Community Section

Online Learning among Primary and Middle School Children in Rural Chennai, Tamil Nadu, India- A Story of Inequitable Distribution

K MARGARET PUNITHA[1], PA ARCHANA LAKSHMI[2], K THENDRAL VEDHAMANI[3], SRINIDHI CHANDRAMOULIE[4], CHRISTINA MARY P PAUL[5], T STEPHEN[6]

(cc) BY-NC-ND

ABSTRACT

Introduction: The Coronavirus Disease-2019 (COVID-19) pandemic has disrupted education and has resulted in a lot of educational losses which is bound to be more exaggerated in the rural areas. The present study was done to assess the availability of prerequisites for online learning among a rural population. The study also looks at the school dropout rates due to the COVID-19 pandemic in a rural population in Tamil Nadu, India.

Aim: To estimate the access to digital devices and school dropout rates in a rural population, to find the hassles faced due to online learning and to identify the risk factors for dropping out of school.

Materials and Methods: The present community-based cross-sectional study was conducted in the rural field practice areas of Karpaga Vinayaga Medical College (KVMC) situated in Chinna Kolambakkam beyond Chengalpet, Chennai, Tamil Nadu, India and data collection was done between June 2021 and August 2021, using a semi-structured proforma. Data was collected from 256 children between the ages of 6-14 years residing in a rural area in Tamil Nadu, to learn about their transition in education during the pandemic and to identify the factors determining dropping out of school. Associations between school dropouts and socio-demographic factors were found using Chi-square test.

Results: Out of total study participants, 131 (51.2%) belonged to primary school and the rest belonged to the middle school category and there were 138 (53.9%) boys and 118 (46.1%) girls. Of all the study participants, 39 (15.2%) had dropped out of school. Dropouts had a statistically significant association with lower socio-economic status (p-value=0.00000007), lower educational status of the father (p-value=0.043), male gender (p-value=0.037) and belonging to a private school (p-value=0.045). Only 25 (9.7%) owned the gadget, they were using to attend online classes.

Conclusion: The current study has revealed high school dropout rates (15.2%) than rural primary and middle school children with inadequate access to digital devices.

INTRODUCTION

The director general of World Health Organisation (WHO) in March 2020 declared COVID-19 as a pandemic and social distancing was announced as a means of controlling the pandemic [1]. Lockdown was implemented in most countries, workplaces and educational institutes were shut down which proved to be efficient and yet led to many challenges to both the teachers and students [2]. This emergency transition had lots of set-backs associated with poor online teaching infrastructure, inexperience of teachers, the information gap, and the complex environment at home. In addition, there was lack of mentoring and support [3].

Many countries around the world instructed schools and colleges to start e-Learning classes. Though urban students with good internet facilities benefitted, but students from rural areas faced many challenges because of lack of facilities [4]. Which resulted in many students discontinuing school education in rural areas, which in turn may have adverse effects on their livelihoods in the future. Besides the potential digital divide and distance learning practices, school closure may have disrupted physical activity, social interaction, and mental health of children [5]. During the pandemic, the Tamil Nadu Government started the "illam thedi kalvi" program with the help of volunteers to help the school dropouts to learn through extracurricular activities with the help of volunteers. The order to resume physical classes was passed by the Tamil Nadu Government for students of classes nine and above (from September 2021), and for classes 1-8 (from 1st November 2021), after a gap of 19 months. Although there is consensus that closure

of schools can cause harm, there is lack of evidence on the extent of harm that was caused due to closure of schools [6].

The abovementioned facts have raised many questions on the availability and utilisation of e-learning population of rural school children in the 19 months, that they did not have physical classes for. Hence, a study was taken up amongst primary and middle schoolers in rural Chennai with the objectives of estimating the prevalence of access to digital learning devices, identifying the hassles faced because of digital learning, estimating the school dropout rates because of the pandemic, and determining the association between school dropouts and socio-demographic factors.

MATERIALS AND METHODS

The present community-based cross-sectional study was conducted in the rural field practice areas of Karpaga Vinayaga Medical College (KVMC) situated in Chinna Kolambakkam beyond Chengalpet, Chennai, Tamil Nadu, India and data collection was done between June 2021 and August 2021. The study was approved by the Institutional Ethics Committee (IEC Ref No KIMS/F/2021/13). Informed consent was obtained from a parent, and in addition assent was also obtained from children aged >7 years of age.

Inclusion criteria: Children aged 6-14 years of age, were included in the study after they expressed their willingness through consent from a parent and through assent if they were above the age of seven.

Exclusion criteria: Children with underlying illnesses that interfere with regular school education were excluded from the study.

Sample size calculation: An online survey done in Tamil Nadu found that 40% of the students did not have computers or small gadgets for e-Learning [4].

Sample size (SS)=$z\alpha^2 PQ/L^2$

$z\alpha$=1.96; P=40%; Q=100-P=60%; L=15% of P=6;

SS=$(1.96)^2 *40*60/6*6$=256

Therefore, the calculated sample size was 256 participants.

Study Procedure

The pandemic COVID-19 is a novel phenomenon, and this is the first time that schools remained shut for extended periods of time. Since there was paucity of literature, a tailor-made 30 item proforma was prepared based on expert opinions from subject experts. Test-retest and inter-rater reliability were calculated during the pilot study, which was done on 5% of the sample size. The test-retest correlation coefficient was 0.9 and Cohen's Kappa score for interrater reliability was 0.8. Necessary modifications were incorporated. Socio-economic classification was calculated using the modified BG Prasad classification 2021 [7]. Pilot testing of the proforma was done on ~5% (15 individuals) to ensure comprehension and feasibility. The respondent's identity details were kept confidential. The questionnaire is available in [Appendix-1].

STATISTICAL ANALYSIS

Data entry and analysis was done using Statistical Package for the Social Sciences (SPSS) software version 28.0. Descriptive data was tabulated using percentages and 95% confidence intervals were calculated. Associations were found using Chi-square values found by Mantel Haenszel test which in turn was used to determine the p-values. The p-value <0.05 was considered statistically significant.

RESULTS

Among 256 study participants, 131 (51.2%) belonged to primary school and the rest belonged to the middle school category. There were more boys (n=138, 53.9%) than girls (n=118, 46.1%). Most of the fathers had completed middle school 102 (39.8%), as also had most of the mothers 109 (42.6%). The socio-economic status of the subjects was assessed using the BG Prasad 2021 scale and most of them belonged to class III (middle class) 116 (45.3%) [Table/Fig-1].

Variables	n	Percentage (%)	95% Confidence interval
Grade of the child			
Primary school (Classes I-V)	131	51.2	44.9-57.5
Middle school (Classes VI-VIII)	125	48.8	42.5-55.1
Gender			
Girls	118	46.1	39.9-52.4
Boys	138	53.9	47.6-60.1
Educational status of father			
Illiterate	20	7.8	4.8-11.8
Primary school	24	9.4	6.1-13.6
Middle school	102	39.8	33.8-46.1
Secondary school	43	16.8	12.4-21.9
Graduate/diploma	60	23.4	18.4-29.1
Postgraduate/professional	7	2.7	1.1-5.6
Educational status of mother			
Illiterate	19	7.4	4.5-11.4
Primary school	18	7.0	4.2-10.9
Middle school	109	42.6	36.4-48.9
Secondary school	54	21.1	16.3-26.6
Graduate/diploma	52	20.3	15.6-25.8
Postgraduate/professional	4	1.6	0.4-4.0

Religion of the child			
Christian	37	14.4	10.4-19.4
Hindu	215	84.0	78.9-88.3
Muslim	4	1.6	0.4-4.0
Socio-economic status based on BG Prasad scale			
Upper class	16	6.3	3.6-9.6
Upper middle class	61	23.8	18.7-29.5
Middle class	116	45.3	39.1-51.6
Lower middle class	51	19.9	15.2-25.4
Lower class	12	4.7	2.5-8.1

[Table/Fig-1]: Socio-demographic profile of the study participants (N=256).

When asked about the school last attended, 123 (48.0%) were found to have attended a private school and 39 (15.2%) had dropped out of school. The reason mentioned for dropping out of school by all (100%) dropouts was the inability to pay fees. Among the study participants, 29 (11.3%) received concession in school fees in view of the pandemic. There was a statistically significant association between the type of school last attended and dropping out of school, wherein 25 out of 39 (64.1%) were from private schools (p-value=0.045) [Table/Fig-2]. A total of 132 (51.6%) of the study subjects attended classes regularly, 187 (73.1%) said they needed a gadget with internet connectivity to attend classes, 75 (29.3%) had both live and recorded sessions, 25 (9.7%) owned a gadget, 183 (71.5%) used a mobile type gadget and 121 (47.2%) had 4G with good connectivity. A 14.8% of the parents said that they had bought a new gadget to support their child's learning [Table/Fig-3].
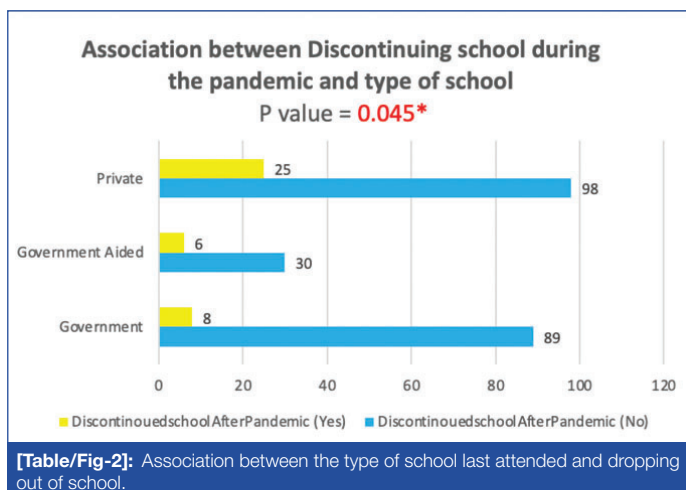
[Table/Fig-2]: Association between the type of school last attended and dropping out of school.

Variables	n	Percentage (%)	95% Confidence interval
Type of school last attended			
Government	97	37.9	31.9-44.1
Government-aided	36	14.1	10.1-18.9
Private	123	48.0	46.0-58.6
Discontinued school during pandemic			
Yes	39	15.2	11.1-20.2
No	217	84.8	79.8-88.9
Regularity of attending classes			
Regular	132	51.6	45.3-57.8
Irregular	85	33.2	27.5-39.3
Not applicable	39	15.2	11.1-20.2
Does the child need gadgets to devices with internet facilities to attend classes?			
Yes	187	73.1	67.2-78.4
No	30	11.7	8.1-16.3
Not applicable	39	15.2	11.1-20.2

Nature of classes			
Live only	43	16.8	12.4-22.0
Live and recorded	75	29.3	23.8-35.3
Recorded only	69	27.0	21.6-32.8
Television only	30	11.7	8.1-16.3
Not applicable	39	15.2	11.1-20.2
Ownership of gadget used for classes			
Self-owned	25	9.7	6.4-14.1
Family-owned	141	55.1	48.8-61.3
Shared among siblings	17	6.6	3.9-10.4
Shared among friends	2	0.8	0.1-2.8
Borrowed	2	0.8	0.1-2.8
Not applicable	69	27.0	21.6-32.8
Bought a new gadget to support the child's learning			
Yes	38	14.8	10.7-19.8
No	149	58.2	51.9-64.3
Not applicable	69	27.0	21.6-32.8
Type of gadget used for classes			
Mobile type	183	71.5	65.5-76.9
Computer type	3	1.2	0.2-3.4
Tablet type	1	0.4	0.0-2.2
Not applicable	69	27.0	21.6-32.8
Type of internet facility used for classes			
4G with good connectivity	121	47.2	41.0-53.6
4G with poor connectivity	66	25.8	20.5-31.6
Not applicable	69	27.0	21.6-31.6

[Table/Fig-3]: Online classes details of the students during the pandemic (N=256).

The number of boys who dropped out of school was 2.15 times higher than the number of girls and the association was statistically significant (p-value=0.037). Students who belonged to lower class and lower middle class according to BG Prasad classification were 6.36 times more likely to dropout of school, when compared to the subjects from middle class, upper middle class and upper class and the association was statistically significant (p-value=0.00000007). Subjects whose fathers had educational qualification of middle class and below were more 2.14 times more likely to dropout of school and the association was statistically significant (p-value=0.043). However, the other associations were not statistically significant. Details can be seen in [Table/Fig-4]. Boys were more likely to use the gadgets for recreational purposes like watching YouTube and playing videogames, details can be seen in [Table/Fig-5].

Among the study participants, 184 (71.9%) said that online classes had more hassles when compared to the physical classes in school, 34 (13.3%) thought that online assessments were reliable and 173 (67.6%) were prepared to send their wards to physical classes, if school opened the very next day. Details can be seen in [Table/Fig-6]. When asked what the hassles faced were, the common responses shared were that concentration and comprehension were less compared with physical classes, headaches were frequent, distractions due to watching movies and playing games during classes, gadget related issues and internet connectivity issues.

DISCUSSION

The current study showed the school dropout rates were 15.2%, this was comparable to the dropout rates of a study done in Mayang Imphal constituency that revealed dropout rates of different schools between 5.5% and 17% [8]. The leading cause for dropout

Variables	Grouping of variables	Students who discontinued from school during the pandemic (n=39), n	Students who did not discontinue from school during the pandemic (n=217), n	Odds ratio (95% CI of odds ratio)	Chi-square value	p-value
Grade of school	Middle school (n=125)	23	102	1.62 (0.81-3.24)	1.89	0.17
	Primary school (n=131)	16	115	1.00		
Gender	Boys (n=138)	27	111	2.15 (1.04-4.46)	4.33	**0.037**
	Girls (n=118)	12	106	1.00		
Socio-economic status (BG Prasad 2021)	Lower class and Lower middle class (n=63)	23	40	6.36 (3.08-13.13)	29.17	**0.00000007**
	Middle class, Upper middle class, and upper class (n=193)	16	177	1.00		
Educational status of the father	≤ Middle school (n=146)	28	118	2.14 (1.01-4.51)	4.08	**0.043***
	> Middle school (n=110)	11	99	1.00		
Educational status of the mother	≤ Middle school (n=146)	27	119	1.85 (0.89-3.85)	2.78	0.095
	> Middle school (n=110)	12	98	1.00		

[Table/Fig-4]: Association between discontinuing school during the pandemic and certain risk factors.
The p-value in bold font indicates statistically significant values
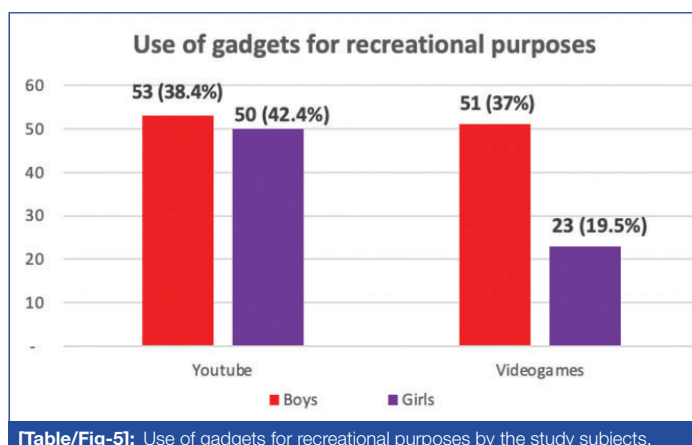
[Table/Fig-5]: Use of gadgets for recreational purposes by the study subjects.

Variables	n (%)	Percentage (%)	95% Confidence interval
Probable hassles with online learning			
More hassles than real school	184	71.9	65.9-77.3
No hassles	72	28.1	22.7-34.1
Do you think online assessments are reliable?			
Yes	34	13.3	9.4-18.1
No	222	86.7	81.9-90.6
If school reopens tomorrow, would you send your ward to school			
Yes	173	67.6	61.5-73.3
No	83	32.4	26.7-38.5

[Table/Fig-6]: Informant's perceptions on online learning and assessments (N=256).

was found to be poverty in that study, which was comparable to the results of the current study that has shown that, dropout rates were significantly much higher (p-value=0.00000007) among lower socio-economic status and lower middle class when compared to the middle class, upper middle class and upper class subjects.

A study done in Pakistan on school dropouts and its consequences concluded that girls had significantly lower Learning Adjusted Life Years (LAYS) among girls when compared to boys [9]. Whereas, the current study showed that the dropout rates were significantly higher among boys (p-value=0.037), this could be because this was a temporary phenomenon because of COVID-19 pandemic as another study done on 41,554 households across all states and union territories in India also found that the dropout rates were significantly more among girls when compared to boys (OR=1.11, 1.00-1.23) [10]. The current study revealed that there were significantly more dropouts among subjects who last attended a private school (p-value=0.045), which was comparable to the findings of an all-India survey, which found that students from private schools were 2.17 times more likely to dropout of school [10]. A study done in rural Madhya Pradesh, India, among Government undergraduate students concluded that rural students prefer offline classes and that 45% of the students did not attend regularly and join online classes for an entire session which was similar to the results of the current study were only 51.6% of the students were attending online classes regularly [2]. A qualitative research study done on 18 teachers, showed that only 9/18 (50%) said that online assessments were reliable and 15/18 (83.3%) faced some difficulty with online assessments, which was similar to the results of the current study that revealed that 86.7% of the informants did not think that online assessments were reliable [11]. The study has shown very important information on the infrastructure deficits that the rural population has which in turn hinders online education, only 9.7% of the study subjects had their own gadget that could be used for attending their classes. However, further comparisons could not be made because of paucity of literature from similar population.

Limitation(s)

The limitation of the present study was the fact that, it was a onetime survey with no follow-up provisions to find out, if the students who had dropped out of school had resumed, after the physical classes had resumed in schools.

CONCLUSION(S)

The present study has revealed very high school dropout rates among rural primary and middle school children (15.2%). The study has identified certain factors such as socio-economic status, educational status of the father, type of school that were associated with students dropping out of school. The current study has been an eye opener with regards to the harsh realities of infrastructure inadequacies in a rural population. The present study also showed how education was not treated as a priority and how measures were not taken to ensure the availability of necessary resources. Follow-up studies on the postpandemic status of the dropouts would be worthwhile and interesting, as would research on adaptation of blended learning.

REFERENCES

[1] Adedoyin OB, Soykan E. COVID-19 pandemic and online learning: The challenges and opportunities. Interact Learn Environ [Internet]. 2020;0(0):01-13. Available from: https://doi.org/10.1080/10494820.2020.1813180.

[2] Agrawal J. Effect of lockdown on education of rural undergraduate students during covid-19 pandemic in Umarban (Dhar), MP, India. Innovare J Educ. 2021;9(3):14-18.

[3] Carrillo C, Flores MA. COVID-19 and teacher education: A literature review of online teaching and learning practices. Eur J Teach Educ. 2020;43(4):466-87.

[4] Meji MA, Dennison MS, Mobisha M, Umar MM. The challenges in E-Learning among Tamilnadu students in the COVID-19 induced crisis. i-manager's J Humanit Soc Sci. 2020;1(4):33-40.

[5] Tang S, Xiang M, Cheung T, Xiang Y. Mental health and its correlates among children and adolescents during COVID-19 school closure: The importance of parent-child discussion. J Affect Disord. 2020;279:353-60.

[6] Alban C, Akseer S, Dreesen T, Kamei A. Potential effects of COVID-19 school closures on foundational skills and country responses for mitigating learning loss Carolina. Int J Educ Dev. 2021;87:01-11.

[7] Mathiyalagen P, Davis P, Sarasveni M. Updated BG Prasad socio-economic classification: The 2020 update. Indian J Pediatr. 2021;88(1):76-77.

[8] Singh AB. A study on the drop out rate of girl students of schools within mayang imphal constituency, Manipur. IJMER. 2021;514(4):127-34.

[9] Jehangir M, Ahmed J. Child education in the time of pandemic: Learning loss and dropout. Child Youth Serv Rev. 2021;127:01-10.

[10] Paul R, Rashmi R, Srivastava S. Does lack of parental involvement affect school dropout among Indian adolescents? Evidence from a panel study. PLoS One [Internet]. 2021;16(5):01-16. Available from: http://dx.doi.org/10.1371/journal.pone.0251520.

[11] Aslan SA, Turgut YE, Aslan A. Teachers' views related the middle school curriculum for distance education during the COVID-19 pandemic. Educ Inf Technol [Internet]. 2021;26(6):7381-405. Available from: https://doi.org/10.1007/s10639-021-10587-z.

PARTICULARS OF CONTRIBUTORS:
1. Assistant Professor, Department of Community Medicine, Sri Lalithambigai Medical College, Chennai, Tamil Nadu, India.
2. Professor, Department of Community Medicine, Karpaga Vinayaga Institute of Medical Sciences and Research Centre, Chennai, Tamil Nadu, India.
3. Medical Officer, Department of Obstetrics and Gynaecology, Apollo Hospital Greams Road, Chennai, Tamil Nadu, India.
4. Medical Officer, Department of General Medicine, ACS Medical College, Chennai, Tamil Nadu, India.
5. Professor and Head, Department of Community Medicine, Indira Medical College and Hospitals, Chennai, Tamil Nadu, India.
6. Associate Professor, Department of Community Medicine, Balaji Medical College, Chennai, Tamil Nadu, India.

NAME, ADDRESS, E-MAIL ID OF THE CORRESPONDING AUTHOR:
Christina Mary P Paul,
No. 32, O Block, 36th Street, Anna Nagar East, Chennai-600102, Tamil Nadu, India.
E-mail: christinapaul82@gmail.com

AUTHOR DECLARATION:
• Financial or Other Competing Interests: None
• Was Ethics Committee Approval obtained for this study?   Yes
• Was informed consent obtained from the subjects involved in the study?   Yes
• For any images presented appropriate consent has been obtained from the subjects.   NA

Appendix 1: Questionnaire

Informed consent: Assent: Yes/NA

Proforma

1. Name of the informant.
2. Relationship to the child.
3. Name of the child.
4. Age of the child.
5. Gender of the child: male/female/other.
6. Religion of the child: Hindu/Christian/Muslim/other.
7. Educational status of the father.
8. Educational status of the mother.
9. Total monthly family income.
10. Total number of family members.
11. Type of school last attended: Govt/Pvt/Govt aided.
12. Grade of the child.
13. Has the child discontinued school after the pandemic: Yes/No?
14. Yes/NA. If yes reasons.
15. Is the student attending school: Yes/no?
16. Is the child attending school regularly: yes/no/NA?
17. Does your child need a gadget to attend classes currently: Yes/No/NA?

18. Nature of classes: Live only/recorded only/mix of live and recorded/through Television only/Mixture of live, recorded and Television/Others specify.
19. Does the student attend live online classes regularly: Yes/No/NA?
20. Nature of gadget: Phone type/computer type.
21. Ownership of gadget: self-owned/family owned/borrowed/shared with friends of same age/shared with siblings/NA.
22. Did you buy a gadget to support your child's learning during the pandemic: Yes/No/NA?
23. Do you have good internet facilities: Yes/No?
24. Type of internet: 4G/Wifi/others specify/NA.
25. Does the child play online games: Yes/No?
26. Does the child watch YouTube: Yes/No?
27. School fees details: in full/concession given/NA.

Questions to parents

28. Do you think online assessments are reliable: Yes/No?
29. If school re-opened tomorrow, would you send your child to school: Yes/No?
30. Write a note on the hassles you faced because of the child's online learning