

# Effectiveness of Virtual Teaching Tool on Quality of Life and Post-Traumatic Stress Disorder among Adolescents Affected by Flood at Uttarakhand: A Pilot Study

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## ABSTRACT

**Background:** Floods comes with devastating effects on individual and family worldwide. Flash floods are very common in India. Indian citizens have experienced a variety of floods at Uttarakhand, Kerala, Chennai, and Assam etc. The aftermath of floods can be seen on quality of life (QOL) and mental health as post-traumatic stress disorder (PTSD) among victims which should be improved. The present study was aimed to assess the effectiveness of the virtual teaching tool (VTT) on measures to improve QOL and PTSD among adolescents who experienced flood at Uttarakhand.

**Methods:** Mixed method research approach and exploratory research study, one-group pre-test-post-test designs were adopted for this study. Using a non-probability, convenient sampling technique, forty adolescents who experienced flood were selected from the Bhatwadi, Uttarkashi district of Uttarakhand. Tools includes demographic data, WHOQOL-BREF, PCL-5 and one subjective question.

**Results:** VTT on measures to improve QOL and PTSD was administered after pre-test. The mean and standard deviation of post-test WHOQOL-BREF score  $275.37 \pm 38.01$  was higher than the mean and standard deviation of pre-test WHOQOL-BREF score  $227.30 \pm 36.52$ . The mean and standard deviation of post-test PTSD (PCL-5) score  $1.00 \pm .00$  was lower than the mean and standard deviation of pre-test PTSD (PCL-5) score  $1.67 \pm .474$ . There were no association between sociodemographic variables with WHOQOL-BREF score and PTSD (PCL-5) scale. There is a correlation in pre-test QOL and PTSD. People were afraid of floods, loss of lives and households, and there is acceptance to the aftermath of flood and ready to accommodate.

**Conclusions:** VTT on measures to improve QOL and PTSD is effective and can bring the community change after among adolescents who experienced floods.

**Keywords:** Adolescents, flood, PTSD, QOL, virtual teaching tool

## INTRODUCTION

Floods that may be big or small, both can have devastating effects on individual and family<sup>1</sup>. It may have impact on quality of life (QOL). People can take steps to reduce the harm due to floods<sup>1</sup>. The aftermath of floods may have medium and long-term health impact on mental health<sup>2</sup>.

India is highly vulnerable and prone to floods. Floods are a recurrent phenomenon, which can cause huge loss of lives, loss of livelihood, property, infrastructure and public utilities<sup>3</sup>. The natural as well as man-made disaster leads to various physical and psychological effects on individual<sup>4</sup>. Systematic reviews revealed that PTSD is the most commonly

studied and reported psychiatric morbidity among survivors of natural disasters worldwide<sup>[5, 6, 8]</sup>. A cross-sectional study to assess the prevalence of PTSD among victims at Primary Health Care Centers of Uttarkashi and Rudraprayag Districts of Uttarakhand, India, highlighted the need for early recognition of psychiatric disorders following disasters and subsequently providing interventions<sup>7</sup>. PTSD is highly prevalent among adolescents<sup>9</sup>.

Experiencing the earthquake may adversely affect psychological dimensions of QOL even five years after disaster<sup>10</sup>.

There is a need for public awareness programs to improve QOL and PTSD among adolescents. So, the present pilot study was aimed to assess effectiveness of the VTT on measures to improve QOL and PTSD at Uttarakhand.

## **METHODS**

### ***Study design, setting, sampling, and tools***

For the present pilot study mixed method research approach and exploratory research study, one-group pre-test - post-test designs were adopted to assess the effectiveness of VTT on QOL and PTSD among adolescents affected by flood at Uttarakhand, Rajasthan. Baseline data were collected before and after VTT. The study conducted by exercising interviews among adolescents by the researcher during 8 Sept. to 31 Oct. 2021. The sample consisted of forty adolescents who met the sampling criteria were selected by using convenient sampling technique. Since it is a pilot study and aimed to assess the effectiveness VTT, small sample was selected.

The content validity of the demographic data, WHOQOL-BREF scale, PTSD (PCL-5) scale and one subjective question and VTT for QOL and PTSD was determined by sending them to the panel of experts. Whereas VTT includes the measures to improve QOL and PTSD. After seeking their valuable comments and suggestions, tools were modified. The demographic questionnaire included age, gender, religion, educational qualification of

the subject, educational qualification of the mother, educational qualification of the father, employment status of the subject, occupation of mother, occupation of father, family income per month, and habitat. WHOQOL-BREF scale consists 26 items and they are categorised into two questions and four domains (DOM). Where QOL (Q1) is "How would you rate your QOL" and QOL (Q2) is "How satisfied are you with your health?". Where DOM1 is Physical health, DOM2 is psychological health, DOM3 is social relationship, and DOM4 is environmental health out of which question no. 21 "How satisfied are you with your sex life?" was not included for this study. For PTSD, PCL-5 was used which consists 20 items. Other than these, one question was included as "How was your experience in flood?" for which fifteen adolescents were recruited and noted down their statements. The reliability of WHOQOL-BREF scale and PCL-5 scale was examined by Cronbach's Alpha as .84 and .85 respectively using SPSS which suggests that tool was highly reliable.

### ***Data collection procedures***

#### ***Structured interview schedule:***

Formal permission was obtained from the Gram Pradhan of the selected village Bhatwadi, Uttarkashi district of Uttarakhand. All adolescents who were willing to participate were eligible for inclusion in the interview for assessment of QOL and PTSD. The researcher approached adolescents of the village, in which information about the project, aims and interview process of the study were presented both orally and, in a letter, emphasizing its privacy and confidentiality, and their consent to participate was requested from their parents, utilizing a structured consent form in the parent's preferred language as Hindi. Forty adolescents were recruited the village. Structured interviews were conducted at the homes of each adolescent by interviewers trained in the study procedures to ensure that adolescent's privacy was maintained.

The pre-test questionnaires examine adolescent's sociodemographic profile, WHOQOL-BREF scale, PCL-5 scale and one subjective question. The same day VTT was given on the measures to improve QOL and PTSD. After 30 days the investigator administered a post-test with WHOQOL-BREF and PCL-5 scales.

### Statistical analysis

Data collected were collated, and was subjected to statistical analysis using SPSS 23 version. Descriptive statistics viz. mean, standard deviation, percentage, and frequency were used to describe the demographic characteristics of the study participants. Frequency distribution of WHOQOL-BREF items' responses were analysed. WHOQOL-BREF scale was computed domain wise as raw score and then transformed into WHOQOL-100 as transformed score according to the guidelines of scoring.

The correlation coefficients were computed in two overall questions and four domains of WHOQOL-BREF. A Paired t-test was used for the four domains of WHOQOL-BREF scale and PCL-5 scale. We used a chi-square test for association between socio-demographic variables with WHOQOL-BREF and PCL-5 score on QOL and PTSD respectively. Correlation, Sig. (2-tailed) was computed between QOL and PTSD. We set the statistical significance level at  $p < 0.05$  and a 95% confidence interval. Results is presented using tables.

### Ethics committee

Ethical clearance was obtained from the Human Research Ethics Committee (HREC), Geetanjali University, Udaipur, Rajasthan vide letter no. GU/HREC/EC/2019/1674 dated 1 Jan. 2019.

## RESULTS

### Demographic Data

Table 1: Demographic profile of participants.

Sl No.	Characteristics	Frequency (N=40)	Percentage (%) (N=40)
1.	Age		
	10-13 years	3	7.5
	14-15 years	19	47.5
2.	Gender		
	Male	21	52.5
	Female	19	47.5
3.	Religion		
	Hindu	40	100
	Muslim	0	0
	Christian	0	0
4.	Educational qualification of the subject		
	No formal education	0	0
	Up to 5th standard	4	10
	6th – 10th standard	21	52.5
5.	Educational qualification of the mother		
	No formal education	10	25
	Up to 5th standard	15	37.5
	6th – 10th standard	8	20
	11th – 12th standard	6	15
6.	Educational qualification of the father		
	No formal education	0	0
	Up to 5th standard	8	20
	6th – 10th standard	15	37.5
	11th – 12th standard	12	30
7.	Employment status of the subject		
	Employed	1	2.5
	Not employed	39	97.5
8.	Occupation of mother		
	Unemployed/Housewife	34	85
	Part time job	6	15
9.	Occupation of father		
	Unemployed/Housemaker	1	2.5
	Part time job	39	98.5
10.	Family income per month (Rs)		
	< 10000	25	62.5
	10001 – 20000 Rupees	9	22.5
	20001 – 30000 Rupees	5	12.5
11.	Habitat		
	Rural	40	100
	Urban	0	0

The pilot study findings showed that majority of adolescents were between the age group of 14 to 15 years 19 (47.5%) and majority of adolescents 21 (52.5%) were males (table 1). All adolescents were Hindu and from rural background. The majority of adolescents 21 (52.5%), adolescent's mother 15 (37.5%), and adolescent's father 15 (37.5%) were having educational qualification between 6<sup>th</sup> to 10<sup>th</sup> standard, up to 5<sup>th</sup> standard, and 6<sup>th</sup> to 10<sup>th</sup> standard respectively. Most of all adolescents were

not employed 39(98.5%). The majority of adolescent's mother 34 (85%) and adolescent's father 39 (98.5%) were unemployed/housemaker and part time job

respectively. The majority of adolescents 25 (62.5%) family income per month (Rs) were less than 10000 (Table 1).

## QOL

**Table 2: Distribution of WHOQOL-BREF items' responses, N=40**

Sl. No.	Item	Very poor	Poor	Neither poor nor good	Good	Very good	Mean±SD
1.	How would you rate your quality of life?	1 (2.5)	5(12.5)	23(57.5)	11(27.5)	-	3.10±.708
		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied	Mean±SD
2.	How satisfied are you with your health?	-	5 (12.5)	8 (20)	24(60)	3(7.5)	3.625±.806
		Not at all	A little	A moderate amount	Very Much	An extreme amount	Mean±SD
3.	To what extent do you feel that physical pain prevents you from doing what you need to do?	2(5)	6(15)	10(25)	10(25)	12(30)	3.60±1.215
4.	How much do you need any medical treatment to function in your daily life?	2(5)	6(15)	10(25)	3(7)	19(47)	5.77±1.329
5.	How much do you enjoy life?	-	5(12.5)	12(30)	11(27.5)	12(30)	3.75±1.031
6.	To what extent do you feel your life to be meaningful?	1(2.5)	13(32.5)	21(52.5)	4(10)	1(2.5)	2.77±.767
		Not at all	A little	A moderate amount	Very Much	Extremely	Mean±SD
7.	How well are you able to concentrate?	3(7.5)	28(70)	8(20)	1(2.5)	-	2.17±.594
8.	How safe do you feel in your daily life?	5(12.5)	14(35)	18(45)	3(7.5)	-	3.47±.816
9.	How healthy is your physical environment?	1(2.5)	25(62.5)	13(32.5)	1(2.5)	-	3.35±.579
		Not at all	A little	Moderately	Mostly	Completely	Mean±SD
10.	Do you have enough energy for everyday life?	13(32.5)	9(22.5)	15(37.5)	2(5)	1(2.5)	2.22±1.049
11.	Are you able to accept your bodily appearance?	-	-	6(22.5)	16(40)	15(37.5)	4.15±.769
12.	Have you enough money to meet your needs?	3(7.5)	21(52.5)	9(22.5)	5(12.5)	2(5)	2.55±.985
13.	How available to you is the information that you need in your day-to-day life?	1(2.5)	22(55)	15(37.5)	2(5)	-	2.45±.638
14.	To what extent do you have the opportunity for leisure activities?	1(2.5)	25(62.5)	11(27.5)	3(7.5)	-	2.40±.671
		Very poor	Poor	Neither poor nor good	Good	Very good	Mean±SD
15.	How well are you able to get around?	4(10)	8(20)	9(22.5)	18(45)	1(2.5)	3.10±1.081
		Very dissatisfied	Dissatisfied	Neither satisfied nor dissatisfied	Satisfied	Very satisfied	Mean±SD
16.	How satisfied are you with your sleep?	-	1(2.5)	22(55)	15(37.5)	2(5)	3.45±.638
17.	How satisfied are you with your ability to perform your daily living activities?	-	4(10)	27(67.5)	8(20)	1(2.5)	3.15±.622
18.	How satisfied are you with your capacity for work?	1(2.5)	4(10)	17(42.5)	16(40)	2(5)	3.35±.833
19.	How satisfied are you with yourself?	-	1(2.5)	10(25)	15(37.5)	14(35)	4.05±.845
20.	How satisfied are you with your personal relationships?	1(2.5)	4(10)	11(27.5)	17(42.5)	7(17.5)	3.62±.978
21.	How satisfied are you with your sex life?	Not considered					
22.	How satisfied are you with the support you get from your friends?	1(2.5)	7(17.5)	21(52.5)	11(27.5)	-	3.05±.749
23.	How satisfied are you with the conditions of your living place?	-	3(7.5)	15(37.5)	13(32.5)	9(22.5)	3.70±.911

**Table 2 Continued...**

24.	How satisfied are you with your access to health services?	12(30)	10(25)	13(32.5)	5(12.5)	-	2.27±1.037
25.	How satisfied are you with your transport?	1(2.5)	17(42.5)	12(30)	7(17.5)	3(7.5)	2.85±1.001
		Never	Seldom	Quite often	Very often	Always	Mean±SD
26.	How often do you have negative feelings such as blue mood, despair, anxiety, depression?	-	3(7.5)	21(52.5)	14(35)	2(5)	3.37±.704

**Table 3: Correlation coefficients in two overall questions and four domains of WHOQOL-BREF**

		How would you rate your quality of life	How satisfied are you with your health?	DOM1: Physical health	DOM2: Psychological health	DOM3: Social relationship	DOM4: Environmental health
How would you rate your quality of life	Pearson Correlation	1	.247	.189	.484**	.051	.396*
	Sig. (2-tailed)		.125	.242	.002	.754	.011
How satisfied are you with your health?	Pearson Correlation	.247	1	.629**	.559**	.062	.357*
	Sig. (2-tailed)	.125		.000	.000	.706	.024
DOM1: Physical health	Pearson Correlation	.189	.629**	1	.670**	.219	.615**
	Sig. (2-tailed)	.242	.000		.000	.175	.000
DOM2: Psychological health	Pearson Correlation	.484**	.559**	.670**	1	.333*	.688**
	Sig. (2-tailed)	.002	.000	.000		.036	.000
DOM3: Social relationship	Pearson Correlation	.051	.062	.219	.333*	1	.076
	Sig. (2-tailed)	.754	.706	.175	.036		.642
DOM4: Environmental health	Pearson Correlation	.396*	.357*	.615**	.688**	.076	1
	Sig. (2-tailed)	.011	.024	.000	.000	.642	

\*\* Correlation is significant at the 0.01 level (2-tailed).  
\* Correlation is significant at the 0.05 level (2-tailed).

**Table 4: Effectiveness of VTT on quality of life for the four domains of WHOQOL-BREF, N=40**

WHOQOL-BREF ITEMS	Mean±SD		P-value
	Pre-test	Post test	
Q1: How would you rate your quality of life?	3.100±.708	4.100±.590	.000
Q2: How satisfied are you with your health?	3.625±.806	4.525±.598	.000
DOM1: Physical health	56.025±11.765	67.925±13.203	.000
DOM2: Psychological health	59.725±11.980	76.075±11.182	.000
DOM3: Social relationship	56.275±12.440	62.850±13.563	.000
DOM4: Environmental health	48.550±11.338	59.900±11.928	.000
Total Quality of Life	227.300±36.529	275.375±38.018	.000

\*p is significant at <0.05 level.

In pre-test, none of adolescents were rated their QOL as “very good”. Only 3 (7.5%) adolescents were rated how they are satisfied with their health as “very satisfied”. Majority of the adolescents 12(30%) rated what extent do they feel that physical pain prevents them from doing what they need to do as in “an extreme amount”. Adolescents around 19 (47%) were rated how much do they need any medical treatment to function in their daily

life as in “an extreme amount”. Majority of adolescents 12 (30%) rated how much do they enjoy life as in both “a moderate amount” and “an extreme amount”. Most of adolescents 21 (52.5%) rated to what extent do they feel their life to be meaningful as in “a moderate amount”. Majority of adolescents 28 (70%) rated how well are they able to concentrate as in “a little”. Most of adolescents 18 (45%) rated how safe do they feel in their daily life as in “a moderate

amount". Majority of adolescents 25 (62.5%) rated how healthy is their physical environment as in "a little". Most of adolescents 15 (37.5%) rated do they have enough energy for everyday life as in "a moderate amount". Majority of adolescents 16 (40%) rated "mostly" for they are able to accept their bodily appearance. Most of adolescents 21 (52.5%) rated "a little" they have enough money to meet their needs. Most of adolescents 22 (55%) rated "a little" for how available to them is the information that they need in their day-to-day life. Majority of adolescents 25 (62.5%) rated "a little" to what extent do they have the opportunity for leisure activities. Most of adolescents 18 (45%) rated "good" for how well are they able to get around. Most of adolescents 22 (55%) rated "neither satisfied nor dissatisfied" for how satisfied they are with their sleep. Majority of adolescents 27 (67.5%) rated "neither satisfied nor dissatisfied" for how satisfied they are with their ability to perform their daily living activities. Most of adolescents 17 (42.5%) rated "neither satisfied nor dissatisfied" for how satisfied they are with their capacity for work. Majority of adolescents 15 (37.5%) rated "satisfied" for how satisfied they are with themselves. Majority of adolescents 17 (42.5%) rated "satisfied" for how satisfied they are with their personal relationships. None of adolescents were asked to rate for how satisfied they are with their sex life as it was removed from the questionnaire. More than half of adolescents 21 (52.5%) rated "neither satisfied nor dissatisfied" for how satisfied they are with the support they get from their friends. Majority of adolescents 15 (37.5%) rated "neither satisfied nor dissatisfied" for how satisfied they are with the conditions of their living place. Majority of adolescents 13 (32.5%) rated "neither satisfied nor dissatisfied" for how satisfied they are with their access to health services. Majority of adolescents 17 (42.5%) rated "dissatisfied" for how satisfied they are with transport. More than half of adolescents 21 (52.5%) rated "quite often" for how often do

they have negative feelings such as blue mood, despair, anxiety, depression (Table 2).

There are statistically significant correlations between all domains of WHOQOL-BREF score (Table 3). In this study, in order to compare the significant difference between score means of different WHOQOL-BREF domain ratings, the paired t-tests were used. The pre-test and post-test mean and standard deviation (SD) of QOL (Q1) were  $3.100 \pm 0.708$  and  $4.100 \pm 0.590$  respectively. Whereas the pre-test and post-test mean and SD of QOL (Q2) were  $3.625 \pm 0.806$  and  $4.525 \pm 0.598$  respectively. In addition to this, the pre-test and post-test mean and SD of QOL DOM1 (Physical health) were  $56.025 \pm 11.765$  and  $67.925 \pm 13.203$  respectively, the pre-test and post-test mean and SD of QOL DOM2 (Psychological health) were  $59.725 \pm 11.980$  and  $76.075 \pm 11.182$  respectively, the pre-test and post-test mean and SD of QOL DOM3 (Social relationship) were  $56.275 \pm 12.440$  and  $62.850 \pm 13.563$  respectively and the pre-test and post-test mean and SD of QOL DOM4 (Environmental health) were  $48.550 \pm 11.338$  and  $59.900 \pm 11.928$  respectively. The pre-test and post-test mean and SD of overall QOL were  $227.300 \pm 36.529$  and  $275.375 \pm 38.018$  respectively (Table 4).

### **PTSD**

A total score of 31-33 or higher suggests the patient may benefit from PTSD treatment. Here, it is categorised as 0-33 and 34-80 where a total score of 33 or higher suggests the patient may benefit from PTSD treatment. The patient can either be referred to a PTSD specialty clinic or be offered an evidence-based treatment for PTSD such as Prolonged Exposure (PE), Cognitive Processing Therapy (CPT), or Eye Movement Desensitization and Reprocessing).

In pre-test, most of adolescents 27 (32.5%) scored 34-80. In post-test, all adolescents 40 (100%) scored 31-33. The mean and SD of post-test ( $1.00 \pm 0.00$ ) was

lower than the pre-test (1.67±.474). Where a significant reduction in mean score of PTSD (PCL-5) in post-test as compared to pre-test indicate that the VTT is effective tool (Table 5).

**Table 5: Pre-test PTSD score of adolescents**

	PTSD (PCL-5) score	Frequency	Percent	Mean±SD	P-value
Pre-test	0-33	13	32.5	1.67±.474	.000
	34-80	27	67.5		
	Total	40	100.0		
Post-test	0-33	40	100.0	1.00±.00	
	34-80	0	0		
	Total	40	100.0		

\*p is significant at <0.05 level.

**Table 6: Association between selected sociodemographic variables and pre-test QOL (WHOQOL-BREF score)**

Sl. No.	Variables	Pre-test WHOQOL-BREF score (N=40)				Chi- square	P value
		Very Poor	Poor	Good	Very good		
1.	Age (in years)					3.712	.259
	10-13 years	-	2	1	-		
	14-15 years	-	3	16	-		
2.	Gender					.033	.855
	Male	-	5	16	-		
	Female	-	5	14	-		
3.	Religion					-	-
	Hindu	-	10	30	-		
	Muslim	-	-	-	-		
4.	Educational qualification of the subject					.343	.842
	No formal education	-	-	-	-		
	Up to 5th standard	-	1	3	-		
5.	Educational qualification of the mother					8.889	.064
	No formal education	-	5	5	-		
	Up to 5th standard	-	5	10	-		
6.	Educational qualification of the father					12.356	.015
	No formal education	-	-	-	-		
	Up to 5th standard	-	4	4	-		
7.	Employment status of the subject					.342	.559
	Employed	-	-	1	-		
	Not employed	-	10	29	-		
8.	Occupation of mother					2.353	.502
	Unemployed/Housemaker	-	10	24	-		
	Part time job	-	-	6	-		
9.	Occupation of father					2.535	.469
	Unemployed/Housemaker	-	-	1	-		
	Part time job	-	10	29	-		
10.	Family income per month (Rs)					7.668	.053
	< 10000	-	3	22	-		
	10001 – 20000 Rupees	-	5	4	-		

\*p is significant at <0.05 level.

**Table 7: Association between selected sociodemographic variables and pre-test PTSD (PCL-5) score**

Sl. No.	Variables	PCL-5 Score (N=40)		Chi- square	P value
		0-33	34-80		
1.	Age (in years)			2.426	.297
	10-13 years	0	3		
	14-15 years	8	11		
	16-19 years	5	13		
2.	Gender			.311	.577
	Male	6	15		
	Female	7	12		
3.	Transgender	0	0	-	-
	Religion				
	Hindu	13	27		
	Muslim	0	0		
4.	Christian	0	0	.635	.728
	Other	0	0		
	Educational qualification of the subject				
	No formal education	0	0		
5.	Up to 5th standard	1	3	14.169	.007
	6th – 10th standard	8	13		
	11th – 12th standard	4	11		
	Educational qualification of the mother				
6.	No formal education	0	10	1.747	.782
	Up to 5th standard	5	10		
	6th – 10th standard	6	2		
	11th – 12th standard	1	5		
	Graduate/Diploma	0	0		
	Postgraduate	1	0		
7.	Educational qualification of the father			.494	.482
	No formal education	0	0		
	Up to 5th standard	3	5		
	6th – 10th standard	6	9		
	11th – 12th standard	3	9		
	Graduate/Diploma	0	2		
8.	Postgraduate	1	2	.762	.859
	Employment status of the subject				
	Employed	0	1		
9.	Not employed	13	26	1.931	.587
	Occupation of mother				
	Unemployed/Housemaker	11	23		
10.	Part time job	2	4	1.183	.757
	Full time job Govt. Job	0	0		
	Family income per month (Rs)				
11.	<10000	9	16	-	-
	10001 – 20000 Rupees	2	7		
	20001 – 30000 Rupees	2	3		
	> 30001 rupees	0	1		

\*p is significant at <0.05 level.

**Table 8: Correlation between QOL and PTSD**

	Mean	Std. Deviation	N
QOL by WHOQOL-BREF	Pearson Correlation	1	-.512**
	Sig. (2-tailed)		.001
PTSD by PCL-5)	Pearson Correlation	-.512**	1
	Sig. (2-tailed)	.001	

\*\* . Correlation is significant at the 0.01 level (2-tailed).

### Association and correlation

There were no association between WHOQOL-BREF score and selected sociodemographic variables like age, gender, religion, educational qualification of the subject, educational qualification of the mother, educational qualification of the father, employment status of the subject,

occupation of mother, occupation of father, family income per month, and habitat (Table 6). There were no association between PTSD (PCL-5) score and selected sociodemographic variables like age, gender, religion, educational qualification of the subject, educational qualification of the mother, educational qualification of the



father, employment status of the subject, occupation of mother, occupation of father, family income per month, and habitat. (Table 7). There is a correlation in pre-test QOL and PTSD significant at the 0.01 level (Table 8).

### ***How was your experience in flood?***

#### ***Afraid of floods***

“The word flood itself is a form of destruction, it always worries what will happen and what will happen to commuting, transportation etc.”

“I am afraid of the word flood itself, cannot leave this place due to the fear of flood.”

“I am very scared of flood, I do not know what will happen to me and my family. However, family members always tell us to be warned and prepared and also suggest to avoid. Then we have to stay where we are, that's why we try to be happy here even in fear”

“There is always damage due to flood but we try how to compensate it. So that the damage caused by this is reduced and we are in a slightly better position.”

“There is fear of floods and there is always concern that people get lost and die. Due to the flood water, people and goods of our houses and shops get washed away. Sometimes a cloudburst also causes floods at that place.”

“We do not even get a chance to handle after the sudden cloudburst, and the hills slip and break etc., due to which the roads are closed and the traffic gets affected. There is also a fear of this flood that what will happen, the same things keep going on.”

“Floods make life difficult. Always worried.”

#### ***Loss of lives and households***

“Our house broke down and there is always an atmosphere of fear in the family. My studies and my family business got ruined.”

“Floods always cause trouble as to what will happen to our family and others. We always try to live in this tension.”

“There is always a worrying atmosphere due to floods that what will happen to our house, family, and food. Our future also remains in the dark.”

“The situation of flood is very frightening, we have seen how this disaster reaches damage. Since then, we suffer all kinds of physical, mental, economic, social damage.”

“Floods always cause damage. Flood damages our houses, shops and also causes a lot of damage to farms and barns and animals and birds, due to which the economic condition deteriorates.”

#### ***Acceptance to the aftermath of flood and ready to accommodate***

“Flood is a natural disaster; we can't do anything We will defend ourselves from it and our situation remains tense”

“Floods keep coming, what are you afraid of. What will happen after that will be seen. Facing hardship is real life”

“Flood is a natural disaster; we cannot stop it but we can only protect ourselves from it. Yet God always takes care of us.”

“The floods keep coming but we are trying to live here. Many times, water comes in the houses due to floods and there is an atmosphere of chaos in the villages, suddenly there is a shortage of water and food. However, we and our government always try to emerge from it.”

So, People were afraid of floods, loss of lives and households, and there is acceptance to the aftermath of flood and ready to accommodate.

## **DISCUSSION**

This study attempted to explore the QOL and PTSD impact of floods and effectiveness of VTT on measures to improve QOL and PTSD among adolescents.

The present study revealed that there is a significant increase in mean score of

first two standardised questionnaire and four domains of WHOQOL-BREF in post-test as compared to pre-test. Though, no literature was found to support the findings.

However, the present study showed in pre-test, a high proportion (34-80) of PTSD among adolescents 27 (32.5%) and in post-test, a high proportion (0-33) of PTSD among adolescents 40 (100%) who experienced flood. Reviewing literature, a similar study done by Geethu et al. in Alleppey district of Kerala, India showed a high proportion of PTSD (34.9%) among adolescents even after 8 months post disaster who experienced flood<sup>11</sup>. One more similar study done by Deiveegan C et al. in Uttarakhand, India, showed that the prevalence of PTSD by the TSQ was found to be 86 (67.7%) among victims<sup>7</sup>. Other than this, one more similar study done by Nisha C et al. in Uttarakhand, India revealed that 32.8% continued to suffer from PTSD after experiencing flood<sup>4</sup>.

There were no association between QOL score and PTSD score with selected sociodemographic variables like age, gender, religion, educational qualification of the subject, educational qualification of the mother, educational qualification of the father, employment status of the subject, occupation of mother, occupation of father, family income per month, and habitat. Reviewing literature, a similar study done by Ardalan A et al. in Bam earthquake revealed that QOL is associated with female gender, age and living in an urban area<sup>10</sup>. While no literature found that support the association with PTSD.

The present study shows that there is a correlation in pre-test QOL and PTSD significant at the 0.01 level. A similar study done by Armen K et al. in Parnitha earthquake revealed that the QOL domain scores were negatively correlated with PTSD<sup>12</sup>.

Finally, a significant increase in mean score of first two standardised questionnaire and four domains of WHOQOL-BREF in post-test as compared to pre-test and a significant reduction in

mean score of PTSD (PCL-5) in post-test as compared to pre-test indicate that the VTT is effective tool. Reviewing literature, a study done by Armen K et al. in Parnitha earthquake supports measures to be undertaken to improve QOL<sup>12</sup>.

The present study shows that people were afraid of floods, loss of lives and households, and there is acceptance to the aftermath of flood and ready to accommodate. A similar study done by Hassan, et al. in Kashmir revealed initial reactions to shock, flashbacks, avoidance, difficulty in concentrating, and helplessness and sadness.

This pilot study is undertaken to identify the feasibility of methods and materials. Due to the small sample size, the findings cannot be generalized. Along with various post relief measures during flood, this study stresses the need to identify and intervene early for QOL and PTSD in adolescent victims.

## CONCLUSIONS

Present pilot study is presented that shows the effectiveness of VTT in improving QOL and PTSD of adolescents. The VTT was found effective and can bring the community change and improve the QOL and PTSD after experiencing floods among adolescents. However, due to the small sample size the results cannot be generalized. So, additional study with a larger sample size would be necessary to confirm the results of the present pilot study.

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