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The Financial effect of Covid-19 on children's hospitals without pediatric psychiatric units

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THE FINANCIAL EFFECT OF COVID-19 ON CHILDREN'S HOSPITALS WITHOUT PEDIATRIC PSYCHIATRIC UNITS

ABSTRACT

Introduction: Boarding of pediatric psychiatric patients in emergency departments and inpatient medical units while awaiting placement in psychiatric facilities was common before the COVID-19 pandemic and was associated with significant hospital cost. The COVID-19 pandemic triggered a mental health crisis in the pediatric population. This study looked at the how the COVID-19 pandemic affected pediatric psychiatric boarding and the effects of pediatric psychiatric boarding on hospital finances.

Methodology: The methodology of this study utilized a literature review with semi-structured interviews of local subject matter experts. The literature review analyzed the effects of the COVID-19 precipitated pediatric mental health crisis on pediatric psychiatric boarding and the financial effects of psychiatric boarding on children's hospitals.

Results: Pediatric psychiatric boarding during COVID-19 was majority due to COVID-related stressors. There is mixed evidence for the number of pediatric psychiatric boarding admissions to emergency departments and general inpatient units during the COVID-19 pandemic. There is also mixed evidence regarding length of stay for pediatric boarding patients. Limited data was found regarding hospital cost and reimbursement for pediatric psychiatric boarding during the COVID-19 pandemic.

Discussion/Conclusion: The COVID-19 pandemic and subsequent pediatric mental health crisis had a significant impact on pediatric psychiatric boarding. More studies are needed to determine the extent of the financial effects of COVID-19 due to pediatric psychiatric boarding.

Key words: boarding, cost, COVID-19, mental health, pandemic, pediatric

INTRODUCTION

Holding patients on a medical unit while they await acceptance, bed availability, and transport to a separate unit or facility has been traditionally known as "boarding" (O'Donnell et al., 2020). In general pediatrics, boarding patients while awaiting acceptance to an inpatient psychiatric facility was frequent prior to the COVID-19 pandemic; pediatric patients were boarded both in emergency departments (EDs) and in general pediatric inpatient units (Gill et al., 2021). In one tertiary pediatric ED, 573 patients boarded for over 24 hours from September 2015 to August 2018, and the most common psychiatric diagnoses were suicidal ideation or suicide attempt and behavior disorders (O'Donnell et al., 2020). A meta-analysis that studied pediatric psychiatric boarding practices in the United States (U.S.) found that 23% to 58% of pediatric patients who required inpatient psychiatric treatment were boarded in an ED, and 26% to 49% of these patients were boarded in a general pediatric medical unit (McEnany et al., 2020). The duration of boarding, a measure of the length of stay (LOS), was measured from 5 to 41 hours in EDs and 2 to 3 days in inpatient medical units (McEnany et al., 2020).

Boarding of pediatric psychiatric patients in EDs and inpatient units has been associated with high hospital costs; pediatric psychiatric admissions were identified by Gill et al. (2021) as some of the 50 most prevalent and costly pediatric conditions for children's hospitals in the U.S, with a per-encounter mean cost of $8138 for suicide/intentional self-inflicted injury and $10,347 for major depressive disorder. Claudius et al. (2014) estimated that the cost per patient boarding on a general pediatric medical unit was $4269 in 2010, a total of 1169 days of care across all boarded patients with a total estimated hospital cost of $2,323,790. One study which analyzed pediatric psychiatric ED presentations from 2010 to 2016 found that the annual cost of pediatric psychiatric presentations to the ED was $821 per presentation for a length of stay less than 24

hours and $4050 per presentation for a length of stay greater than or equal to 24 hours (Hoffmann et al., 2019). Fieldston et al. (2014) identified the underlying cause of high costs as severe underfunding of mental health care, leading to prolonged boarding time due to a severe shortage of inpatient bed availability. 94.2% of pediatric patients requiring involuntary psychiatric hospitalization were admitted to an inpatient medical unit for boarding rather than an inpatient psychiatric unit due to a lack of psychiatric bed availability (Claudius et al., 2014). As part of the Medicaid Emergency Psychiatric Demonstration, attempts were made to lower psychiatric patients' boarding in the ED; many measures were implemented, including increased training for ED staff in de-escalation techniques, encouraging the utilization of multidisciplinary teams for faster placement and disposition of patients, and improving community crisis resources (Alakeson et al., 2010). However, these measures have not extended to pediatric services, as the project was intended to allow all hospitals which provided emergency psychiatric care to adults to receive reimbursement (Alakeson et al., 2010).

The COVID-19 pandemic triggered psychiatric crises in the pediatric population due to stressors related to shelter-in-place orders (Choi et al., 2021). The US Surgeon General declared a national emergency for children's mental health in 2021 as the proportion of ED visits for mental health increased by 24% in children ages 5-11 and 31% in adolescents ages 12-17 from March to October 2020 (Radhakrishnan et al., 2022). As a result of school closures, 18-61% of children and adolescents demonstrated an increase in symptoms of depression and anxiety (Viner et al., 2022). Suicide attempts rose 50.6% in adolescent girls and 3.7% in adolescent boys in 2021 compared with 2019 (Yard et al., 2021). There was also an 18% increase in inpatient psychiatric consults for pediatric patients admitted to inpatient medical units in 2020 (Monroe et al., 2022).

This research aimed to evaluate the financial effects of pediatric psychiatric boarding on children's hospitals during COVID-19.

METHODOLOGY

This study hypothesized that an increase in pediatric psychiatric admissions to general children's hospitals without pediatric psychiatric units during the COVID-19 pandemic negatively affected the financial state of children's hospitals due to increased boarding and lengths of stay, decreased reimbursement, and increased hospital-associated costs. The methodology of this study was a qualitative literature review and semi-structured interviews of experts in pediatric hospital medicine and hospital administration.

Literature Review

The literature review was performed in two searches, each following the 2009 guidelines of the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA), as shown in the PRISMA diagram in Appendix 1. The results from these searches were used as secondary materials for this study. The literature for the first search was located using Marshall University library's SUMMON feature and the PubMed database. Keywords used in the first search included 'COVID-19 OR pandemic' AND 'pediatric OR child OR adolescent' AND 'psychiatric OR psychiatric boarding.' This search was limited to publications from 2012 to 2022 and yielded 281 results from SUMMON and 555 from PubMed; removing duplicates from search 2, limiting to full-text and the English language only resulted in 275 abstracts from SUMMON and 547 from PubMed. The 275 results on SUMMON were limited to scholarly and peer-reviewed articles, yielding 17 results that underwent abstract review. Two other results were excluded as

they were letters to the editor, not scholarly articles. The remaining 547 results from PubMed underwent abstract review; 397 were excluded due to not studying the pediatric patient population, 67 were excluded as they studied non-psychiatric conditions, and 77 were excluded as the population studied was not inpatient or ED patients. This literature review can be visualized as "Search 1" in the PRISMA diagram found in Appendix 1.

The literature for the second search was also obtained from Marshall University library's SUMMON feature and the PubMed database. Keywords used in this search included 'pediatric OR child OR adolescent' AND 'psychiatric OR psychiatric boarding' AND 'cost OR reimbursement.' The search was limited to full-text, English-language publications from 2012 to 2022. This search yielded two results from SUMMON and eight results from PubMed. One result from PubMed was excluded as it analyzed financial data pre-COVID-19. One result from SUMMON and three results from PubMed were excluded as they did not study cost or financial effects. Five full articles were included in this study. This literature review can be visualized as "Search 2" in the PRISMA diagram found in Appendix 1.

These searches were completed by PT and validated by AC, who acted as a second reviewer and determined if the references met inclusion criteria.

Semi-structured Interviews

Semi-structured interviews with children's hospital administrators, pediatric case management, pediatric hospitalists, and child and adolescent psychiatrists were conducted. Participants were selected through purposeful sampling. Interviews were performed in person after written informed consent was obtained. Interviews were recorded and transcribed for analysis. IRB approval was obtained from Marshall University's Institutional Review Board before conducting

interviews. Interview questions have been included in Appendix 2. The information obtained from these interviews was used as primary sources.

RESULTS

Pediatric Psychiatric Presentation and Boarding Rate

An online survey of adolescents conducted in May of 2020 demonstrated that the COVID-19 pandemic was associated with increased anxiety as measured by the DSM-5 Level 2 Anxiety Scale, with 40.3% of respondents reporting anxiety symptoms and 28% of respondents screened positive for moderate to high levels of anxiety (Selçuk et al., 2021). The same authors found a prevalence of depressive symptoms of 50.8% and post-traumatic stress disorder symptoms of 61.1%. Additionally, a significant increase from 50.7% to 66.7% in suicide attempts in late adolescents (ages 17-18) was seen after the onset of the COVID-19 pandemic, related to mental health (loss of interpersonal relationships and/or school-related motivation) (Kim et al., 2022). These findings were supported by a systematic review performed in 2021, which found that 14/16 studies demonstrated a negative impact of the COVID-19 pandemic on pediatric mental health (Jones et al., 2021). One analysis found that 53% of pediatric psychiatric boarding admissions from March 2020 to January 2021 were associated with stressors from COVID-19 (Reece & Sams, 2021). These findings regarding pediatric psychiatric symptoms during COVID-19 are summarized in Table 1.

A retrospective observational study from a single children's hospital in France showed a significant decrease in the admission and boarding rate of pediatric patients for suicidal behaviors during the lockdown period of March to May of 2020 when compared with before the pandemic (January 2018 to March 2020) (Mourouvaye et al., 2021). Before the pandemic, there

were 2.5 admissions per week for boarding due to suicidal behaviors compared with 1.25 admissions per week during lockdown (Mourouvaye et al., 2021). A nationally renowned American freestanding children's hospital reported a significant decrease of 60.84% in pediatric patients presenting to the ED with mental health diagnoses when compared with the pre-pandemic period (378 presentations pre-pandemic compared with 148 presentations during the pandemic) (Leff et al., 2021). A tertiary hospital in Madrid reported a decrease in both ED presentations (64 in 2019 vs. 25 in 2020) and inpatient admissions (31 in 2019 vs. 18 in 2020) for adolescents with psychiatric diagnoses (Díaz de Neira et al., 2021). A pan-Canadian study found that the total number of ED presentations for psychiatric or mental-health-related diagnoses decreased by 56% in the "early-pandemic" period (March-April 2020) compared to immediately prior to the pandemic (January-March 2020) (Finkelstein et al., 2021). There was a 72% decrease in all pediatric ED presentations and a 46.2% decrease in pediatric psychiatric ED presentations in Italy during the first two months of the COVID-19 lockdown (Davico et al., 2021). This trend for Italian pediatric patients continued, as another study found a decrease of 33% in ED presentations for psychiatric symptoms from October 2020 to February 2021 (Cozzi et al., 2022). A decrease in overall pediatric ED presentations and a 65.2% decrease in pediatric ED presentations for suicide was described in Portland, Oregon (Sheridan et al., 2021). In Portugal, there was a 52.5% decrease in pediatric psychiatric ED presentations from March-May 2020, with 23.7% of ED visits requiring inpatient psychiatric treatment; however, no figures were available for the number of boarded patients (Gonçalves-Pinho et al., 2021). These findings are summarized in Table 2.

This decrease in pediatric presentations to EDs for psychiatric diagnoses was also seen in inpatient pediatric psychiatric admissions. Analysis of the Pediatric Health Information Systems

database collected from 49 U.S. children's hospitals revealed a 45.4% decrease in all pediatric inpatient admissions with a corresponding reduction in the number of pediatric psychiatric admissions (Pelletier et al., 2021). In Denmark, pediatric psychiatric admissions declined 19% in the first three weeks of lockdown compared with pre-pandemic admission rates (Rømer et al., 2021). These findings are also summarized in Table 2.

However, in some regions and instances worldwide, an increased prevalence of pediatric psychiatric symptoms led to an increased seeking of medical attention. One northern Italian hospital reported increased inpatient admissions for pediatric psychiatric diagnoses (60 during the pandemic vs. 49 pre-pandemic) (Bortoletto et al., 2022). A survey of several additional pediatric EDs across Italy showed a decrease in overall pediatric ED presentations but a proportional increase in the proportion of pediatric psychiatric ED presentations (0.3% in 2019 vs. 1.2% in 2020) (Cella et al., 2020). In northern California, there were 2123 overall adolescent ED visits related to suicide in 2020 versus 2339 in 2019, but female patients presented at significantly higher rates (1.19-1.22 times as many female patients presenting to the ED related to suicide) (Ridout et al., 2021). In Australia, there was no significant decrease in ED presentations or inpatient admissions for pediatric psychiatric diagnoses pre-pandemic and during the initial lockdown period (March-May 2020); a 25-55% increase in pediatric psychiatric admissions and ED presentations then followed (Hu et al., 2022). The Canary Islands reported a 164.5% increase in pediatric psychiatric ED presentations in 2020, and Ireland reported a 23% increase in the mean number of pediatric psychiatric ED presentations (McDonnell et al., 2020; Wallis Gómez et al., 2021). After an initial drop in mental health presentations to a British pediatric ED at the onset of the COVID-19 pandemic, there was a rise in pediatric mental health presentations during the second and third waves; there were 76 presentations from November 5,

2020, to December 12, 2020 (compared with 54 during 2017, 62 in 2018, and 58 in 2019) and 200 presentations from January 5, 2021, to March 8, 2021 (61 in 2017, 108 in 2018, 151 in 2019) (Cuellar et al., 2021). This initial drop in presentations was mirrored in China, which showed a 42% decrease in pediatric psychiatric ED visits at the start of the pandemic (Eray & Sahin, 2021). These findings are summarized in Table 2.

Length of Stay of Pediatric Psychiatric Boarding Patients

During two weeks in 2012 in Massachusetts, the median LOS of patients boarding in the emergency department awaiting transfer to a psychiatric facility was 9.32 hours, with longer durations of over 24 hours sustained by patients with Medicaid or uninsured (Pearlmutter et al., 2017). However, during the COVID-19 pandemic, there were mixed reports of lengths of stay for pediatric psychiatric boarding patients. In a Madrid tertiary care children's hospital, the average boarding LOS dropped from 14.32 ± 10.23 days in 2019 to 8.94 ± 4.87 days in 2020 (Díaz de Neira et al., 2021). Another hospital in Asia reported an 81.7% reduction in median LOS for boarding pediatric psychiatric patients during the COVID-19 pandemic (March-June 2020) (Kose et al., 2021). A survey conducted by the Pediatric Research in Inpatient Settings (PRIS) organization revealed a median LOS of 48 hours for pediatric psychiatric boarding patients on inpatient pediatric units with fewer patients boarded in children's hospitals-within-hospitals vs. freestanding children's hospitals (Leyenaar et al., 2021). Additionally, 75.3% of PRIS survey respondents reported increased LOS for boarding patients, while 84.4% reported increased pediatric boarding frequency during the COVID-19 pandemic (Leyenaar et al., 2021). These findings are summarized in Table 3.

Reimbursement and Hospital-associated Costs of Pediatric Psychiatric Boarding

Analysis of admissions in 49 children's hospitals in the U.S. during the COVID-19 pandemic showed a 3.3% decrease in total hospital charges during the first quarter of 2020 and a 27.7% decrease in charges during the second quarter of 2020 when compared with the median of quarterly charges from 2010-2019 despite a higher median per-admission charge in 2020 ($24,358) vs. 2010-2019 ($20,352) (Pelletier et al., 2021). No studies analyzed financial data of pediatric psychiatric boarding during the COVID-19 pandemic.

DISCUSSION

This study hypothesized that there would be an increase in pediatric psychiatric boarding, seen as an increase in the number of boarding admissions and an increase in length of stay, resulting in a negative financial impact on children's hospitals. Overall, there were mixed results in the literature regarding the number of admissions and boarding and lengths of stay. Local subject matter experts had a much more apparent consensus; excerpts and themes from semi-structured interviews are summarized in Table 4 and Figure 2.

The number of pediatric psychiatric admissions and boarding

There was strong evidence of increased pediatric psychiatric symptoms, particularly depression, anxiety, and suicidal ideation. Despite the increase in the prevalence of psychiatric symptoms in pediatric patients, there was not necessarily an increase in pediatric psychiatric presentations or admissions. Many studies performed worldwide demonstrated a decrease in the presentation of pediatric patients to EDs for psychiatric or mental health diagnoses. However, interviews with local subject-matter experts stated that there was a definite increase in pediatric psychiatric

admissions leading to increased boarding, saying things like, “We saw a drastic increase during COVID,” “it has been a huge increase in admissions,” and “I don’t have the specific data to tell you what the increase in patients has been here, but it’s clearly higher than it was prior to 2020.”

Boarding lengths of stay

Initial studies at the beginning of the COVID-19 pandemic revealed a shorter length of stay on average for pediatric psychiatric patients. However, a qualitative study and local subject matter experts disagreed, with most respondents reporting an increase in the number of boarding patients and their lengths of stay. Local experts theorized on the cause of increased lengths of stay. Many of them agreed that the availability of pediatric inpatient psychiatric treatment facilities was the most likely driver of the length of stay.

Reimbursement and cost

There was a distinct lack of information regarding the specific costs of pediatric psychiatric boarding during the COVID-19 pandemic. Several interviewees concurred that “hospitals are not reimbursed for psychiatric boarding.” One administrator stated, “There’s no doubt that the children’s hospital lost a lot of money…How much of it was psychiatric? Probably not the bulk of it, but it certainly didn’t help.” The overall consensus among subject-matter experts was that providing care for boarding patients costs children’s hospitals money that payers did not reimburse. This cost was due to basic care such as meals, room costs, and nursing supervision.

Local experience vs. National trends

All the local experts interviewed agreed that their experience of increased pediatric psychiatric boarding was not unique, saying that "it's throughout the country" and "you have a finite number of mental health resources."

Study Limitations

There were several limitations to this study. The literature review was limited by database availability through Marshall University, keyword selection, the number of databases utilized, and selected sources which potentially impacted the quality of the study. Author and publication bias in selected sources also potentially impact the quality of the study. Many studies selected for inclusion study the initial period of the pandemic (March – October 2020), and there are currently limited publications that look at data obtained in the latter periods of the pandemic (post-October 2020), which may affect admission and boarding rate trends. Opinions gathered from semi-structured interviews have limited generalizability. The subject-matter experts interviewed have practiced primarily in the US and children's hospitals (either freestanding or in a hospital-within-a-hospital setting); these findings may not apply internationally or to other hospital settings. Additionally, all interviewees were known professionally to the interviewer, which may have contributed to bias in the interviews.

Practical Implications

The current body of literature does not mirror the lived experience of local subject matter experts when it comes to pediatric psychiatric boarding during the COVID-19 pandemic. Additionally, while the cost of pediatric psychiatric boarding pre-COVID-19 has been analyzed and the deleterious effects of COVID-19 on children's hospitals financially are being studied, no studies

have been published that look at the financial effect pediatric psychiatric boarding on children's hospitals during the COVID-19 pandemic. Further, longitudinal studies analyzing pediatric psychiatric boarding throughout the pandemic need to be undertaken to evaluate the financial effects of boarding on children's hospitals during the COVID-19 pandemic and to discover potential areas of improvement in mental health care delivery in medical treatment and high-value care.

CONCLUSION

The COVID-19 pandemic precipitated a mental health crisis in pediatric populations worldwide. This crisis significantly impacted children's hospitals, with increases in boarding recognized on a national level. The qualitative experience of local experts was not reflected in current literature, which was likely due to a lack of longitudinal research as the COVID-19 pandemic was ongoing, and there is a delay in research findings due to the publication process. The financial impact of this mental health crisis has not been adequately studied; further research must be done to fully grasp the financial impact of COVID-19 on pediatric mental health and to provide insight to improve mental health care delivery and value.