A Comparative Study on Pre-and Post-Covid Paediatric Admissions in Pakistan

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Abstract

Objective: The COVID 19 pandemic brought with it a complex pattern of changes in society behaviour especially in access to healthcare which was seen in markedly reduced trend of paediatrics hospital admissions worldwide. The aim of this study to see if a similar trend was present in Pakistan by comparing the number and characteristics of paediatrics inpatients in a tertiary care hospital.

Method: Retrospective cross-sectional study performed on patients aged 1-12 years admitted in paediatric ward of Punjab Rangers Teaching Hospital, Lahore during the year before Covid-19 pandemic, i.e., March 2019- February, 2020 and the year after the pandemic in Pakistan, March, 2020 - February, 2021. Data collected from hospital medical records included the number of paediatric admissions, admissions of infectious vs. non-infectious illnesses with special focus on Acute Respiratory Illness (ARI) and Acute Gastroenteritis (AGE) and whether patients were pre-schoolers or school-going children. The data was analysed using SPSSv.21.

Results: A decrease of 50% in Paediatric admissions was seen in post-Covid period which was significant (P-Value 0.001 (95% CI 17.6 – 54.3)). The fall in admissions of school-going children was more significant (P-Value <0.001) compared to preschool age admissions (P-value 0.026). Infectious disease was 70% of the admissions but fell by 60% after the pandemic started (P-value <0.001). There was a significant reduction in admissions with both ARI (P-value 0.049) and AGE (P-value 0031) in pre-school children.

Conclusion: Our study demonstrates that there was a significant decrease in paediatric hospital admissions during the pandemic. This is suggestive that patients may have avoided or refused necessary healthcare due to fear of contagion.

Keywords: Post-Covid, Paediatric Admissions, Pakistan

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Introduction

World Health Organization declared a new pandemic of Severe Acute Respiratory Syndrome Coronavirus 2 disease on 11th March, 2020.[1] The 1st case of Covid-19 infection in Pakistan was reported on 26th February, 2020 and the wave peaked in June, 2020.[2] An extended lockdown from late March, 2020 and multiple measures taken at government level helped bring the numbers down by July, 2020. However, the gradual easing of restrictions and resumption of social and business activities led to the second wave of Covid epidemic, declared on 28th of October, 2020.[3] To date there have been 1.5 million confirmed cases of Covid in Pakistan with around 30,500 confirmed deaths.[4]

The pandemic of SARS-COV-2 has remained a mild, self-limiting respiratory illness in children, as shown in a systematic review of 1065 children infected with Covid, with only 2% requiring intensive care[5,6]. However, children and their families have been affected in other ways due to the imposition of lockdown and public health measures, such as social distancing, to contain the pandemic. By the 1st of April, 2020, 194 countries had enforced school closure in an effort to control the

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pandemic by limiting child-to-child transmission of viral illnesses.[7] During the lockdown period, movement outside of homes was strongly discouraged, only allowed in case of medical emergencies. This social isolation was aggravated by the pervasive fear of contagion and increasingly suspicious attitudes towards larger communities.[8]

One of the major resulting effects noted from this was the decreasing trend in hospital admissions of paediatric population. Access to healthcare along with education and social services are basic facilities in place to ensure and maintain the well-being of a growing child, which is why the decline in hospital admissions should be investigated further.[9] Besides that, it is more worrying that many children suffering from chronic illnesses may have been deprived of healthcare during the lockdown and may have compounded the morbidity of their condition.

Imposing lockdown for any time period had serious implications and did not only have a limiting effect on COVID-19 spread but also on all other transmissible infectious diseases.[10] This effect is more pronounced in the pediatrics field, since 28% of diagnoses in pediatric emergency departments (EDs) are due to infectious disease.[11] As it was expected, a fall in the total pediatric admissions and visits to the emergency department (ED) has followed lockdowns worldwide.[12,13] However, it is not clear whether this decrease is only due to a decrease in transmissible infections or by changes in behavior around healthcare utilization, as well. As an example, there have been numerous reported examples of avoidance of care due to fear of a hospital environment, which is potentially disastrous.[14,15]

This study focuses mainly on the impact of the pandemic on access to health services for children and their families, in Pakistan. The objective was to compare the number of admissions Pre-Covid and Post-Covid periods in a tertiary care hospital. We further looked into how the admission of cases of major infectious diseases of a developing country, such as Acute Respiratory Infections (ARI) and Acute Gastroenteritis (AGE), were affected by the Covid-19 pandemic in pre-school and school-going children.

Material and Methods

We carried out a retrospective cross-sectional analysis in the Paediatrics Department at a tertiary care set-up, Punjab Rangers Teaching Hospital (PRTH), Lahore, Pakistan. All cases of paediatric inpatients (1 month - 12 years) admitted in the one-year period before Covid pandemic (March, 2019-February, 2020) and one year post-Covid (March, 2020-February, 2021) were included in this study.

We obtained patient demographics from medical records and the number of admissions in total. The diagnosis of ARI and AGE were tabulated specifically. Further variables analysed were the number of paediatric admissions with infectious vs. non-infectious diseases and the pattern of admissions in pre-school (<5 yrs) and school-going children (5-12 yrs.) in pre-Covid and post-Covid period.

The data was entered on Microsoft application v.16 and analysed using SPSS statistics software application v.21.

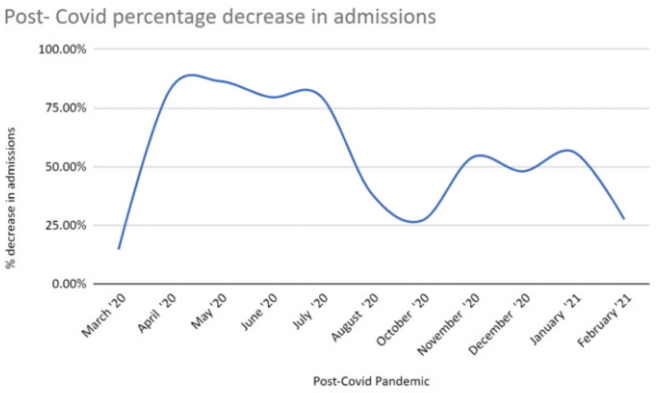
Results

There were a total of 883 admissions in PRTH, Paediatrics department between March 2019 and February, 2020 compared to 452 admissions after the advent of Covid-19 Pandemic, the following year between March, 2020 and February, 2021. This is a fall in paediatric admissions by almost 50%. On application of paired t-test between admissions of pre-covid and post-covid there is significant difference between means and standard deviations of total cases per month for each year at a P-Value of 0.001 (95% Confidence Interval 17.6 – 54.3) (Tab 1). Comparing the months of April-May 2019 and April-May 2020, there was more than 80% decrease in admissions following the lockdown imposed on 24th March, 2020. At the time of the second wave of Covid in late October, 2020 the admissions in November-December, 2020, decreased by around 50% compared to the same months in 2019. (Fig. 1)

Fig. 1- *The Percentage of Decrease in Paediatric Admissions in Post-Covid Period.*

Table 2: *Comparison of Decrease in Paediatric Inpatients between 1st and 2nd wave of Pandemic*

Time Period	Mean % decrease in admissions from Pre-Covid time	P-value
1st wave April '20 – July '20	82.2%	**0.013**
2nd wave November ' 20 - January '21	52.6%	



The ratio of pre-school to school-going children was 3:2 and remained mostly unchanged in the post-Covid time period. The number of Preschool children admitted in paediatrics ward declined significantly from at a mean difference of 15.8 with standard deviation of 21.4. (Tab. 2) This was significant at a P-Value of 0.026 (95% CI 2.2-29.4). In case of school-going children, the difference in admission between pre-Covid and post-Covid years was more significant at P-Value of <0.001 (95% CI 11.9-26.5). Both pre-school children and school-going children at a decreased admission percentage of 57.9% and 65.3% respectively.

Infectious diseases made up almost 70% of the bulk of paediatric admissions in the Pre-Covid period with ARI compromising 19.9% and AGE 25.5% of the illnesses. The total no. of inpatients with infectious illnesses reduced significantly at a mean of 31 (P-value <0.001, 95% CI 17.26-44.9). (Tab. 1 Fig 2) The admissions with non-infectious illnesses reduced but it was insignificant (P-value 0.091, 95% CI 1-11.9). ARI and AGE both made up 25% each of hospital admissions post-Covid with infectious illnesses.

Preschool children were largely affected by infectious diseases at 62% compared to school-going children. The no. of patients with infectious diseases fell by 60.7% post-Covid, of which ARI fell by 51.2% and AGE by 60.6%. It was observed that even though the reduction in total admissions with ARI fell by more than 50% which was insignificant (P-value 0.057, 95% CI -.18-10.5), the fall in pre-school age ARI admissions by 56% was significant (P-value 0.049, 95% CI 0.03-9.96). Reduction in the number of school-going children with ARI was not significant (P-value 0.72, 95% CI -1.26-1.76).

The decrease in Total AGE admissions by 60.06% and of Pre-school admissions with AGE by 58.9%, in pre-Covid period, were both significant at P-value 0.026 (95% CI 1.08-13.74) and P-value 0.031 (95% CI 0.76-13.41), respectively.

Table 1: *Paired Differences T-test on Total Admissions, Infectious vs. Non-Infectious, ARI and AGE Admissions*

Subgroups comparison Pre- vs. Post-COVID	Paired Differences		P-value
	Mean	95%CI	
Total Admissions	35.91	17.56-54.2	0.001*
• Preschool Age	15.83	2.23-29.44	0.026*
• School-Going Age	19.25	11.98-26.52	<0.001*
Infectious Illnesses	31.08	17.26-44.9	<0.001*
• Preschool Age	18.33	7.06-29.59	0.004*
• School-Going Age	12.75	8.61-16.88	<0.001*
Non-Infectious Illnesses	5.16	1-11.29	0.091
Total ARI[1] Admissions	5.16	-.18-10.5	0.057
• Preschool Age	5.0	0.03-9.96	0.049*
• School-Going Age	0.25	-1.26-1.76	0.723
Total AGE[2] Admissions	7.41	1.08-13.74	0.026*
• Preschool Age	7.08	0.76-13.41	0.031*
• School-Going Age	0.33	-0.54-1.20	1.417

**2-tailed t-test observed difference was statistically significant.*
[1] Acute Respiratory Illnesses.
[2] Acute Gastroenteritis

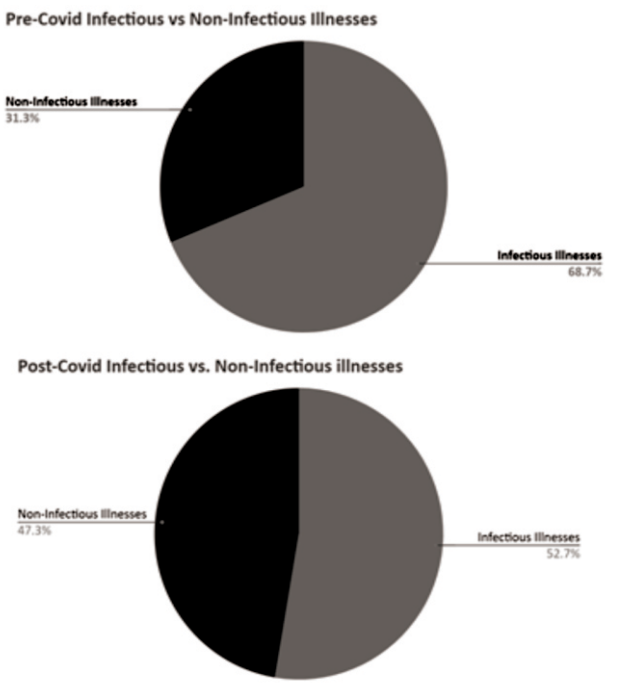


Fig. 2- *Comparison of Hospital Admissions with Infectious vs Non-Infectious Illnesses in Pre-Covid and Post-Covid Time Period*

Discussion

This retrospective observational study has shown that there has been a significant reduction in paediatric hospital admissions by almost 50% (P-Value 0.001, 95% CI 17.6 – 54.3) since Covid pandemic compared to pre-Covid time period, in Pakistan.

A similar decline in paediatric admissions were reported in Italy, United Kingdom and United States. Isba et al. reported a fall in UK Paediatric Emergency department attendances in February and March 2020 by 5.6% and 30.4% respectively compared to the same months in 2019, following the UK lockdown implementation from 23rd March, 2020.[12] Similarly, in Pakistan, when we compare the months of April-May 2019 and April-May 2020, there was more than 80% decrease in admissions following the lockdown imposed on 24th March, 2020. In the US, Nourazari et al. also reported 32% reduction in admissions between week 11 and 36 in 2020.[16] In Northern Italy, Rabbone et al. observed a 73.2% reduction in total paediatric admissions in the year 2020 compared with the same period in 2019.[17]

In our study, there was a sharp fall in number of paediatric admissions with infectious illnesses (P-value <0.001) with the start of the pandemic. This was especially significant in pre-school age children, in whom there was a decrease in admissions with both ARI (P-value 0.057, 95% CI -.18-10.5) and AGE (P-value 0.026, 95% CI 1.08-13.74). This was also the case in Northern Italy, during Covid-19, where there was a significant (p< 0.001) drop in infectious (-51%), respiratory (-25.5%), and nervous systems diseases (-50%).[17, 18] The fall in ARI admissions in children under 5 years of age, which included paediatric asthma cases, could be attributed to the improvement of the Air Quality Index (AQI) during lockdown in combination with the reduced transmission of viral respiratory infections. There is a significant association between increased AQI and severity of lower respiratory tract infection in children under 5 years of age.[19]

The drop in number of admissions to our paediatric department was not as marked around the 2nd wave of the Covid-19 pandemic as the first wave. Since the start of extended lockdown in April 2020 the number of admissions decreased by 80% compared to the year before and remained so until July 2020. Thereafter a rise in paediatric inpatients was seen with a higher number of admissions in September 2020 compared to September 2019. From November 2020, with the advent of second lockdown the number of admissions decreased again but by only 45-50% from the same months in 2019. The percentage of decrease in admissions from the government-imposed lockdown at the time of the 1st wave of pandemic was higher by roughly 30% compared to the decrease in hospital admissions around the second wave, which was significant (P-value 0.013, 95% CI -38.4—12.9) This could be attributed to the less strict adherence to SOPs at a public level. This resistance to social distancing and SOP in Pakistan, was observed by Elahi et. al and it was found that the major determinant of this behaviour was low literacy level.[20] Similar behaviours were noted across the globe, such as in Spain, Gualda et.al observed that the reason behind the lower compliance to SOPs were sociodemographic factors, personal hygiene patterns, and lack of trust in political institutions. Less compliance was also associated with beliefs in some specific conspiracy theories with regard to COVID-19.[21] These factors may also be relevant in the Pakistani population and deserve more insight to combat any future pandemics.

Exploring the reasons behind the sharp decline in post-Covid paediatric admissions is likely to be multifactorial. Imposition of lockdown led to isolation from large gatherings, following SOPs, including social distancing, wearing masks and handwashing. The fear of contagion in general public most likely led to avoidant behaviour in seeking healthcare services. From a study by Dan et. al, in a busy Irish hospital, due to a combination of factors, there was a reduction in presentations widely accepted as mediated by viral exposure (wheeze, bronchiolitis and febrile convulsions); reduction in school-related stress (headaches and abdominal pain); and parents deciding to stay at home due to fear of attending during the pandemic, with non-emergent conditions (neonatal feeding issues, vasovagal episodes and non-anaphylactic allergic reactions). Injuries, scalds, ingestions and foreign bodies became less frequent, likely because of fewer outdoor activities and more supervision by parents.[22]

The point of concern here is that reduced access to healthcare facilities due to priority given to Covid patients combined with fear of carers/guardians to exposure to Covid affected at a hospital, may have led to delay in seeking treatment for seriously unwell children, especially those with chronic ailments. In a nationwide NHS England study by Etoori et.al, one in six clinically vulnerable children accounted for almost half of the reduction in hospital care during the pandemic.[23] The inability to carry out routine healthcare for complex illnesses and

disruption of vaccination schedules has increased the risk of emerging diseases.[24] An improvement in Air Quality Index, during lockdown, also brought about a reduction in acute exacerbation of asthma and other respiratory ailments in children.[19]

Conclusion

In conclusion, the significant reduction in total paediatric admissions, especially of infectious ailments in children under 5 years, during the Covid-19 pandemic, has driven major changes in paediatric practice and leaves many lessons for us to learn for future pandemics. It is justifiable to introduce telemedicine and virtual access to healthcare, especially to children with chronic ailments. There is also requirement of ensuring that mental and emotional well-being of families and children is cared for.[25] To combat the avoidant behaviour of following SOPs we need to educate and build trust with the general population, through national programs. Further research is required to assess the consequential damage that has taken place in Pakistan during the pandemic.

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Authors Contribution

ASQ: Writing of Manuscript

MA: Data Collection

SN: Literature Search

MA: Statistical Analysis

ZA: Drafting, Revision

MAK: Conceptualization of project