
ORIGINAL ARTICLE**Adolescents and Floods: An Exploratory Study from Kerala**

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Abstract:

Background: A better understanding regarding the experiences faced by adolescents is essential to plan need based interventions and disaster preparedness. *Aim and Objectives:* To assess impact of floods among adolescents in Kerala. *Material and Methods:* This study was conducted among 670 adolescent children in selected schools using stratified sampling in Alleppey district. The study tool included a structured questionnaire which collected information on sociodemographics and impact (rescue, flood related losses, life during floods, morbidity, stay in relief camps and effect of academic activities) *Results:* Among the 670 participants assessed, 362 (54%) were females with a mean age of 16.03 ± 0.73 years. More than 50 percent reported that they had to survive without basic necessities such as food (125, 18.7%), water (146, 21.8%), electricity (369, 55.1%) and proper sanitation facilities (71, 10.6%) during floods. Nearly 25 percent of them needed a rescue service and majority were rescued using boat service. In the study, 189 (28.2%) of them reported flood related losses. This included damage to houses (178, 26.6%), household items (174, 26%), documents (207, 31%), study materials (140, 20.9%) and pets (41, 6.1%). Few reported deaths of their loved ones in the family. The common morbidity reported was skin infection (27, 4%). Among students, 86 (12.8 %) stayed in rescue camps with median days of stay of 8 days (IQR 5, 15). More than 80 percent of them were happy with the facilities provided in the camp. Among students, 265 (39.6%) missed classes and majority reported that they are unable to concentrate

post floods. We noted significant differences in the flood related loss and experience of students from private and public school. *Conclusion:* This study observed many personal and academic losses related to floods that can have a deep psychological impact among adolescents. Mental health of the adolescents should be treated as a priority and trained mental health specialist should be included in the disaster relief team. The experience they gained can be used to plan local interventions and train them in disaster preparedness and risk reduction.

Keywords: Floods, Adolescents, Disaster

Introduction:

Natural disasters have existed ever since the history of mankind and millions of people are affected annually. A disaster is an event causing severe disruption to normal functioning of a society, leaving a profound trail of human, material, or environmental losses. In recent years, global reports suggest a significant increase in the occurrence of natural disasters [1]. India is highly prone natural disasters due to its geographical location and climatic changes. Past ten years has witnessed worst floods in many areas of India making floods one of the most commonly occurring disaster in the country. Literature suggests that flooding is responsible for tremendous physical, social, and psychological disruptions of the affected community. The impact is more in developing countries due to limited

resources and coping strategies for post-disaster rehabilitation [2]. The flood disaster in 2018 wreaked havoc in Kerala state of India. The worst flooding in more than a century has left hundreds dead, hundreds of thousands homeless, billions of dollars of losses and the lingering risk of disease in Kerala. A similar event experienced by different people may have very different traumatic effects from person to person [3]. Adolescents are highly vulnerable to traumatic events like disasters and can have long term sequels. Several factors play a pivotal role in determining the impact of a trauma on children's wellbeing. This includes loss of valued personal and family possessions, friendship networks, disruption of education, experience of fear, anxiety, poverty, isolation, uncertainty, lack of sleep and recreation, basic necessities, housing conditions and many more. The magnitude of the trauma experienced can affect physical and mental health of children. This was the first experience of the community dealing with a disaster of this magnitude and hence the immediate response, rescue mechanisms and the strategies adopted in this area may be completely different from other areas.

A better understanding regarding the experiences faced by adolescents is essential to plan need based interventions and will aid in disaster preparedness in future. Knowledge regarding strengths and vulnerabilities of adolescents and equipping them proper education and training will enable them to be active support during disasters [4]. There is also a need for the community to acknowledge and understand the range of losses experienced by them. The perceived losses by adolescents affected with same trauma may be completely different from the adult community of that area. Most of the studies done on flooding have only captured the

experiences and perspectives of adults and have neglected one of the most vulnerable population i.e. adolescents [4-5]. There is lack of literature exploring the flood related experiences of adolescents from Kerala. Hence this study is carried out to assess impact of floods (flood related damages, loss and morbidity) among adolescents in flood affected areas of Alleppey district, Kerala, to understand the flood related experiences during the floods and in relief camps from the perspective of adolescents and to compare the magnitude of flood related loss and experience across adolescents from private and public schools in Alleppey district, Kerala.

Material and Methods:

A cross sectional study was conducted among adolescent children from flood affected areas of Alleppey district. Adolescents belonging to high school and higher secondary classes were selected using stratified sampling from private and public schools of Alleppey district. A list of schools from both the private and public sector was obtained from the flood affected areas of Alappuzha district and one school from each category was selected based on convenience. Principal/Management of the schools were approached for the permission to conduct the study. A written informed consent was obtained from the principal and assent of the students were also taken. A total of 670 students (335 from each stratum) were included in the study. A structured questionnaire was used to collect information regarding flood related experiences. The questionnaire was validated prior to deployment in the field by having it reviewed by a panel of experts. Suitable modifications were incorporated.

The questionnaire was divided into the following two parts:

Part 1: Sociodemographic Variables:

- Socio-demographic variables- Age, gender, educational status of parents, occupation of parents, type of family, family income per month etc.

Part 2: Flood Related Experiences:

- Flood related damages-Damages to houses, household properties, documents, death of family members and loss of pets.
- Morbidity-Any illness during and after the floods.
- Experiences during flood- Days spent without basic necessities like food, drinking water, electricity and details of rescue operation including mode of rescue.
- Experience in relief camps- Good and bad experiences in relief camps, toilet facilities, food, medical checkup etc.

Institutional Ethical Review Board (IERB) approval was obtained for conducting the study. On obtaining written informed consent and assent, pretested questionnaires were administered to the adolescents who fulfilled the inclusion criteria and data was collected by trained medical students.

The data collected was coded and entered in Microsoft Excel. All the statistical analysis was performed using Epi info software. Descriptive statistics comprising of mean and Standard Deviation (SD), frequencies and percentages were calculated. Proportions were compared using Chi square test. A p value less than 0.05 was considered to be statistically significant.

Results:**Sociodemographic Factors:**

Among the 670 participants assessed 308 (46%) were males and 362 (54%) were females with a mean age of 16.03 ± 0.73 years. There were equal number of participants from government and private school under the study. Majority of the students, 476 (71%) belonged to a nuclear family, 174 (36%) from a joint family and 20 (3%) from extended families or others. While 378 (56.4%) hail from rural area only 292 (43.6%) have their residence in an urban area. Majority of the study population belonged to the income category of Rs.<10,000. The socio-demographic profile of the participants has been described in Table 1.

Table 1: Distribution of Study Population Based on Socio-demographic Profile

	Variable	Frequency	Percentage
Gender	Male	308	46
	Female	362	54
Class	Class 10	104	15.5
	Class 11	430	64.2
	Class 12	136	20.3

Continued...

	Variable	Frequency	Percentage
Type of school	Government	335	50
	Private	335	50
Educational status of father	High school	178	26.6
	Higher secondary	181	27
	Graduate	246	36.7
	Post graduate	65	9.7
Educational status of mother	High school	154	23.1
	Higher secondary	175	26.1
	Graduate	266	39.7
	Post graduate	75	11.1
Occupation of father	Professional	162	24.1
	Non professional	456	68.1
	Retired/not working	52	7.8
Occupation of Mother	Professional	170	17.9
	Non professional	170	25.4
	Retired/not working	380	56.7
Type of family	Nuclear	476	71
	Joint	174	36
	Extended/others	20	3
Place of residence	Urban	292	43.6
	Rural	378	56.4
Monthly income	<10,000	231	34.5
	10,000 – 50,000	275	41
	>50,000	164	24.5

Flood Related Losses:

In the study, 189 (28.2%) of them suffered some sort of damages and 178 (26.6%) had damage to the houses. 174 (26%) out of the study population reported that they lost some of their household properties while 496 (74%) had no loss of the household properties. Nearly one fifth of the study population lost their study materials.

And 41(6.1%) of them lost their pets (Graph 1). Six (0.9%) out of the 670 of the participants

reported death of their family members in floods. One third of students reported that they feel their family faced financial loss of varying degrees due to floods. Out of the 670 participants, 626 (93.4%) had no any illness post flood while the remaining 44 (6.6%) of them suffered from various illness after floods, the details of which is given in the table below. The common morbidity reported was skin diseases.

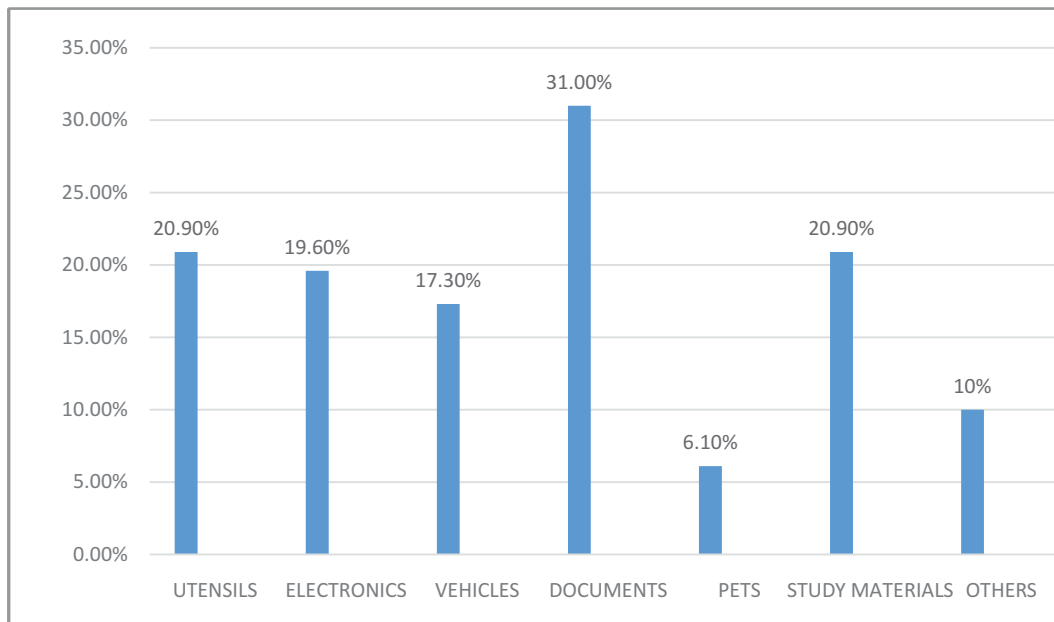


Table 2: Distribution of Study Population Based on Morbidities during Flood

Illness	Frequency	Percentage
Respiratory illness	5	0.7
Skin diseases	27	4
Diarrhoeal diseases	2	0.3
Mosquito borne illness	6	0.9
Others	4	0.6
Total	44	6.6

Rescue, Camp Stay and Experiences:

Among the participants, 362 (54%) reported that they had a lack of basic necessities such as food (18.7%), lacked water (21.8%), electricity (55.1%) and proper toilet facilities (10.6%) on the days following the flood (Table 3).

Among the study population, 494 (73.7%) did not require any rescue service, the remaining 176 (26.3%) had to depend on various modes of rescue. It included manual 67 (10%), boat service 77 (11.5%), helicopter 8 (1.2%) and other modes 24 (3.6%) for their rescue. Out of this population, only 86 of them (12.8%) had to stay in camps with median days of stay was 8 days (IQR 5, 15). Among them, 78 (90.6%) were happy with the stay, 74 (86%) were happy with the sanitation facilities, 76 (88.4%) had no complaints about the medical care and 77 (89.5%) was happy with the food provided. The median days of stay without basic necessities was 3 (3, 7). Overall, 71 (78.9%)

were thankful to the services and happy with the experiences in the relief camps set up immediately after the flood. More than one third i.e. 265 (39.6%) reported that they missed their classes for less than a week, while 248 (37%) of them missed classes for more than 2 weeks and some of them did not miss any classes.

Comparison between Private and Public Schools:

Students belonging to both private and public schools were affected by floods. Even private school students had to stay in relief camps, encountered flood related losses and lived without basic necessities during the days following floods. We noted significant differences in the flood related loss and experience of students from private and public school (Details in Table 4).

Table 3: Distribution of Population Based on Lack of Basic Necessities Post Flood

Facility lacking	Frequency	Percentage
Food		
Yes	125	18.7
No	545	81.3
Water		
Yes	146	21.8
No	524	78.2
Electricity		
Yes	369	55.1
No	301	44.9
Sanitation		
Yes	71	10.6
No	599	89.4

Table 4: Comparison of Flood Related Experience across Private and Public School

Variables	Categories	Type of school			Chi square <i>p</i> value
		Public	Private	Total	
Flood related damage	Yes	61(32.3%)	128(67.7%)	189	$\chi^2=33.084$ $p<0.0001^S$
	No	274(57%)	207(43%)	481	
Loss of pets	Yes	21(51.2%)	20(48.8%)	41	$\chi^2=0.26$ $p=0.872^{NS}$
	No	314(49.9%)	315(50.1%)	629	
Life without basic necessities	Yes	162(44.8%)	200(55.2%)	362	$\chi^2=8.677$ $p=0.003^S$
	No	173(56.2%)	135(43.8%)	308	
Camp stay	Yes	34(39.5%)	52(60.5%)	86	$\chi^2=4.322$ $p=0.038^S$
	No	301(51.5%)	283(48.5%)	584	
Lack of sanitation facility in camps	Yes	26(36.6%)	45(63.4%)	71	$\chi^2=8.373$ $p=0.004^S$
	No	12(78.6%)	3(21.4%)	15	
Loss of study materials	Yes	49(35%)	91(65%)	140	$\chi^2=15.928$ $p<0.0001^S$
	No	286(54%)	244(46%)	530	
Unable to concentrate	Yes	195(43.9%)	249(56.1%)	444	$\chi^2=19.470$ $p<0.0001^S$
	No	140(61.9%)	86(38.1%)	226	

Discussion:

The manuscript describes flood related experiences from the perspective of adolescents in flood affected areas of Alleppey district. Disasters immensely affect children because of their particular stage of psychological and social development. It is noted that nearly one third of the participants had to be rescued during the event of flood and some of them had to stay in relief camps. Living with uncertainties and changes will be problematic for many especially adolescents. Studies have showed that disruption the floods

caused to their homes, schools and friendship networks were seen to impact on children's physical and emotional health [6]. Some of the adolescents even reported that they had lost their pets during the event. The mental trauma of losing pets can be sustained for longer periods in children compared to adults [7].

More than half of them had to stay without basic necessities like food/water/sanitation/electricity for days. This indirectly showed the magnitude of the event faced by children which can have a

profound impact in their life. Psychological health of children is affected largely by the nature of disaster, the level of exposure to disaster, personal loss, and individual characteristics of children. A similar study done in UK revealed some of the complexities experienced by flood-affected adolescents. These included the long-term effects of living in temporary accommodation, re-locating to a different school, family tensions at home exacerbated by flood-related financial worries and the fear of recurring disaster [6]. In Kerala type of school is an indirect indicator of socioeconomic status. We observed that children belonging to all socioeconomic classes were affected by this flood. Even students of private school had to depend on relief camps. Some of them had to live without basic necessities during the flood event and days after. Major proportion of the students who had flood related losses belonged to private school. This could have a detrimental effect on adolescents especially in private schools (higher socioeconomic status) that are not used to hardships. In spite of extensive literature search we could not find studies comparing the experiences of private and public-school students. In this study it has been observed that majority could not attend classes and had difficulty in concentrating post floods. Previous studies also have shown significant effect of natural disasters on academic activities and children's education. Floods cause loss of learning hours, loss of qualified personnel, outbreak of diseases, high absenteeism and low syllabus coverage leading to children's poor academic performance [8]. Adolescence is a significant period of human growth and maturation [9]. The experiences faced during this period can have a profound impact in the future both physically and mentally. At the same time the experiences gained,

and lessons learnt can also help in positive ways. It can play an important role in recovery from flood disasters by helping families and communities. Studies have observed that active involvement by children in disaster management can help in their recovery. Usually flood and emergency planning policy either ignores children and adolescents or labels them as vulnerable rather than treating them as responsible citizens in their own right. There is need to integrate disaster risk reduction into the education curriculum. Children and adolescents need to be taught how to prepare, mitigate, prevent, respond to, and recover from flood disasters. Teachers can be trained to prepare and equip them to deal with the psychosocial issues effectively [1, 6].

Strengths and limitations: This study is one among the few school-based studies that have looked into the flood experiences among adolescents in India and probably to the best of our knowledge the only one and first of its kind in Kerala. Stratified sampling involving with a good sample size involving different type of schools improved representation of the study population. The information collected was from self-report of adolescents. As it was a school-based study, it was not feasible to include parents in this study.

We recommend studies with qualitative methods to assess the experiences and perspectives of adolescents in future to get a better understanding. The approach taken in the disaster management has taken a paradigm shift from post disaster intervention to disaster preparedness and risk reduction. Considering the experiences among adolescents, mental health of the adolescents should be considered as a priority and trained counsellor/psychologist/psychiatrists should be included in the relief team.

Conclusion:

This study observed many personal and academic losses related to floods among adolescents. More than 50 percent of adolescents had to live without basic necessities during floods. We observed that children belonging to all socioeconomic classes were affected by this flood. All these can have a deep psychological impact among adolescents. Mental health of the adolescents should be treated as a priority and trained mental health specialist should be included in the disaster relief team. The

experience they gained can be used to plan local interventions and train them to become socially responsible citizens who can play a pivotal role in the disaster preparedness and risk reduction.

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