaviors (disruption, ADHD, OCD), but pediatric referrals were 62% internalizing (mood & anxiety) and 38% externalizing. Osofsky studied 7,258 children affected by Hurricane Katrina using the NCTSN Hurricane Assessment and Referral Tool for Children and Adolescents (modified for cultural sensitivity) and identified that in 2005-2006 49.1% of students met the UCLA PTSD-Index score for mental health referral, and in 2007-2008 the number dropped to 41.6%. Rosen examined determinants of mental health referrals for disaster relief and needs for additional crisis counseling in 703,000 crisis counseling encounters 3-18 months after Hurricane Katrina. Rosen found that referrals were most common 3-6 months after the disaster and much less common 15 months after (OR = .51).

Tuicomepee assessed the relationship between children's mental health service availability and mental health outcome using medical records and found no significant association. However, this conflicted with individual reports by subjects who reported problems concentrating, obsessive thoughts, nightmares, loneliness, and confusion. The Thai Youth Self-Report found that behavioral difficulties are positively related to youth reporting issues (r = .17,

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p <.01)(Tuicomepee & Romano, 2008). Four studies suggest a lasting increase in mental health service needs, Tuicomepee's results contradict the prior studies, but children's reporting indicates that the analytic results overlooked student experiences.

The studies suggest that long-term mental health access needs prior disparities exacerbated both the need for services and the lack of service access. Several studies indicate a decline in the demand for services; however, the lack of access to care and assessment may hide the service needs of children.

Funding and organizational strategies for access

Mental healthcare is a multi-billion-dollar industry, but access is limited by legislation, insurance, and cost, making funding critical for evaluation in access. Six articles evaluated and provided interpretations for data regarding the relationship between financing and organizational strategy and post-disaster mental health service access. Jia, as described above, found that children who lost family members were 6.6 times more likely to develop PTSD and 4.4 times more likely to develop depression. However, only 12.2% of children with PTSD and 24.1% of children with depression used mental health services. Jia suggests this is because the services were designed for school students, and thus students who dropped out did not receive the necessary assistance. Jia's also paper highlighted the importance of language and cultural competence as barriers to communication and resource access (Jia et al., 2010).

Quast explained disparity in mental health service utilization partially by the impact of the Medicaid restriction formula on prescription resource availability (Quast et al., 2018). In Texas, Quast suggests higher copayments are related to the drop in service utilization by displaced children due to job loss. However, in Louisiana, the Medicaid copayments were three dollars or less, and prescriptions did not have a copayment, likely explaining utilization disparities. Dell'Aringa et al., as described above, hypothesized that a lasting peak in service utilization was due to poor resource management strategies. If surge capacity strategies hadn't been developed, the population would have had insufficient support and poor service availability. (Dell'Aringa et al., 2018).

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Three qualitative studies asked patients and care providers about resource availability and delivery strategy in response to a natural disaster (Kataoka et al., 2009; Lee, Danna, & Walker, 2017; Madrid et al., 2008). Lee conducted a case study evaluating a mental health service strategy, Class-Community Consultation (C3), and had child mental health providers identify the strengths and weaknesses of a school-based community counseling program. Counselors repeatedly highlighted the importance of a vital resource supply structure for the program's effectiveness.

Madrid conducted a qualitative study examining mental health service resources after Katrina reported that mental health providers were severely unprepared for the post-disaster recovery needs(Madrid et al., 2008). Providers reported a severe lack of school personnel and post-disaster trauma mental health training. Kataoka's community-partnered qualitative study found that participants who were part of community clinics reported real supply issues. Those who worked independently identified structural, organizational topics such as professional isolation(Kataoka et al., 2009).

These studies identify the need for further research into the funding and organizational strategies critical for the resilient service availability and effectiveness of mental health services.

Discussion

This scoping review is the first to summarize the peer-reviewed literature on child and adolescent mental health service efficacy and utilization. Using a service-focused approach eliminates the critical bias of disparity in service access. Our approach allows for a targeted collection and assessment of a poorly researched but critical literature gap. Our review highlighted the difficulty in research synthesis. There are differences in study logistics and protocols, significant contrasts in statistical techniques, and an overall lack of standardized data collection.

There are two primary findings that are critical in identifying future research endeavors. The studies suggest hidden or poorly researched disparities amongst communities that result in differential outcomes. Differences by race, gender, and socioeconomics need more work, but combinations of these factors and additional interests such as immigration status, and understudied communities are imperative as our findings highlight the unique nature of various

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communities and their different acute and longitudinal needs. Our project also found instances of conflicted findings between children's self-assessment and professional reporting which suggests a need for more refined assessments.

Our literature review identifies numerous avenues for future work, focus on developing standardized disaster-assessment techniques, a need for more longitudinal research to assess recovery efforts and needs over time, and more research that assess the impact of demographics and socioeconomics.

Our study has several significant limitations. Among the disasters evaluated, most papers focused on Hurricane Katrina. Although Katrina resulted in tremendous mental health challenges to those impacted, the intensity, frequency, and economic losses of disaster events have dramatically increased since 2005, which will impact service needs and outcomes. The studies are complicated because it is difficult to quantify and account for the cumulative effects of multiple disasters in the same area. Given the increasing frequency and severity of disasters and their growing mental health impacts, additional research is needed to identify changes in mental health infrastructure to improve the quality of mental health services.

Conflicts of Interest: None

https://doi.org/10.1017/dmp.2023.183 Published online by Cambridge University Press

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