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ORIGINAL ARTICLE

Physical, Psychosocial and Economic Wellbeing of Caregivers during COVID-19 Pandemic and its Impact on Developmental Milestones of Children (6 to < 30 months): A Cross-Sectional Study

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Abstract

Introduction: This study aimed to investigate the pattern of developmental milestones of children born during the COVID-19 pandemic and the impact of caregivers' physical, psychosocial and economic well-being on achievement of developmental milestones in children. **Methodology:** A crosssectional study was conducted on children (6 to < 30 months) born after March 2020 and their caregivers. Study tools includedGAD-7,RBSK screening tool andpre-designed pre-testedsemi structured questionnaire. Data was analysed using SPSS ver 20.0.R**esults:** Out of 228 children, developmental milestones were delayed in 62(27.19%) children. In the age group of 12 to <15 months, the caregivers with GAD Score of >10 and< 10, had 66.7% and 25% of their children with developmental delays and this difference was found to be statistically significant (p=0.04). **Conclusion:** An upward trend of developmental delays was observed in children born during pandemic although it was not affected by physical, psychosocial and economic wellbeing of care givers. Ironically, presence of caregivers and siblings at home for extended periods have also provided opportunities for care and interaction.

Key Words: Caregivers, COVID -19 Pandemic, Developmental milestones, Developmental delay, Economic Physical / Psychosocial Wellbeing

Introduction

COVID-19 originated in Wuhan city of China in December 2019 and took on pandemic proportions affecting all countries across globe. The pandemic triggered first phase of nationwide lockdown in India on March 25, 2020. Further over two years, specific containment zones were declared to restrict widespread infection.[1]

Lockdowns isolated families, depriving children of social interactions.[2]Many parents and their infants lost support systems, including extended family, friends, and healthcare professionals. Some caregivers suffered illness or death due to COVID-19. Others were consumed with stress, anxiety or financial instability due to unemployment.[3] Social restrictions, job loss, economic insecurity and stress of COVID-19 infection among family members can lead to stress among caregivers which can have a bearing on growth and development of children. A developmental dip in cognitive performance scores of children born during 2020 and 2021 has been reported by researchers.[4]

As COVID-19 is a relatively new infectious disease, data on its impacts on human health is limited. In this context, this study aimed:To study pattern of developmental milestones of children born during COVID-19 pandemic,

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to assess physical, psychosocial and economic well-being of caregivers of these children and to study impact of caregivers' well-being on achievement of developmental milestones.

Material and Methods:

An analytical Cross sectional study was conducted in theImmunisation section of a tertiary care hospital for three months (July- Sep 2022) duration.

Study Population: Children of four age groups viz. 6 to <12 months *(Group 1)*, 12to <18 months *(Group 2)*, 18 to <24 months *(Group 3)* and 24 to <30 months (Group 4) who attended the immunisation section were randomly selected for the study. Group 1was further subdivided into two subgroups Subgroup 1a (6 to <9 months) and Subgroup 1b (9 to <12 months). Group 2 was also subdivided into two subgroups Subgroup 2a (12 to<15 months) and Subgroup 2b (15 to <18 months). All children born after March 2020 were enrolled for study. Mother/ caretaker of the child were explained the purpose of the study and those who agreed to participate were asked to give a written consent in presence of a witness. Face to face interview were conducted on mothers or care givers who looked after the children.

Inclusion criteria:

1.Parents/caregivers must provide written consent
2.The family should be resident of Jammu district
3.Child born after March 2020
4.Children in the age group of 6 to <30 months.

Exclusion criteria:

1.Mother or caregiver not available to give information
2.Very sick child
3.Any congenital anomaly in the child
4.Any chronic disease in the family.

Sample size:

Assuming the prevalence of developmental delays as 16.2%, absolute precision of 5% at 95% confidence interval and non-response rate of 10%, a sample of 228 children was calculated.

Data collection tool: A pre-designed and pre-tested questionnaire was used for collecting socio-demographic details and data regarding physical, psychosocial and economic well-being of caregivers.

Generalized Anxiety Disorder-7 scale (GAD-7) was used to screen parents/caregivers for the presence of anxiety. A score of 10 or greater on the GAD-7 was taken as a cut off point to identify cases of GAD.[5]

Rashtriya Bal SwasthyaKaryakram (RBSK) screening tool was used for developmental assessment of children. It has 61 questions pertaining to five key domains of child development- gross motor, fine motor, speech and language, cognition and socialization. In addition, autism was evaluated for age groups 15 to<18 months and 18to< 24 months.[6]

Data collection procedure: After explaining the purpose of the study, the interviewer obtained informed written consent from the parents/caregivers. The Children in each age group where the response found to be "No" for any of the questions asked using RBSK screening tool, were referred to Paediatrics OPD for evaluation by paediatrician. The diagnosis of such children was confirmed by a paediatrician and then categorised as having development delay. Counselling was provided to the parents/caregivers of such children.

Ethical considerations: Ethical clearance was received from the Institutional Ethical Committee (IEC) of GMC Jammu. (N0: IEC/GMCJ/2022/1142 registered wide no:C-331 dated 31.10.2022

Statistical Analysis: Data was entered into Excel spreadsheets and tabulated using Microsoft Excel (version 2009). The qualitative data was presented as number and percentages and quantitative data as mean (±SD). Chi square test / student t test were used to find associations. IBM SPSSsoftware version 20.0 was used and $p<0.05$ was considered statistically significant.

Results

A total of 228 children were included in the study. There were 76 (33.33%), 56 (24.56%), 48 (21.05%) & 48 (21.05%) children in group1, 2, 3 &4 respectively. The mean age was 16.14±6.86 months with a M:F of 1.42:1. 75.9% children were Hindus by religion. 6.57% mothers and 5.26% fathers were illiterate. Majority of the fathers (67.98%) were labourers while 94.73% mothers were homemakers.

50% of the respondents gave history of fever/COVID-19 infection in the mother or caregiver of the child or any family member while only 2 reported hospitalization due to COVID. 59.6% reported decreased fruit intake, while 59.2% decrease in vegetable consumption. Two respondents had suffered death of a family member due to COVID. There was no significant difference among various age groups with regards to the different variables for physical wellbeing [*Table 1*].

46.1% parents/family members experienced loss of job during the pandemic. 72.4% reported decrease in income, 46.5% respondents had difficulty in accessing medicines/ healthcare facilities and 46.9% had difficulty in procuring groceries due to financial reasons. However,there were no significant differences among various age groups [*Table 2*].

It was revealed that on an average the child used to come in contact with people other than family 7.66 ± 8.75 times and was taken to park/public place 2.79 ±

4.04 times in a month.The children were exposed to TV/ mobile for approximately 8.80 ± 9.18 hours per day during lockdown. However, there were significant differences among children of various age groups [*Table 3*].

When screened using RBSK tool, all babies 6 to < 9 months had developed the ability to grasp objects with whole hand while 38.7% parents reported that their baby does not watch TV/any object without tilting his/her head. Among children 9 to <12 months of age, 15.6 % could not sit without support while 13.3% did not respond to their name. Only 68.9% children could avoid bumping into objects while walking.

Among children aged 12 to <15 months 58.8% could not pick up small objects using thumb and index finger like peas and rasins. Only 68.2% children 15to <18 months put objects into container while playing and 54.5% could say at least 2 words other than mama or dada; 91.5% followed simple one step directions and 81.8 % could walk alone. Among children aged 18 to < 24 months, only 64.6% could say at least five words consistently and 66.7% could walk steadily while pulling a toy. 77.1% children could point to 2 or more body parts.89.6% children 24 to <30 months of age had developed fine motor skill of feeding themselves with spoon or hand. Only 66.7% children could make a 2 word phrase while 100% enjoyed playing with other children.

Out of 228 children, development milestones were delayed in 62(27.19 %) children. In group 1a 7/31(22.58%), Gp 1b 12/45(26.66%), Gp 2a 11/34(32.35%), Gp 2b 8/ 22(36.36%), Gp 3 17/48(35.41), & Gp4 7/48(14.58%) children had delayed milestones. Physical and ecnomic well being of 206/228(90.3%) care givers was affected. The association between physical and ecnomic well being of caregivers and development delay in children was not found to be statistically significant in any group or total children. . Analysis GAD 7 score showed that 45/ 228(19.73%) care givers had cut off score of 10 and more and were affected. The association between anxiety in caregivers and development delay in children was not found to be statistically significant in any group or total In

Table 1: Physical wellbeing of the family/ caregivers of enrolled children during COVID lockdown.

Physical wellbeing	**Group 1**		**Group 2**		**Group 3**	**Group 4**	**Total**
	6-9 mths N=31 No (%)	9-12 mths N=45 No (%)	12-15 mths N=34 No (%)	15-18 mths N=22 No (%)	18-24 mths N=48 No (%)	24-30 mths N=48 No (%)	N=228 No (%)
1.History of fever/COVID-19 infection in mother/caregiver/family X^2=1.32, p=0.93							
Yes	14(45.2)	23(51.1)	17(50)	10(45.5)	27(55.1)	23(48.9)	114(50)
No	17(54.8)	22(48.9)	17(50)	12(54.5)	21(43.8)	25(52.1)	114(50)
2.History of hospitalization of any family member due to COVID X^2=5.76, p=0.33							
Yes	0(0)	1(2.2)	0(0)	1(4.5)	0(0)	0(0)	2(0.9)
No	31(100)	44(97.8)	34(100)	21(95.5)	48(100)	48(100)	226(99.1)
3.Fruit consumption during lockdown X^2=12.39, p=0.25							
Increased	2(6.5)	3(6.7)	1(2.9)	0(0)	0(0)	1(2.1)	7(3.1)
Reduced	20(64.5)	19(42.2)	21(61.8)	16(72.7)	29(60.4)	31(64.6)	136(59.6)
No change	9(29)	23(51.1)	12(35.3)	6(27.3)	19(39.6)	16(33.3)	85(37.3)
4.Vegetable consumption during lockdown X^2=11.89, p=0.29							
Increased	2(6.5)	3(6.7)	1(2.9)	0(0)	0(0)	1(2.1)	7(3.1)
Reduced	19(61.3)	19(42.2)	21(61.8)	16(72.7)	29(60.4)	31(64.6)	135(59.2)
No change	10(32.3)	23(51.1)	12(35.3)	6(27.3)	19(39.6)	16(33.3)	86(37.7)
5.Difficulty in accessing healthcare facilities for chronic/preventive/antenatal care X^2=7.63, p=0.17							
Yes	11(35.5)	19(42.2)	20(58.8)	13(59.1)	26(54.2)	29(60.4)	118(51.8)
No	20(64.5)	26(57.8)	14(41.2)	9(40.9)	22(45.8)	19(39.6)	110(48.2)
6.Missed routine immunisation of child X^2 =10.68, p=0.05							
Yes	6(19.4)	16(35.6)	11(32.4)	4(18.2)	10(20.8)	5(10.4)	52(22.8)
No	25(80.6)	29(64.4)	23(67.6)	18(81.8)	38(79.2)	43(89.6)	176(77.2)
7.Mortality due to COVID-19 in family X^2=6.92, p=0.22							
Yes	1(3.2)	0(0)	0(0)	1(4.5)	0(0)	0(0)	2(0.9)
No	30(96.8)	45(100)	34(100)	21(95.5)	48(100)	48(100)	226(99.1)

*$p<0.05$

Table 2: Economic wellbeing of families/caregivers of enrolled children during COVID lockdown

Economic wellbeing	Group 1		Group 2		Group 3	Group 4	Total
	6-9 mths	9-12 mths	12-15 mths	15-18 mths	18-24 mths	24-30 mths	
	N=31	N=45	N=34	N=22	N=48	N=48	N=228
	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)	No (%)
1.Did the parents/family members experience loss of job during the pandemic? X^2=4.00, p=0.54							
Yes	14(45.2)	17(37.8)	18(52.9)	8(36.4)	22(45.8)	26(54.2)	105(46.1)
No	17(54.8)	28(62.2)	16(47.1)	14(63.6)	26(54.2)	22(44.8)	123(53.9)
2.Any change in income of family during the pandemic? X^2=5.34, p=0.37							
Increased	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)	0(0)
Reduced	24(77.4)	31(68.9)	27(79.4)	13(59.1)	32(66.7)	38(79.2)	165(72.4)
No change	7(22.6)	14(31.1)	7(20.6)	9(40.9)	16(33.3)	10(20.8)	63(27.6)
3.Any difficulty in accessing medicines/health facilities due to financial reason? X^2=3.48, p=0.62							
Yes	14(45.2)	23(51.1)	19(55.9)	9(40.9)	18(37.5)	23(47.9)	106(46.5)
No	17(54.8)	22(48.9)	15(44.1)	13(59.1)	30(62.5)	25(52.1)	122(53.5)
4.Any difficulty in procuring groceries due to financial reasons? X^2=2.66, p=0.75							
Yes	15(48.4)	21(46.7)	19(55.9)	9(40.9)	19(39.6)	24(50.0)	107(46.9)
No	16(51.6)	24(53.3)	15(44.1)	13(59.1)	29(60.4)	24(50.0)	121(53.1)

Table 3: Socialisation of enrolled children and their families during COVID lockdown

Socialisation of child and mother /caregiver	Group 1		Group 2		Group 3	Group 4	Total
	6-9 mths	9-12 mths	12-15 mths	15-18 mths	18-24 mths	24-30 mths	
1.On an average, how many times did the child come in contact with people other than family members in a month during 2020 and 2021?	6.74 ± 8.77	6.17 ± 8.52	9.55 ± 9.34	11.63 ± 10.45	5.37 ± 8.35	8.77 ± 7.33	7.66 ± 8.75
	F=2.43, p=0.03*						
2.On an average, how many time was the child taken to park/market/public places in a month during 2020 and 2021?	1.45 ± 2.09	2.2 ± 4.54	3.58 ± 4.40	4.77 ± 4.82	3.06 ± 5.10	2.47 ± 1.62	2.79 ± 4.04
	F=2.36, p=0.04*						
3.On an average, for how much time was the child exposed to television/mobile phone each day during 2020 and 2021?	8.41 ± 9.31	6.46 ± 8.78	9.32 ± 8.91	12.86 ± 9.87	7.00 ± 9.19	10.83 ± 8.66	8.80 ± 9.18
	F=11.26, p=0.00*						
4.On an average, how many times did the mother/caregiver come in contact with people other than family members in a month during 2020 and 2021?	5.35 ± 5.98	5.80 ± 7.83	4.67 ± 5.58	6.31 ± 6.39	6.14 ± 7.98	5.12 ± 6.52	5.55 ± 6.87
	F=2.38, p=0.03*						
5.On an average, how many times did the mother/caregiver visited park/market/public places in a month during 2020 and 2021?	5.8 ± 5.99	4.68 ± 7.84	6.32 ± 5.58	6.02 ± 6.39	5.23± 7.95	5.55 ± 6.55	5.35± 6.88
	F=0.28, p=0.92						

contrast, Shuffrey LC[4] didn't find any association between maternal SARS-COV-2 infection status, timing or severity and infant neurodevelopment at age 6 months using a standardized screener. However, authors further reported that infants born during the pandemic, irrespective of COVID-19 status, scored significantly lower on gross

Table 4: Developmental delay in children (6 to < 30 mths) and its association with physical, psychosocial and economic wellbeing of care givers

Age group	Developmental delay	Physical well being affected		Economic well being affected		GAD 7 Score =10	<10
		Yes (%)	No(%)	Yes (%)	No (%)	Yes (%)	No(%)
6to<9 mths	Present	7(28.0)	0(0.00)	6 (24.0)	1(16.7)19(76.0)	1(16.7)	6(24.0)
	Absent	18(72.0)	6(100.0)	5(83.3)		5 (83.3)	19(76.0)
	$X,^2p$	2.170, 0.141		0.149, 0.700		0.149, 0.700	
9to<12 mths	Present	11(27.5)	1(20.0)	9(27.3)	3(25.0)	2 (16.7)	10(30.3)
	Absent	29(72.5)	4(80.0)	24(72.7)	9(75.0)	10(83.3)	23(69.7)
	$X,^2p$	0.128, 0.721		0.023, 0.879		0.837, 0.360	
12to<15 mths	Present	10(32.3)	1(33.3)	8(28.6)	3(50.0)	4 (66.7)	7(25.0)
	Absent	21(67.7)	2(66.7)	20(71.4)	3(50.0)	2(33.3)	21(75.0)
	$X,^2p$	0.001, 0.970		1.037, 0.309		3.920, 0.048*	
15to<18 mths	Present	6(31.6)	2(66.7)	6(37.5)	2(33.3)	1(20.0)	7(41.2)
	Absent	13(68.4)	1(33.3)	10(62.5)	4(66.7)	4 (80.0)	10(58.8)
	$X,^2p$	1.378, 0.240		0.033, 0.856		0.749, 0.387	
18to<24 mths	Present	17 (37.0)	0(0.0)	12(37.5)	5(31.2)	3(33.3)	14(35.9)
	Absent	29(63.0)	2 (100.0)	20(62.5)	11(68.8)	6 (66.7)	25(64.1)
	$X,^2p$	1.144, 0.285		0.182, 0.670		0.021, 0.885	
24<30 mths	Present	6 (13.3)	1 (33.3)	7 (17.9)	0(0.0)	3(42.9)	4(9.8)
	Absent	39(86.7)	2 (66.7)	32(82.1)	9(100.0)	4(57.1)	37 (90.2)
	$X,^2p$	0.903, 0.342		1.891, 0.169		5,259, 0.22	
Total	Present	57(27.7)	5(22.7)	48(27.7)	14(25.5)	14(31.1)	48(26.2)
	Absent	149(72.3)	17(77.3)	125(72.3)	41(74.5)	31(68.9)	135(73.8)
	$X,^2p$	0.245, 0.620		0.111, 0.739		0.435, 0.510	

children. In the age gp of 12 to <15 months, the caregivers with GAD Score of >=10, had 66.7% of their children with developmental delay and 33.3% children did not have developmental delay and this difference was found to be statistically significant p=0.04(*Table 4, Fig.1*).

No significant statistical difference was found between presence and absence of developmental delay based on social interaction of children and caregivers. Interestingly the children without developmental delay had been exposed more to television or mobile phones than those without delay and this difference was not found to be statistically significant(p=0.41) On asking autism specific questions to children in the age group of 15to <18 months and 18 to< 24 months none of the child was found to be autistic in these age groups.

Discussion

The study of development delays in babies born during pandemic, though not a nascent topic in the western world, remains largely unexplored in developing nations including India.

The prevalence of children with development delays in the present study was 27.19% (62/228). These results are higher than those reported by Sharma N[7] and Gupta A[8] who reported the prevalence rates as 16.2% and 6.3% respectively. Globally the prevalence rates range from 1.5% to 19.8%.[9] This variation is probably due to use of different tools for assessing development milestones and also due to geographical considerations.

Huang P [10] reported high risk of neurodevelopmental delay in fine motor and communication domains in 1 year old children. Fine motor skills like picking small objects using thumb and index finger were affected in 58.8% respondents in 12 to<15 months age groups and these results were in agreement to those reported by Huang P.[10]groups and these results were in agreement to those reported by Huang P.[10]

In contrast, Shuffrey LC[4] didn't find any association between maternal SARS-COV-2 infection status, timing or severity and infant neurodevelopment at age 6 months using a standardized screener. However, authors further reported that infants born during the pandemic, irrespective of COVID-19 status, scored significantly lower on gross motor, fine motor and personal social sub domains of ASQ-3 compared to historical cohort of infants born in the same hospital. Other researchers have also revealed similar findings.[11,12,13]

Data from large number of cohort studies have demonstrated that prenatal perceived stress, loneliness

and stress of early gestation lead to increase risk for adverse neurodevelopment in children.[14]About 60% had decreased fruit and vegetable intake during lock down and these results are in agreement to those reported by Singh K.[15]

Results have revealed that about 52% of caregivers and difficultly in accessing healthcare facility while 46.5% had difficulty in procuring medicines during pandemic and these results are in consonance with other authors.[16]

The findings in the present study have revealed that association between physical well being of care givers and developmental delays in children was found to be statistically insignificant ($p>0.05$). However, authors have found in the age group of 12 to<15 months caregivers who had GAD score of =10, 66.7% of their children displayed developmental delays.

Both the care-givers as well as social networks have a key role in the home and community to monitor and enhance self care behaviours among patients who are co-morbid. The well being of care givers has a direct bearing on the health outcomes of children in the family. To the best of the authors knowledge, this is the first of its type of study in this part of India which is the strength of the present study. But the study has some limitations also. The small sample size and a single site data may limit the generalizability of the study results.

Conclusion

The results showed that physical, economic and psychosocial wellbeing of large majority of the caregivers was affected due to the pandemic. Prevalence of developmental delays in children born during the pandemic were higher than the pre pandemic levels. Further research is needed with children born after the COVID pandemic as comparison group so that causal association, if any, between the effects of pandemic on caregivers and achievement of developmental milestones in children could be elicited.

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Conflict of Interest:Nil

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