

To Study the Impact of Covid Pandemic on Growth and Development of Preschool Children

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Abstract

Introduction: COVID 19 pandemic has brought with it insecurities in housing and food. There had been increased incidences of domestic violence and neglect. Such untoward events called as adverse childhood experiences, definitely have long-term consequences. Family members had to separate when a caregiver or a family member becomes ill. Many had to move and stay into crowded or rather over crowded multi-generational homes although for few days.

Materials & Methods: Research Approach: Descriptive exploratory study Research Design: Community Based survey Study setting: Community – Jodhpur District Study population: Children in 3 to 6 years of age, both genders Sample size: 300 Sampling technique: Purposive sampling Instrument: a) Demographic data sheet, b) WHO standard chart of growth and development, c) Developmental Milestones Checklist

Results: The development of preschooler children during the COVID- 19 pandemic is affected at all levels. The children are found unable to achieve even the 50% of the development in most of the domains of development. The pandemic seems to influence the most in the domain of cognitive development. The height weight differences are re-stated by impact on the movements and physical development of the pre-school children. The 2 years old children have maximum impact on their development in all the four domains.

Conclusions: Covid pandemic has influenced the growth and development of pre-school children to a considerable extent. The younger the child more is the impact of covid. Health Professionals need to focus more on children born during the pandemic who are now pre-school children.

Keywords: Impact; Pandemic; Growth; Development; Preschool Children

Introduction

Growth stunting among under-five children is a significant public health concern globally, affecting approximately 149 million children worldwide. Stunting refers to a condition where a child's height-for-age is below the average for their age, indicating that the child has not grown adequately due to a lack of nutrition, repeated infections, and inadequate psychosocial stimulation. Stunted children are at risk of impaired cognitive development, decreased immune function, and increased morbidity and mortality.

According to the World Health Organization (WHO), an estimated 40 million children under the age of 5 years old were classified as underweight globally in 2020 (WHO, 2021). The prevalence of underweight among preschool children varies significantly by region and country.

In 2020, the highest prevalence of underweight was found in South Asia, where 28.4% of children under the age of 5 years old were classified as underweight. Sub-Saharan Africa had the second-highest prevalence at 13.3%, followed by East Asia and the Pacific at 6.1% (WHO, 2021).

The prevalence of underweight varied by region, with the highest rates observed in the northern and eastern regions of the country. For example, in Bihar, 43.9% of children under the age of 5 years old were classified as underweight, followed by Jharkhand at 41.5% and Uttar Pradesh at 39.5% (IIPS & ICF, 2021).

In contrast, the prevalence of underweight was much lower in high-income countries. For example, in North America and Europe, less than 1% of children under the age of 5 years old were classified as underweight in 2020 (WHO, 2021).

There are several factors that contribute to the high prevalence of underweight among preschool children in low-income countries, including poverty, limited access to

healthcare and nutrition services, poor sanitation, and infectious diseases (Black et al., 2013).

Developmental delay refers to a condition where a child does not reach their developmental milestones at the expected time. It can result from a variety of

factors, including genetic, environmental, and biological factors.

Growth retardation, also known as stunting, is a condition where children have low height-for-age, indicating poor growth and development. The magnitudes of the problem of growth retardation among under-five children is well recorded in literature. According to the World Health Organization (WHO), an estimated 149 million children under the age of five are affected by stunting globally, with the highest prevalence found in sub-Saharan Africa and South Asia. Stunting is associated with increased morbidity and mortality, as well as reduced cognitive function and productivity in adulthood. India has one of the highest rates of stunting in the world, with an estimated 37.9% of children under the age of five affected. Stunting rates are highest in rural areas and among low-income families. Stunting is associated with a higher risk of morbidity and mortality, as well as impaired cognitive function and school performance.

Objectives of the Study

1. To study the growth parameters of preschool children during COVID pandemic.
2. To study the developmental parameters of preschool children during covid pandemic.
3. To estimate the impact of Covid pandemic on the growth parameters of preschool children.
4. To evaluate the impact of Covid pandemic on developmental milestones of preschool children.
5. To compare the impact of COVID pandemic on growth and developmental parameters of male and female preschool children.

Materials & Methods:

Research approach: The study is a descriptive exploratory study. Descriptive study design is selected

Research design: The study is an observational descriptive study.

Population: The study included preschool children in 2 to 5 years of age. Both genders male and female were included in the study. One parent and one preschool child were selected from each eligible family.

Sample size: In all 300 preschool children were recruited for the study.

Sampling technique: The settings of the study were selected randomly by the online random number generator. The individual participants were selected by purposive sampling.

Setting of the Study: The setting selected is the community setting of Nagpur district. Four containment zones of Nagpur city declared during the COVID pandemic by the Collector of Jodhpur District were selected randomly by using random numbers table online.

Data collection Tools/Instruments: The data collection is collected with the help of the tool titled 'Developmental Milestones Inventory for Preschoolers' having 3 parts.

Part I: Demographic data sheet: It consisted of items collecting information regarding general information of the participant. It had 10 items such as age, gender, residence, religion, parent's education, Parent's occupation, and number of children in the family, total number of family members, child's education and history of COVID cases in the family.

Part II: Height & Weight record: These recordings were later compared with the WHO standard chart of height to weight.

Part III: Developmental Milestones Checklist: Developmental Milestones Checklist had items on growth and development of preschool child in four domains. The domains of development covered are physical growth, social – emotional skills, language

skills and cognitive skills development. The items had four options to score from. The options were based on the ability of the child to perform the age-appropriate skills. Developmental Tasks Inventory for preschoolers was developed by the investigator and found reliable ($r=0.78$).

Method of data Collection: The data was collected in the community on one-to-one basis. The identified families were informed about the visit of the investigator for data collection 72 hours in advance on telephone. The time convenient for the child (avoiding times of sleep and feeds) was selected. Normally data was collected between 10 to 11.30 a.m. and 4 p.m. to 6 p.m. Most participating parents shared that this was their child's play time. 31 children were found to be sick at the given time. Their visits were then rescheduled after the 10 – 15 days. This period was considered as adequate for recuperation from minor ailments.

Results

The collected data is coded and analyzed based on the objectives of the study. Data Analysis is done with the application of descriptive statistics of percentage and standard deviation. The inferential statistics of correlation coefficient is used for assessing the inter-relationship between the developmental scores with the growth parameters. Regression linear model is used to establish the association with the demographic variables.

Distribution of Study Participants According to Demographic Characteristics

Table 1: Description of population according to their demographic characteristics

S.N.	Demographic Characteristics	Categories	Frequency	%
1	Age of the child	a) 2	45	15
		b) 3	86	28.67
		c) 4	78	26.00
		d) 5	91	30.33
2	Gender	a) Male	144	48.00
		b) Female	156	52.00

S.N.	Demographic Characteristics	Categories	Frequency	%
3	Parent Education	a) Illiterate	32	10.67
		b) High School	149	49.67
		c) Graduate	89	29.67
		d) Post Graduate	30	10.00
4	Parent's Profession	a) Jobless	1	0.33
		b) Labour	66	22.00
		c) Business	62	20.67
		d) Private Job	93	31.00
		e) Govt Job	52	17.33
		f) Professional	26	8.67
5	No. of Children	a) 1	121	40.33
		b) 2	167	55.67
		c) 3	12	4.00
		d) More than 3	0	0.00
6	Total No. of Family Members	a) 3-5	235	78.33
		b) 6-8	61	20.33
		c) 9-11	3	1.00
		d) More than 11	1	0.33
7	Religion	a) Hindu	111	37.00
		b) Muslim	48	16.00
		c) Christian	46	15.33
		d) Buddhist	58	19.33
		e) Others	37	12.33
8	Residence	a) Urban	163	54.33
		b) Slum	137	45.67

LEVEL OF GROWTH AND DEVELOPMENT

In this section the growth and development parameters are studied.

Table 2: Growth parameters of the study population

Age in Years	Std. Ht. in cms for Indian Population	Height Mean	Height SD	Std. Wt. in kgs. for Indian Population	Weight Mean	Weight SD
2	86	82.47	5.03	11.6	10.24	1.99
3	95	93.12	3.76	14	12.29	1.08
4	103	100.40	4.13	16	13.32	1.25
5	108	107.35	4.29	17.2	16.71	1.90

Table 3: Developmental Milestones of the study population

Sr.No.	Domain of Development	Age in Years	Freq.	Max. Score	Score Obtd.	% of Score
Q1A	Social And Emotional	2	45	450	198	44
Q1B	Language/Communication			630	237	37.62
Q1C	Cognitive (Learning, Thinking, Problem-Solving)			720	271	37.64
Q1D	Movement/Physical Development			630	227	36.03
Q2A	Social And Emotional	3	86	1720	900	52.33
Q2B	Language/Communication			1376	653	47.46
Q2C	Cognitive (Learning, Thinking, Problem-Solving)			1376	613	44.55
Q2D	Movement/Physical Development			688	276	40.12
Q3A	Social And Emotional	4	78	1092	528	48.35
Q3B	Language/Communication			780	350	44.87
Q3C	Cognitive (Learning, Thinking, Problem-Solving)			1560	642	41.15
Q3D	Movement/Physical Development			468	180	38.46
Q4A	Social And Emotional	5	91	1820	907	49.84
Q4B	Language/Communication			728	379	52.06
Q4C	Cognitive (Learning, Thinking, Problem-Solving)			910	423	46.48
Q4D	Movement/Physical Development			1092	506	46.34

Relationship between study variables

This section deals with the inter-relationship between

the height, weight and developmental scores in four domains of development

Table4: Relationship between Height and Development of study participants

Study Variables	Age	Freq	Mean	SD	'r'	'p'
Height	2	45	82.47	5.03	0.146	0.339
Development			20.73	3.03		NS,p>0.05
Height	3	86	93.12	3.76	-0.028	0.797
Development			28.40	4.80		NS,p>0.05
Height	4	78	100.40	4.13	0.369	0.001
Development			21.79	4.90		S,p<0.05
Height	5	91	107.35	4.29	-0.075	0.480
Development			24.34	4.70		NS,p>0.05

Table5: Relationship between Weight and Development of study participants

Study Variables	Age	Freq	Mean	SD	'r'	'p'
Weight	2	45	10.24	1.99	0.105	0.491
Development			20.73	3.03		NS,p>0.05
Weight	3	86	12.29	1.08	0.163	0.133
Development			28.40	4.80		NS,p>0.05
Weight	4	78	13.32	1.25	0.158	0.166
Development			21.79	4.90		NS,p>0.05
Weight	5	91	16.71	1.90	0.094	0.373
Development			24.34	4.70		NS,p>0.05

Table6: Relationship between height and weight of preschool children

Study Variables	Age	Freq	Mean	SD	'r'	'p'
Height	2	45	82.47	5.03	0.420	0.004
Weight			10.24	1.99		S,p<0.05
Height	3	86	93.12	3.76	0.295	0.06
Weight			12.29	1.08		S,p<0.01
Height	4	78	100.40	4.13	0.622	0.000
Weight			13.32	1.25		S,p<0.05
Height	5	91	107.35	4.29	0.626	0.00
Weight			16.71	1.91		S,p<0.05

Association of Study Variables with Demographic Characteristics

This section deals with the finding out the predictors of shortfalls in growth and development of preschool children during the COVID pandemic.

Table7: Association of Height with the demographic variables of 2years old preschool children

S.N.	DemographicVariable	Mean	SD	FValue	-
1	HeightwithGender	82.47	5.03	-0.303	0.022 S,p<0.05
2	HeightwithEducationofthe Parent	82.47	5.03	0.154	0.157
3	HeightwithOccupationofthe Parent	82.47	5.03	0.095	0.268
4	HeightwithNo.ofchildrenin Thefamily	82.47	5.03	0.329	0.014 S,p<0.05
5	HeightwithNo.Offamily members	82.47	5.03	-0.114	0.228
6	Heightwithreligion	82.47	5.03	-0.087	0.285
7	HeightwithResidence	82.47	5.03	-0.047	0.380
8	HeightwithChild's Education	82.47	5.03	-0.273	0.035 S,p<0.05
9	HeightwithH/o.COVIDin family	82.47	5.03	0.406	0.003 S,p<0.05

Table No.8: Association of Weight with demographic variables of 2 year sold preschool children

S.N.	DemographicVariable	Mean	SD	FValue	'p'value
1	WeightwithGender	10.24	1.99	-0.003	0.493
2	WeightwithEducationofthe Parent	10.24	1.99	0.217	0.076
3	WeightwithOccupationofthe Parent	10.24	1.99	0.293	0.025 S,p<0.05
4	WeightwithNo.ofchildrenin Thefamily	10.24	1.99	0.106	0.244
5	WeightwithNo.offamily members	10.24	1.99	0.277	0.033 S,p<0.05
6	Weightwithreligion	10.24	1.99	-0.220	0.073
7	WeightwithResidence	10.24	1.99	0.097	0.264
8	WeightwithChild's Education	10.24	1.99	-0.215	0.078
9	WeightwithH/o.COVIDin family	10.24	1.99	0.049	0.374

Table No.9: Association of over all Development with the demographic variables of 2 years old preschool children

S.N.	DemographicVariable	Mean	SD	FValue	'p'value
1	DevelopmentwithGender	20.73	3.03	0.085	0.290
2	DevelopmentwithEducationof TheParent	20.73	3.03	-0.031	0.421
3	DevelopmentwithOccupation of the Parent	20.73	3.03	-0.108	0.241
4	DevelopmentwithNo.of Childreninthefamily	20.73	3.03	0.138	0.183
5	DevelopmentwithNo.offamily members	20.73	3.03	0.063	0.340
6	Developmentwithreligion	20.73	3.03	-0.190	0.106
7	DevelopmentwithResidence	20.73	3.03	-0.207	0.086
8	DevelopmentwithChild's Education	20.73	3.03	-0.140	0.180
9	DevelopmentwithH/o. COVID Infamily	20.73	3.03	-0.011	0.470

Table10: Association of Height with the demographic variables of 3year sold preschool children

S.N.	DemographicVariable	Mean	SD	FValue	'p'value
1	HeightwithGender	93.12	3.76	-0.068	0.266
2	HeightwithEducationofthe Parent	93.12	3.76	0.116	0.143
3	HeightwithOccupationofthe Parent	93.12	3.76	0.159	0.072
4	HeightwithNo.ofchildrenin Thefamily	93.12	3.76	-0.095	0.192
5	HeightwithNo.offamily members	93.12	3.76	0.023	0.415
6	Heightwithreligion	93.12	3.76	-0.100	0.180
7	HeightwithResidence	93.12	3.76	-0.333	0.001 S,p<0.05
8	HeightwithChild'sEducation	93.12	3.76	0.139	0.101
9	HeightwithH/o.COVIDin family	93.12	3.76	0.011	0.458

Table No. 11: Association of Weight with demographic variables of 3 year sold preschool children

S.N.	DemographicVariable	Mean	SD	FValue	'p'value
1	WeightwithGender	12.29	1.08	0.119	0.138
2	WeightwithEducationofthe Parent	12.29	1.08	0.048	0.329
3	WeightwithOccupationof TheParent	12.29	1.08	0.072	0.256
4	WeightwithNo.ofchildrenin the family	12.29	1.08	-0.031	0.389
5	WeightwithNo.offamily members	12.29	1.08	-0.015	0.445
6	Weightwithreligion	12.29	1.08	0.052	0.316
7	WeightwithResidence	12.29	1.08	-0.007	0.475
8	WeightwithChild's Education	12.29	1.08	-0.011	0.459
9	WeightwithH/o.COVIDin family	12.29	1.08	-0.032	0.385

Table12 shows the association between development of 3 years old preschool children with their demographic characteristics at 5% level of significance.

S.N.	DemographicVariable	Mean	SD	FValue	'p'Value
1	DevelopmentwithGender	28.40	4.80	0.098	0.186
2	DevelopmentwithEducation Of the Parent	28.40	4.80	-0.059	0.293
3	DevelopmentwithOccupation of the Parent	28.40	4.80	0.036	0.370
4	DevelopmentwithNo.of Childreninthefamily	28.40	4.80	0.121	0.133
5	DevelopmentwithNo.of Familymembers	28.40	4.80	0.002	0.492
6	Developmentwithreligion	28.40	4.80	-0.272	0.006 S,p<0.05
7	DevelopmentwithResidence	28.40	4.80	0.017	0.439
8	DevelopmentwithChild's Education	28.40	4.80	0.204	0.030 S,p<0.05
9	DevelopmentwithH/o. COVIDinfamily	28.40	4.80	0.019	0.432

Table13: Association of Height with the demographic variables of 4 year sold preschool children

S.N.	DemographicVariable	Mean	SD	FValue	'p'value
1	HeightwithGender	100.40	4.13	0.026	0.411
2	HeightwithEducationofthe Parent	100.40	4.13	0.148	0.099
3	HeightwithOccupationofthe Parent	100.40	4.13	0.074	0.261
4	HeightwithNo.ofchildrenin the family	100.40	4.13	-0.156	0.086
5	HeightwithNo.offamily members	100.40	4.13	0.007	0.476
6	Heightwithreligion	100.40	4.13	0.211	0.032 S,p<0.05
7	HeightwithResidence	100.40	4.13	-0.336	0.001 S,p<0.05
8	HeightwithChild'sEducation	100.40	4.13	0.151	0.094
9	HeightwithH/o.COVIDin family	100.40	4.13	-0.062	0.295

TableNo.14:AssociationofWeightwithdemographicvariables of4yearsold preschool children

S.N.	DemographicVariable	Mean	SD	FValue	'P'value
1	WeightwithGender	13.32	1.25	-0.092	0.211
2	WeightwithEducationofthe Parent	13.32	1.25	0.060	0.301
3	WeightwithOccupationofthe Parent	13.32	1.25	0.118	0.152
4	WeightwithNo.ofchildrenin Thefamily	13.32	1.25	-0.054	0.319
5	WeightwithNo.offamily members	13.32	1.25	-0.025	0.415
6	Weightwithreligion	13.32	1.25	-0.066	0.282
7	WeightwithResidence	13.32	1.25	-0.179	0.059
8	WeightwithChild's Education	13.32	1.25	0.045	0.348
9	WeightwithH/o.COVIDin family	13.32	1.25	-0.116	0.155

TableNo.15: Association of overall Development with the demographic variables of 4 years old preschool children

S.N.	DemographicVariable	Mean	SD	FValue	'P'value
1	DevelopmentwithGender	21.80	4.90	0.033	0.386
2	DevelopmentwithEducation OftheParent	21.80	4.90	-0.098	0.197
3	DevelopmentwithOccupation of the Parent	21.80	4.90	-0.077	0.251
4	DevelopmentwithNo.of Childreninthefamily	21.80	4.90	0.102	0.188
5	DevelopmentwithNo.of family members	21.80	4.90	-0.022	0.423
6	Developmentwithreligion	21.80	4.90	-0.026	0.412
7	DevelopmentwithResidence	21.80	4.90	0.329	0.002 S,p<0.05
8	DevelopmentwithChild's Education	21.80	4.90	-0.391	0.000 S,p<0.05
9	DevelopmentwithH/o. COVID in family	21.80	4.90	-0.032	0.392

Table16:Association of Height with the demographic variables of 5 year sold preschool children

S.N.	DemographicVariable	Mean	SD	FValue	'p'value
1	HeightwithGender	107.35	4.29	-0.021	0.421
2	HeightwithEducationofthe Parent	107.35	4.29	0.212	0.022
3	HeightwithOccupationofthe Parent	107.35	4.29	0.109	0.152
4	HeightwithNo.ofchildrenin Thefamily	107.35	4.29	-0.130	0.110
5	HeightwithNo. offamily members	107.35	4.29	0.046	0.331
6	Heightwithreligion	107.35	4.29	0.025	0.407
7	HeightwithResidence	107.35	4.29	-0.085	0.212
8	HeightwithChild's Education	107.35	4.29	0.066	0.267
9	HeightwithH/o.COVIDin family	107.35	4.29	-0.026	0.402

TableNo. 17: Association of Weight with demographic variables of 5 year sold preschool children

S.N.	DemographicVariable	Mean	SD	FValue	'P'value
1	WeightwithGender	16.71	1.91	0.038	0.360
2	WeightwithEducationofthe Parent	16.71	1.91	0.123	0.123
3	WeightwithOccupationofthe Parent	16.71	1.91	0.020	0.426
4	WeightwithNo.ofchildren in Thefamily	16.71	1.91	-0.148	0.081
5	WeightwithNo.offamily Members	16.71	1.91	-0.006	0.478
6	Weightwithreligion	16.71	1.91	-0.093	0.191
7	WeightwithResidence	16.71	1.91	-0.005	0.481
8	WeightwithChild's Education	16.71	1.91	0.073	0.245
9	WeightwithH/o.COVIDin family	16.71	1.91	0.045	0.338

TableNo.18:Association of over all Development with the demographic variables of 5 years old preschool children

S.N.	DemographicVariable	Mean	SD	FValue	'P'value
1	DevelopmentwithGender	24.34	4.70	-0.022	0.418
2	DevelopmentwithEducation of the Parent	24.34	4.70	0.069	0.256
3	DevelopmentwithOccupation OftheParent	24.34	4.70	0.048	0.327
4	DevelopmentwithNo.of children in the family	24.34	4.70	-0.082	0.221
5	DevelopmentwithNo.of family members	24.34	4.70	-0.177	0.047
6	Developmentwithreligion	24.34	4.70	-0.060	0.285
7	DevelopmentwithResidence	24.34	4.70	0.024	0.412
8	DevelopmentwithChild's Education	24.34	4.70	0.138	0.096

Conclusions

An observational exploratory study was planned with the main aim to assess the impact of COVID 19 pandemic on the growth and development of preschool children from containment zones in Nagpur city of Maharashtra state in India.

In all 300 preschool children were recruited for the study. The sample size was estimated with the help of online <http://riskcalc.org:3838/samplesize> for the observational study.

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Conflict of Interest: There are no conflicts of interest

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