

III. METHODOLOGY

Early Adolescence the developmental period, between ages 10 and 15 years, was conventionally understood as the years between the onset of sexual maturity and the start of the quest for independence. Numerous studies in recent years have demonstrated that this section of the population group was experiencing more levels of psychological distress which included depression, anxiety and stress that can lead to many problems in later years. Worldwide, it was projected that one in seven from 10 to 19-year-olds do have mental health issues (Institute of Health Metrics and Evaluation. GHDx, 2021), Avoiding institutionalization and over-medicalization, prioritizing non-pharmacological approaches, and respecting the rights of children in line with the United Nations Convention on the Rights of the Child and other Human Rights instruments were keys for adolescents' mental health, yet these remain largely unrecognized and untreated.

Multiple factors affect mental health. The more risk factors adolescents were exposed to, the greater the potential impact on their mental health. Factors that can contribute to psychological urges during adolescence include exposure to adversity, pressure to conform to peers, and exploration of identity along with the socio-economic determinants. With this realisation, the researcher posited three questions. Firstly, were Depression, Anxiety and Stress (DAS) prevalent among school-going adolescents? Secondly, does the DAS correlate with each other among school-going adolescents? Thirdly, does the socio-demographic factor affect the levels of DAS in them? With these research questions, the study aimed to explore the prevalence and detect the potential determinants of DAS, and formulate and implement a suitable customized intervention based on the needs of the identified population to alleviate DAS. Here the fourth question arises what type of preventive intervention would help these adolescents to possess a repertoire of coping skills to alleviate DAS?

Accordingly, the present study was carried out in two phases. A descriptive cross-sectional study predominantly adopting questionnaires was embraced for the first phase of the study to understand the prevalence and aetiology of DAS among school-going adolescents. The first phase had three sub-phases namely i) To assess the prevalence of DAS among school-going adolescents and determine its association with each other. ii) To analyse the interaction effect of socio-demographic factors (independent variables) upon

the DAS (dependent variables). iii) To identify the determinants of DAS among this sect of the population.

Subsequently, the research design adopted for the second phase was before, after, and follow-up with a waitlist-control group experimental design. Accordingly, the second phase of the study involves two sub-phases i) To formulate and implement a customised preventive intervention for school-going adolescents to alleviate DAS and lead a productive life. The process was through collating literature to identify suitable intervention procedures and techniques. ii) To test the effectiveness of the formulated preventive intervention in terms of reduced DAS among school-going adolescents. The research designs of the two phases offer scope to review many different aspects of the problem to integrate, consolidate, analyse, and interpret the findings into a meaningful discussion. The variables under study for the corresponding phases were as given below.

Phase I: Identify the levels of Depression, Anxiety and Stress (DAS), their interrelationship, and their determinants

- **Dependent variables:** Depression, Anxiety and Stress (DAS)
- **Independent variables to determine the interaction effect of the socio-demographic factors:** Class, age, gender, educational qualification of parents, area of residence
- **Independent variables to determine the determinants of DAS –** Determinants of Depression, Determinants of Anxiety and Determinants of Stress

Phase II: Effectiveness of the formulated preventive intervention

- **Dependent variables:** Depression, Anxiety and Stress (DAS)
- **Independent variables:** Formulated preventive intervention and gender

In light of the theoretical framework, the collated literature, and studies discussed in the earlier chapter, the methodology of the study entitled “**Depression, Anxiety and Stress among Adolescents and efficacy of Preventive Intervention**” was presented under the following heads.

- A. Population and sampling
- B. Construction and selection of tools
- C. Conduct of the study
- D. Analysis of the data

A. POPULATION AND SAMPLING

Based on the study purpose, the population and sampling methods for the current study were discussed concerning the defined two phases of the study as below.

Phase I: Identify the levels of Depression, Anxiety and Stress (DAS), their interrelationship, and their determinants

A probability random sampling procedure was adopted for the first phase of the study. The sampling process was carried out in three stages as explained below.

Stage 1 - Selection of Area: Globally, one in every eight people lives with a mental disorder, where anxiety and depressive disorders were the most common (GHDx, 2022). UNICEF (2021) has cautioned that every year, almost 46,000 children between the ages of 10 and 19 end their own lives. The scenario in India was almost similar to the global scenario, where 56 and 38 million Indians suffer from depression and anxiety disorders respectively, out of which 14% were adolescents (WHO, 2022). Sagar et al. (2020) said that mental disorders were one of the leading causes of the non-fatal disease burden in India.

Tamil Nadu, being one of the States in the high socio-demographic index group, accounted for a high prevalence of depressive and anxiety disorders in the overall population. Accordingly, the Crude Disability Adjusted Life Years Rate of Depressive Disorders was highest in Tamil Nadu in the adolescent group (Josephine, 2020). Coimbatore the second largest city of Tamil Nadu after Chennai, and one of the fastest-growing Tier II cities in India was selected as the area of the study for the following reasons. The district, bordering the states of Tamil Nadu and Kerala, was a well-developed industrial and education hub and has a large diversified multilingual population dominated by the manufacturing sector and facilitated by several schools/colleges. Coimbatore City Municipal Corporation has been divided into five zones namely North, South, East, West, and Central zone.

As per the 2011 Census of India, Coimbatore District had a population of 3,458,045 in 2011 out of which 1,729,297 were males and 1,728,748 were females. (Estimates, as per Aadhaar uidai.gov.in, Dec 2020). Out of the total population, 24.27% of the population lives in urban areas (Census India, 2011) and it was this population that was

being subjected to adversities that took a toll on their mental health. Hence the urban and the extended corporation wards (referred to as semi-urban) of each of the five zones were selected and only higher secondary schools from each of the places were taken into consideration as they encompass the majority of the adolescent population.

Stage 2 - Selection of schools: The study conceived certain criteria to select schools to maintain uniformity among the participant schools, in terms of the area of the school, syllabus pattern, and the type of school. The inclusion and exclusion criteria set for the study were explained below:

Inclusion Criteria:

- *Semi-urban and the urban area within a 15 km radius from the heart of the city:* The reason for setting up these criteria was that more schools/colleges were found escalating in and around the corporation limit of Coimbatore.
- *Schools following the Samacheer pattern of study:* The Samacheer Syllabus was the Uniform System of School Education, implemented by the Tamil Nadu Uniform System of School Education Act, 2010 to provide quality education to all children without any discrimination based on their economic, and social or cultural background. Apart from this, there were many other boards of education like the Central Board of Secondary Education (CBSE), Indian Certificate of Secondary Education (ICSE), Council for the Indian School Certificate Examinations (CISCE), National Institute of Open Schooling (NIOS) and International Baccalaureate (IB) that exists in Coimbatore District. However, to maintain homogeneity in terms of curricular framework and similar workload, schools following the Samacheer Pattern were selected.
- *Co-education schools:* Only co-ed schools were included in the present study to maintain homogeneity, as the school environment with only girls or only boys was different from that of the co-ed schools.

Exclusion criteria:

- *Government-run schools:* The purpose of excluding government schools was that the school environment in general and academic environment in particular was completely dissimilar from private schools and it was common that different environments would pose different challenges to the students. To maintain homogeneity, the schools which were private and government-aided following the Samacheer pattern were included and the government schools were excluded.

- *Tamil medium schools:* To uphold homogeneity and to reduce bias all the shortlisted schools were schools where the medium of learning was English.

Accordingly, a total of 30 schools from all five zones of Coimbatore District were shortlisted. However, after seeking permission from the administrators of all the short-listed schools, only a total of 15 schools expressed their willingness to participate and permitted the researcher to collect data. The investigator ensured the smooth conduct of the research by seeking voluntary participation and wholehearted cooperation from all of these 15 schools.

Stage 3 - Selection of sample: Adolescence was usually viewed as a transitional period associated with physical and psychological changes etc. It was at this stage they were overloaded with multiple exposures and adversities and hence the prevalence of mental disorders was common. The academic load was seen as one of the most common forms of mental disorders among adolescents of all phases, ages, and genders (Parikh et al., 2019).

Hence, this study focused on target respondents of adolescents enrolled in Class 8 and Class 9, as it was during this stage the adolescents were getting ready for the Board exams (10th, 11th, and 12th standard based on the Indian Education System) in a year or two. They were exposed to much psychological adversity in the process of getting prepared to face board exams added to the burden of transitional hardships. These adversities and hardships were observed to have a greater potential impact on their mental health. Moreover, lack of proper guidance and more pressure from school as well as home worsens the situation. Accordingly, many studies have also portrayed that these adolescents were prone to mental pressure which may affect their future behaviour and productivity.

Anyan and Hjemdal (2016) specified that nowadays, Depression, Anxiety and Stress (DAS), the emblematic negative emotions, were the risk factors among adolescents and also confirmed that DAS had a close relationship with each other. Frison and Eggermont (2016) stated that negative emotions were found to be closely correlated with many other negative outcomes, such as suicidal behaviour. This reality seeks a preventive intervention to protect adolescents and enable them to live productive lives.

Accordingly, all students from classes 8 and 9 from the 15 schools (selected in Stage 2) constituted the population sample. Henceforth, the population sample accounted

for a total of 1038. The detailed split of the selected sample based on the type of school, gender, and class of study was given in Table III.

Table III
Detailed split of population sample selected for the study

Type of school	Class of study		Gender		Total N (%)
	8 th N (%)	9 th N (%)	Male N (%)	Female N (%)	
Private	391 (48%)	423 (52%)	385 (51.7%)	429 (52.7%)	814 (78.4%)
Aided	113 (50.4%)	111 (49.6%)	141 (62.9%)	83 (37.1%)	224 (21.6%)
Total	504 (48.6%)	534 (51.4%)	526 (50.7%)	512 (49.3%)	1038 (100%)

However, based on the type of schools i.e., private and government-aided schools chosen by set inclusion and exclusion criteria and consent from the authorities, the current data showed a higher enrolment rate in private schools (78.4%), followed by the aided schools (21.6%). The class of study and gender showed a more or less equal representation between its subgroups.

Phase II: Effectiveness of the formulated preventive intervention

The Phase II of the study was to devise a preventive intervention to alleviate DAS and assess the effectiveness of the same. Accordingly, the selection of the school and sample were described below:

Selection of school - Out of the 15 schools identified with a sample size of 1038, only two schools provided consent and were ready to spare certain structured hours within four months needed to implement the formulated preventive intervention. Out of these two schools, the school with a greater mean score on DAS constituted the experimental group and the other school was considered as the wait-list control group.

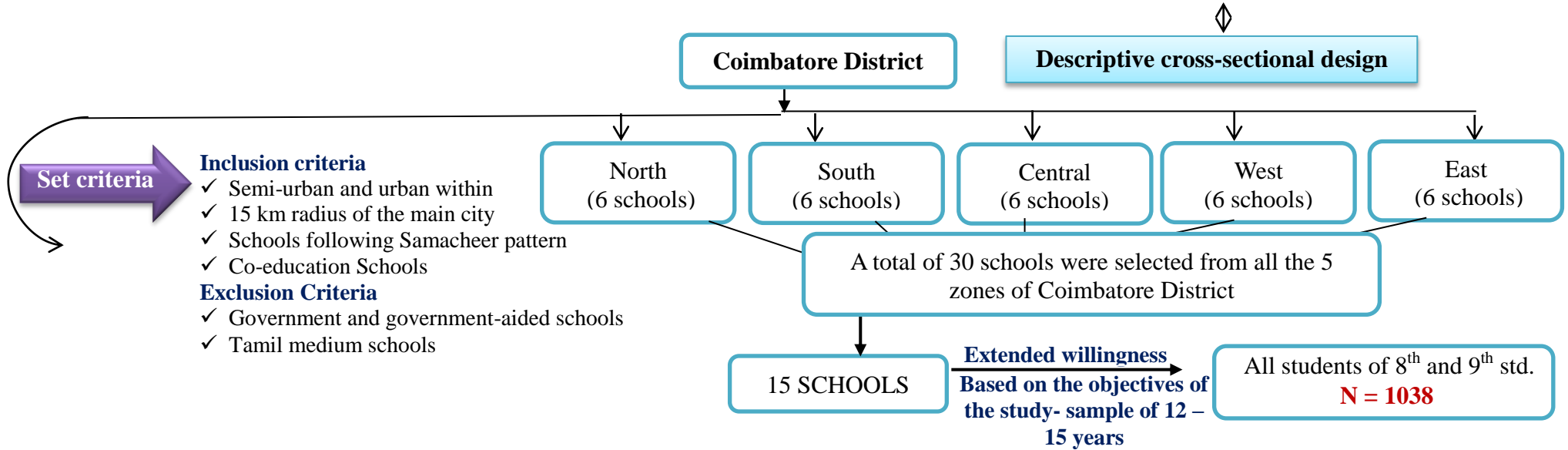
Selection of sample - Accordingly, all students in the 8th and 9th classes of these two schools constituted the sample for the second phase of the study (Experimental group - 60 students, Wait-list control group – 60 students). Figure 9 gives a bird’s eye view of the whole population and the sampling procedure adopted.

Ethical consideration

As a matter of ethics, the students and their parents were informed about the research through a written consent form. In addition, the higher authorities of the schools selected and the class tutors of the identified children were informed about the study. The study also allowed voluntary choice for participants. The application form explaining the design and the protocols used in the research study was subjected to the Institutional Human Ethics Committee (IHEC) and clearance was obtained. The approval number for the study was IHEC / 17-18HD/29. The clearance certificate issued by the Institutional Human Ethical Committee was furnished as Appendix – 1

Population and Sampling – At a glance

Phase I: Identify the levels of Depression, Anxiety and Stress (DAS), their interrelationship, and their determinants



Phase II: Effectiveness of the formulated Preventive Intervention

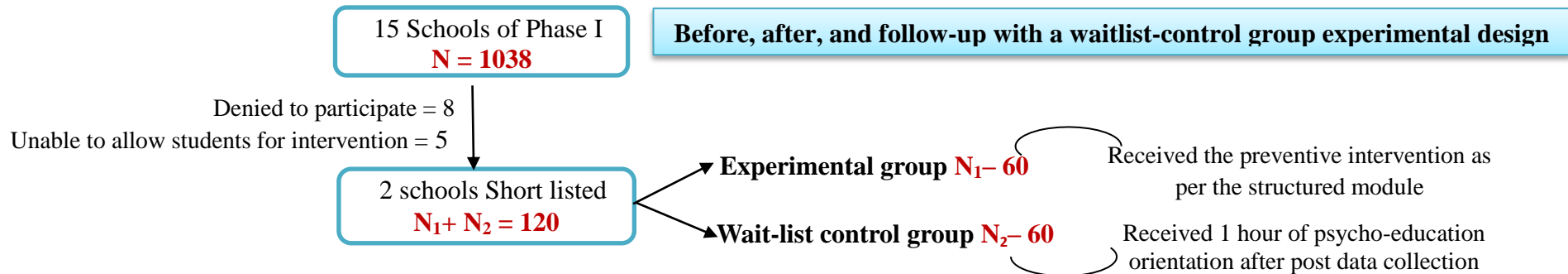


Figure 9

B. CONSTRUCTION AND SELECTION OF TOOLS

As human behaviours were always complicated to measure and were unreliable, a careful selection of tools was made to assess the same. For the first phase of the study, the investigator chose a relevant standardized tool to appraise the level of DAS among the selected respondents and formulated two tools, one to collect the required personal data and the other to identify the potential determinant of DAS. For the second phase of the study which pertains to the effectiveness of the preventive intervention, an intervention module was formulated based on the theoretical and conceptual constructs and tested. Detailed procedure of tool construction and selection as per the defined two phases of the study were explained below:

Phase I: Identify the levels of Depression, Anxiety and Stress (DAS), their interrelationship, and their determinants

For phase I, the tools used were:

- a. General Profile Questionnaire
- b. Depression, Anxiety and Stress Scale (DASS-42)
- c. Self-formulated scale on Determinants of Depression, Anxiety and Stress

Each of the tools used was detailed below:

a. *General Profile Questionnaire:* The investigator devised a questionnaire to collect the general profile of the selected respondents. The questionnaire was formulated with special relevance to name, age, date of birth, gender, name of the school, class of study, area of residence, type of family they hailed from, and parents' education qualification and was appended as Appendix II.

b. *Depression, Anxiety and Stress Scale (DASS-42):* The capacity to discriminate between the three related states of Depression, Anxiety and Stress (DAS) should be useful to researchers concerned with understanding the nature, aetiology, and mechanisms of emotional disturbance. Henceforth, to identify the states of DAS, a standardised tool formulated by Lovibond and Lovibond in 1995 entitled Depression Anxiety Stress Scale (DASS-42) was used. As the essential development of the DASS-42 was carried out with non-clinical samples, it was found suitable for screening normal adolescents and adults. Given the necessary language proficiency, there seems no compelling case against the use of

the scale with children as young as 12 years. The DASS-42, comprising three self-report scales was designed to measure the negative emotional states of - depression, anxiety, and stress among adolescents and adults. Each of the three scales contains fourteen items. Table IV presents the categorisation of the 42 statements based on the three negative states.

Table - IV
Categorization of items as per the negative emotional states

Negative emotional states	No. of items in the scale	Scale items
Depression	14	3,5,10,16,17,21,24,26,31,34,37,38,42
Anxiety	14	2,4,7,9,15,19,20,23,25,28,30,36,40,41
Stress	14	1,6,8,11,12,14,18,22,27,29,32,33,35,39

The respondents were asked to use four-point severity/frequency scales to rate the degree to which they have experienced each mental state over the past week. Scores for each of the mental states were calculated by summing the scores for the pertinent items. The summed-up score was then categorized into five levels on each of the negative emotional states – normal, mild, moderate, severe, and extremely severe - with the score ranges as presented in Table V.

Table - V
Categorization of the summed-up score based on the severity of the negative emotional states

Levels	Depression	Anxiety	Stress
Normal	0 – 9	0 – 7	0 – 14
Mild	10 – 13	8 – 9	15 – 18
Moderate	14 – 20	10 – 14	19 – 25
Severe	21 – 27	15 – 19	26 – 33
Extremely Severe	28+	20+	34+

Reference: Lovibond, S., H., Lovibond, P., F. (1995)

The essential function of the DASS-42 was to assess the severity of the core symptoms of DAS. Accordingly, the scale determines the level of negative emotional

states, thereby revealing the psychological status of an individual. It could be used for pre-post tests to measure baseline data and outcomes of related interventions. Cronbach's alpha for the Depression scale, Anxiety scale, and Stress scale were .91, .84, and .90 respectively. DASS-42 has been shown to have high internal consistency and yielded meaningful discrimination between symptoms. Moreover, DASS-42 has been validated for the normal population and the norms were considered to be irrelevant only to a specific population of lower age groups (less than 10 years), illiterates, individuals with medical conditions, and individuals who display medicinal effects. Hence DASS-42 was chosen to identify the levels of DAS among the selected respondents.

A pilot study was conducted with 100 school-going adolescents relevant to the age group of the current research. After this, the scale was considered to be appropriate to the target population in terms of the complexity of statements and cultural considerations. The DASS-42 was appended as Appendix III.

c. Self-formulated scale on Determinants of Depression, Anxiety and Stress: A rating scale was formulated to ascertain the potential determinants influencing the three negative emotional states – DAS. The major objective of the rating scale was to elicit quantitative and qualitative attributes based on the signs and symptoms experienced and behaviour manifested based on the determinants of DAS. With a careful analysis of the literature collated concerning the determinants, five potential indicators pertinent to each of the negative emotional state were identified with relevance to the age group and was as given below:

- i. *Determinants of Depression* – Attitudinal issues; Present/Future life concerns; Academic pressure; Family and Relationship issues; and Psychological concerns
- ii. *Determinants of Anxiety* – Generalized Panic; Social anxiety; Specific Phobia; Academic anxiety; and Obsessive-compulsive issues
- iii. *Determinants of Stress* – Family Stress; Drastic Changes in life; Attitudinal Stress; Academic anxiety; and Poor time management

Under the above-mentioned determinants of each of the negative emotional states, ten items were framed on a 5-point Likert scale (1-always, 2-often, 3-sometimes, 4-rarely, and 5-never). The items were framed in such a way that the lower the score higher the severity of the individual being exposed to DAS. Altogether, the formulated tool had three

subscales namely Determinants of Depression, Determinants of Anxiety, and Determinants of Stress. All of these three subscales were checked for three major psychometric properties namely validity, exploratory factor analysis, and internal consistency separately, and were explained below.

i) Determinants of Depression: As stated above, the five determinants of depression namely Attitudinal issues, Present/Future life concerns, Academic pressure, Family and Relationship issues, and Psychological concerns with 10 items in each determinant were formulated. The psychometric properties of the constructed scale were done as below.

i a) Validity: A tool was said to be valid when it measures what its prerogatives were to measure. The validity of the scale was examined by face validity and content validity.

➤ **Face validity:** As it was important to check whether the items of the scale were sensible, appropriate, and relevant to the target respondents, the scale was sent to six experts representing academicians from the school education, psychologists, and educationists (2 in each field). Based on the scoring of the experts on every item in the checklist of 'yes' or 'no', 10 items were removed, and 18 items were modified for better comprehension. On the whole 40 items were retained within the five determinants.

➤ **Content validity:** Content validity was measured by assessing the 40 items on a 3-point Likert scale – Essential; Useful but not necessary; and Not necessary to determine the importance of the items to the objectives of the study, relationship to the specified determinant, and its theoretical constructs. Fifteen subject experts from the fields of Psychology, Human Development, and Education were asked to rate every item on the three-point Likert scale. The Content Validity Ratio (CVR) was calculated with the formula $CVR = (N_e - N/2) / N/2$, wherein N_e denotes the number of 'essentials' in the response sheet and N indicates the number of experts. The average content validity of the scale was 0.80 indicating an excellent content validity for the formulated sub-scale.

i b) Pilot Study: The sub-scale - Determinants of Depression - was subjected to a pilot study with 400 school-going adolescents to gain insight into the difficulty in understanding and phrasing the items. Accordingly, a few modifications were made to the scale.

i c) Principal Component Analysis (PCA): To support the validity of the newly developed scale, an exploratory factor analysis called Principal Component Analysis (PCA) was performed with the data procured from the pilot study with a sample size of 400 respondents. The sample of 400 was deemed to be adequate for running PCA. PCA was used to underline variation for which principal data components were calculated and to bring out strong patterns in the dataset. Accordingly, five determinants of depression with 40 items were subjected to PCA.

After running PCA two times, and by removing the items that had factor loadings of $<.5$ in the rotated component matrix, the final PCA had only 20 items with adequate factor loadings and communalities. The Kaiser-Meyer-Olking (KMO) statistic (used to assess sampling adequacy) and Barlett's test (used to evaluate the correlations and partial correlations to determine if the data were likely to coalesce on determinants) were computed. The final KMO value of 0.909 indicated sample adequacy. Bartlett's test was highly significant with $p < 0.01$ with the off-diagonal values not at zero and hence the correlation matrix was not an identity matrix.

To estimate the number of components for a given item set, Eigenvalues explaining the total variance were used. Out of these, the first five have eigenvalues over 1.00, and together these explain over 57.042 of the total variability in the data. This leads us to the conclusion that a five-component solution will probably be adequate. Scree plot, a graphical tool used in the selection of the number of relevant components or factors to be considered or retained in a PCA further authenticates that the five-component solution would be the best-fit model based on Kaiser's rule.

The components (referred to as determinants) were named based on the extractions of items such as Attitudinal issues, Present/future life concerns, Academic pressure, Family and relationship, and Psychological concerns and each determinant had a few items in it as depicted in Table IV.

i d) Scoring and gradations: As mentioned, the Determinants of Depression scale has a total of 20 items segregated within five determinants. Every item was scored on a 5-point scale. As the number of items in each of the determinants varies, the minimum to maximum score for every determinant based on the data set of the pilot study was graded on four levels namely extremely high, high, moderate, and mild and the score range was as shown in Table VI.

Table – VI
Determinants of Depression - Gradation and Scoring norms

Determinants	Item No.	Total items	Max. score	Min. score	Score range			
					Ext. high	High	Mod.	Mild
Attitudinal issues	1,6,11, 16,18,20	6	30	1	<15	16-19	20-23	>24
Present/future life concerns	2,7,12, 17,19	5	25	1	<12	13-15	16-19	>20
Academic pressure	3,8,13	3	15	1	<7	8-9	10-12	>13
Family and relationship	4,9,14	3	15	1	<7	8-9	10-12	>13
Psychological concerns	5,10,15	3	15	1	<6	7-9	10-11	>12

i e) Reliability: Cronbach Alpha test was carried out for the twenty items in the tool. The reliability statistic for the twenty items was 0.885. Each item in the tool had a Cronbach alpha of more than 0.8.

ii) Determinants of Anxiety: For the negative emotional state, Anxiety, five determinants were identified as specified above (Generalized Panic; Social anxiety; Specific Phobia; Academic anxiety, and Obsessive-compulsive issues) and each determinant had 10 items. The psychometric properties of the constructed scale were computed and described below.

ii a) Validity: The validity of the scale was examined by face validity and content validity.

➤ *Face validity:* The scale was sent to six experts representing academicians from the school education, psychologists, and educationists (2 in each field). Based on the scoring of the experts on every item in the checklist of ‘yes’ or ‘no’, 14 items were removed, and 10 items were modified for better comprehension. On the whole 36 items were retained within the five determinants.

➤ *Content validity:* Content validity was measured by assessing the 36 items on a 3-point Likert scale – Essential; Useful but not necessary; and Not necessary to determine the importance of the items to the objectives of the study, relationship to the specified determinant, and its theoretical constructs. Fifteen subject experts from the fields of

Psychology, Human Development, and Education were asked to rate every item on the three-point Likert scale. The Content Validity Ratio (CVR) was calculated with the formula $CVR = (N_e - N/2) / N/2$, wherein N_e denotes the number of 'essentials' in the response sheet and N indicates the number of experts. The average content validity of the scale was 0.82 indicating excellent content validity for the scale.

ii b) Pilot Study: The sub-scale – Determinants of Anxiety - was subjected to a pilot study with the same 400 school-going adolescents to gain insight into the difficulty in understanding and phrasing the items and needed modifications were carried out.

ii c) Principal Component Analysis (PCA): To support the validity of the newly developed scale, Principal Component Analysis (PCA) had only was performed with the data procured from 400 respondents. As, the sample of 400 was deemed to be adequate for running PCA, five determinants of anxiety with 36 items were subjected to PCA.

After running PCA two times and removing the items that have factor loadings of $<.5$ in the rotated component matrix, the final PCA had only 16 items with adequate factor loadings and communalities. The Kaiser-Meyer-Olking (KMO) statistic was 0.910 indicating sampling adequacy. Bartlett's test was highly significant with $p < 0.01$ with the off-diagonal values not at zero and hence the correlation matrix was not an identity matrix.

To estimate the number of components for a given item set, Eigenvalues explaining the total variance were used. Out of these, the first four had eigenvalues over 1.00, and together these explained 55.97% of the total variability in the data. This leads us to the conclusion that a four-component solution would probably be adequate. Scree plot further authenticated that the four-component solution would be the best-fit model based on Kaiser's rule.

The components (referred to as determinants) were named based on the extractions of items – Generalized Panic; Social anxiety; Specific Phobia; and Academic anxiety and each of the determinants had few items in it as depicted in Table V. None of the items related to obsessive-compulsive issues had adequate factor loadings.

ii d) Scoring and gradations: As mentioned, the Determinants of Anxiety sub-scale has a total of 16 items segregated into four determinants. Every item was scored on a 5-point scale. As the number of items in each of the determinants varies, the minimum to maximum score for every determinant based on the data set of the pilot study was graded

on four levels namely extremely high, high, moderate, and mild and the score range was shown in Table VII.

Table VII
Determinants of Anxiety - Gradation and Scoring norms

Determinant	Item No.	Total items	Max. score	Min. score	Score range			
					Ext. high	High	Mod.	Mild
Generalized Panic	1,5,9, 13,15, 16	6	30	1	<14	15-18	19-23	>24
Social anxiety	2,6,10,14	4	20	1	<9	10-12	13-15	>16
Specific Phobia	3,7,11	3	15	1	<7	8-9	10-12	>13
Academic anxiety	4,8,12	3	15	1	<6	7-9	10-12	>13

ii e) Reliability: Cronbach alpha test was carried out for the sixteen items in the tool. The reliability statistic for the sixteen items was 0.850. Each item had a Cronbach alpha of more than 0.83.

iii) Determinants of Stress: For the negative emotional state, Stress, five determinants were identified (Family Stress, Drastic Changes in life, Attitudinal Stress, Poor time management, and Academic anxiety) and each determinant had 10 items. The psychometric properties of the constructed scale were processed as below.

iii a) Validity: The validity of the scale was examined by face validity and content validity.

- *Face validity:* The scale was sent to six experts like the other two sub-scales. Based on the scoring of the experts on every item in the checklist of ‘yes’ or ‘no’, 20 items were removed, and 10 items were modified for better comprehension. On the whole 30 items were retained within the five determinants.
- *Content validity:* Content validity was measured by assessing the 30 items on a 3-point Likert scale – Essential; Useful but not necessary; and Not necessary - as like the other

two sub-scales The Content Validity Ratio (CVR) was calculated using the formula $CVR = (N_e - N/2) / N/2$. The average content validity of the scale was 0.80 indicating excellent content validity.

ii b) Pilot Study: The sub-scale, Determinants of Stress, was subjected to a pilot study with the same 400 school-going adolescents to gain insight into the difficulty in understanding and phrasing the items.

iii c) Principal Component Analysis (PCA): To support the validity of the newly developed scale, PCA was performed with the data set procured from 400 respondents encompassing 30 items. After running PCA three times and removing the items that have factor loadings of $<.5$ in the rotated component matrix, the final PCA had only 17 items with adequate factor loadings and communalities. The Kaiser-Meyer-Olking (KMO) statistic was 0.912 indicating sampling adequacy. Bartlett's test was highly significant with $p < 0.00$ with the off-diagonal values not at zero and hence the correlation matrix was not an identity matrix.

To estimate the number of components for a given item set, Eigenvalues explaining the total variance were used. Out of these, the first four had eigenvalues over 1.00 and together explained 50.02% of the total variability in the data. This leads us to the conclusion that a four-component solution would probably be adequate. Scree plot, further authenticated that the four-component solution would be the best-fit model based on Kaiser's rule.

The components (referred to as determinants) were then named based on the extractions of items such as Family Stress, Drastic Changes in life, Attitudinal Stress, and Academic anxiety and each of the determinants had a few items in it as depicted in Table VI. The fifth determinant namely poor time management items was within the attitudinal stress and hence merged.

iii d) Scoring and gradations: As mentioned, the Determinants of Stress scale has a total of 17 items segregated within four determinants. Every item was scored on a 5-point scale. As the number of items in each of the determinants varies, the minimum to maximum score for every determinant based on the data set of the pilot study was graded on four levels namely extremely high, high, moderate, and mild and the score range was shown in Table VIII.

Table VIII
Determinants of Stress - Gradation and Scoring norms

Determinants	Item No.	Total items	Max. score	Min. score	Score range			
					Ext. high	High	Mod.	Mild
Family Stress	,5,9, 12,15,17	6	30	1	<15	16-18	19-22	>23
Drastic changes in life	2,6,10,13,16	5	22	1	<12	13-15	16-20	>21
Attitudinal Stress	3,7,11,14	4	20	1	<10	11-13	14-16	>16
Academic stress	4,8	2	10	1	<4	5-6	7	>8

iii e) Reliability – Cronbach alpha statistic for the seventeen items was 0.854. Each item in the tool had a Cronbach alpha of more than 0.84.

The final tool with three sub-phases was given in Annexure IV. Figure 10 vividly illustrates the construction of tools adopted for the first phase.

Construction of tools – At a glance – Phase I

Phase I: Identify the levels of Depression, Anxiety and Stress (DAS), their interrelationship, and their determinants

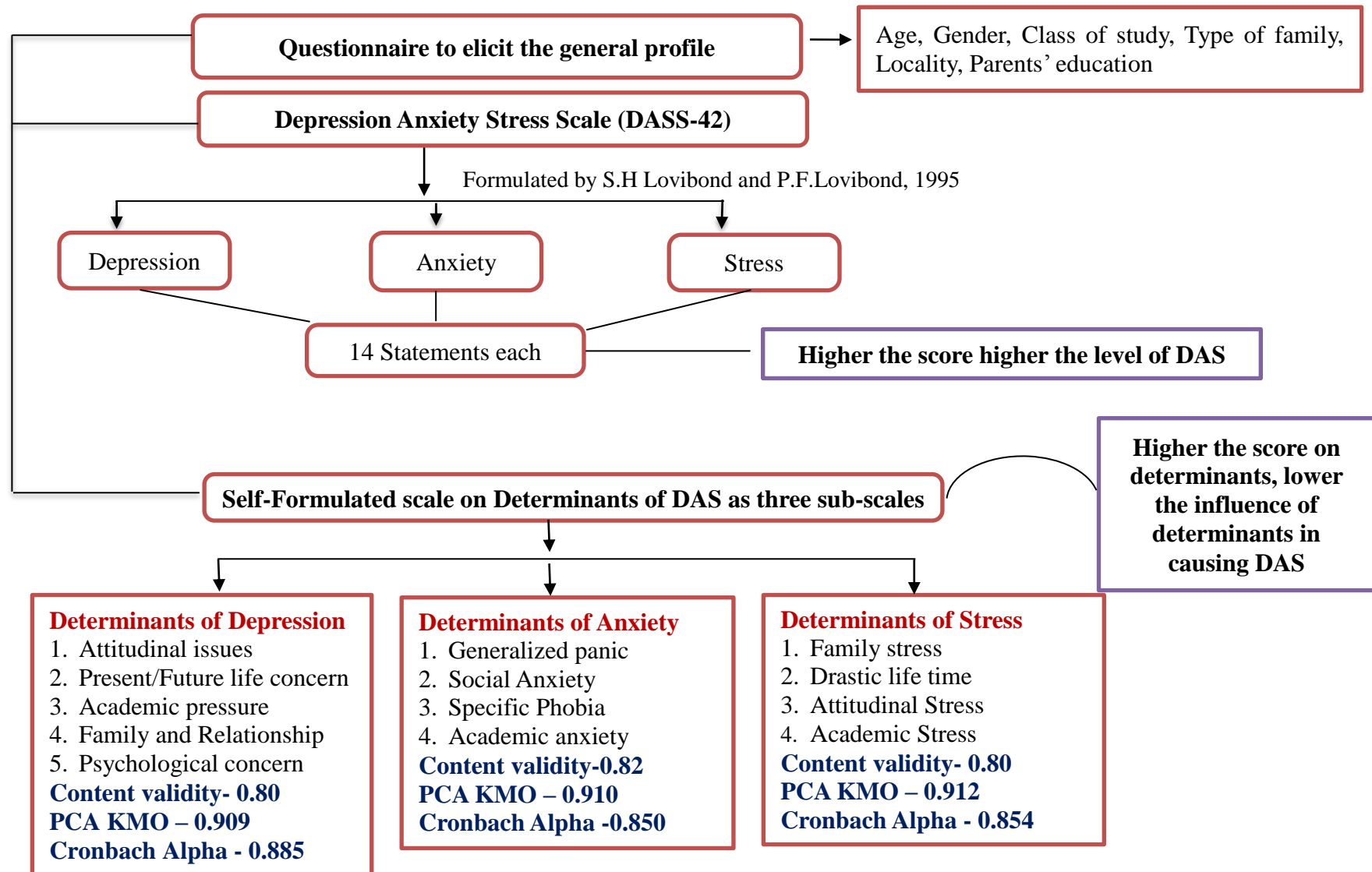


Figure 10

Phase II: Effectiveness of the formulated preventive intervention

The tool devised for the second phase of the study was the preventive intervention. As indicated in the section 'Population and Sampling', the preventive intervention was developed and implemented as a preventive intervention among 60 school-going adolescents to combat DAS. The stages in the formulation and implementation of the preventive intervention were detailed below.

- a. Conceptual and theoretical constructs of preventive intervention
- b. Blueprint of preventive intervention
- c. Content development of modules in preventive intervention
- d. Face validity of preventive intervention

a. Conceptual and theoretical constructs of preventive intervention

Determining the most appropriate instrument to become aware of DAS, and practicing strategies and techniques to combat DAS was a challenging task. Hence, immense efforts were undertaken to collate literature about an intervention that could intervene early and at the same time prevent the occurrence of DAS among school-going adolescents. The conceptual and theoretical constructs behind the development of a preventive intervention were explained under three sub-heads below.

i. Preventive intervention based on the developmental stage of the target respondents:

Although risk factors for adolescent depression, anxiety and stress were categorized as biological, psychological, or environmental, the incidence of DAS among adolescents was of great concern because of its acute and lasting consequences connected with mental disorders. The increase in the sub-levels of DAS where symptoms were present but did not meet criteria for depression, anxiety and stress have been mostly linked to developmental change in adolescents, and also, there was a lack of spotlight on the implications for early modes of interventions and the gap remains in understanding the relationship among etymology, dimensions, subclinical levels, and the nature of growth of emotional disorder.

ii. Preventive intervention based on the results of the first phase of the study: The study attempted to identify the levels of DAS initially among a section of school-going adolescents. Though the results of the first phase of the study would be elaborated on in the Results and Discussion section, the key findings of the first phase served as a base to

structure the framework of the preventive intervention. The key finding was that out of the 1038 school-going adolescents under study, between mild to extremely severe levels, a total of 947 were found to be anxious, followed by 847 depressed and 778 stressed individuals. The question of how to enhance their mental health by combating DAS via figuring out strategies for prevention at an early age and facilitating them to practice the coping skills as a routine arises.

iii. Preventive intervention based on the scientific constructs of available interventions:

With the backdrop of realising the alarming prevalence of mental health problems in terms of DAS among adolescents, there was a dire need for preventive intervention to combat DAS in them. It was a well-known fact that the intervention was of three types namely, primary, secondary, and tertiary. However, the researcher chose to formulate a primary intervention because it aims to prevent the target group who being at risk of becoming exposed to DAS. Accordingly, a detailed review of various interventions has led the investigator to combine two interventions namely Cognitive Behaviour Therapy (CBT) and Stress Inoculation Training (SIT), and postulate a preventive strategy called Comprehensive School-based Intervention Training to alleviate Depression, Anxiety and Stress and abbreviated as CSIT-DAS.

Cognitive Behavioural Therapy (CBT), developed by Aaron Beck in 1960, was a form of talk therapy designed to help people recognize unhelpful thoughts and behaviours and learn how to change them. CBT focuses on the present and the future, rather than on the past. This therapy, when carried out with young teens, would help them understand the negativity of their thought patterns and learn how to replace them with more positive ones. CBT, as research indicates would help children learn to control self-defeating thoughts, impulsivity, defiance, and tantrums.

Based on the principle of Stress Inoculation Training, developed by Meichenbaum and Deffenbacher (1988). Maraichelvi (2016) pilot-tested an intervention titled School Stress Inoculation Training (SSIT) in three batches by adopting the experimental waitlist control group design. SIT was a flexible, individually tailored, multi-faceted form of training on a preventative basis to inoculate individuals to future and ongoing stressors by enhancing their coping repertoires.

Hence, the present research formulated a primary intervention by combining these two techniques with the assumption that the replacement of negative thoughts with

constructive ones along with the practice of skills inoculating them against mental disorders on an everyday basis would be helpful to combat the three negative emotional states namely depression, anxiety and stress during the adolescent period thereby, their future become productive.

b. Blueprint of preventive intervention

As mentioned, the preventive intervention abbreviated as CSIT-DAS was an approach exclusively designed for the student population. A team of 10 experts from the field of Psychology, Human Development, and Education and five high-school teachers working in schools were made to realise the brunt of the results of the first phase of the study, and the consideration of combining CBT and SIT as a preventive intervention technique. After five meetings with all these experts, a blueprint for CSIT-DAS meant exclusively for school-going students was formulated. As per the blueprint, CSIT-DAS was planned to be implemented through four-stage training phases as described below.

Stage 1 – Trust building and eligibility check: It was a well-known fact that to kick start any programme trust building was crucial. Hence the first stage of the training encompassed an ice-breaking session. After this session, both the experimental group and wait-list control group were tested for their Intelligence Quotient (IQ), for which Raven's Progressive Matrices (RPM) of 60 multiple choice questions, listed in order of increasing difficulty were administered. RPM was administrated to measure the level of intellectual development and logical thinking. The reason owed to administer RPM was that the preventive intervention titled CSIT-DAS necessitated at least an average level of intelligence to comprehend. Accordingly, the results of RPM revealed that all the students have either an average or more than an average IQ.

Stage 2 – Orientation and pre-test evaluation: The second stage of the training process was two-fold. One was to orient the target respondents on the importance of the study and the planned intervention. The second was to administer DASS-42 for both the experimental and wait-list control groups of students. The reason behind this administration of the DASS-42 was that the data collected for the first phase of the study was before the COVID-19 pandemic and the schools were closed for almost 18 months. Hence the need for administrating DASS-42 for the second time became essential, to assess the DAS level among the target respondents just before the intervention.

Stage 3 – Education and training sessions: As in the previous stage, this stage was also two-fold with all-encompassed intervention.

1. The first aspect was titled ‘Psycho-education’ and was planned to be carried out both with the experimental group (beginning of the implementation stage) and the wait-list control group of respondents (after the post-data collection as they were the wait-list control group). The ‘Psycho-education’ was carried out to make the respondents understand the importance of having good mental health to lead a productive life. It also facilitated them to analyse how and why their mental state deteriorates and what were its reasons. On an overall note, the session was devised to give them a prelude to the concept of depression, anxiety, and stress and how it affects their overall life.
2. The second part was the most important and encompasses the maximum number of sessions and was carried out only with the experimental group of respondents. This stage incorporates the demonstration of various Behavioural and cognitive techniques to combat DAS and facilitates the respondents to practice the same on an everyday basis. The module-wise detail of the training was explained in the next subsection.

Stage 4 – Post-test evaluation and follow-up: After the elaborate training sessions, DASS-42 was re-administered to both the experimental and wait-list control groups to appraise the effectiveness of the proposed intervention i.e. CSIT-DAS. However, to statistically compute the sustainability of the CSIT-DAS, DASS-42 was again re-administered among the experimental participants two more times namely, after one week of the last session referred to as Follow-up 1 and one month later referred to as Follow-up 2. The blueprint of the intervention titled Comprehensive School-based Intervention Training to alleviate Depression, Anxiety and Stress (CSIT-DAS) was depicted in Figure 11.

c. Content development of modules in preventive intervention

Based on the blueprint of CSIT-DAS, the team of experts worked on the content/ activities/ techniques in each of the modules of stage 3. After developing a detailed plan of training, the team looked into the feasibility of conducting the programme on the floor, and a few modifications were made. The final plan of work was detailed in Appendix V.

d. Face validity of the preventive intervention

The final plan of work of the intervention titled CSIT-DAS was circulated among five Psychologists to check the relevance of the plan of work, the order of the stages, and the appropriateness of the activities to the target respondents. Moreover, the validity was also measured if the detailed work plan suited the objectives of the proposed intervention.

Blue print of Comprehensive School-based Intervention Training to alleviate Depression, Anxiety and Stress (CSIT-DAS)

Period - 4 Months; Sessions – 15; Hours: 30 hrs

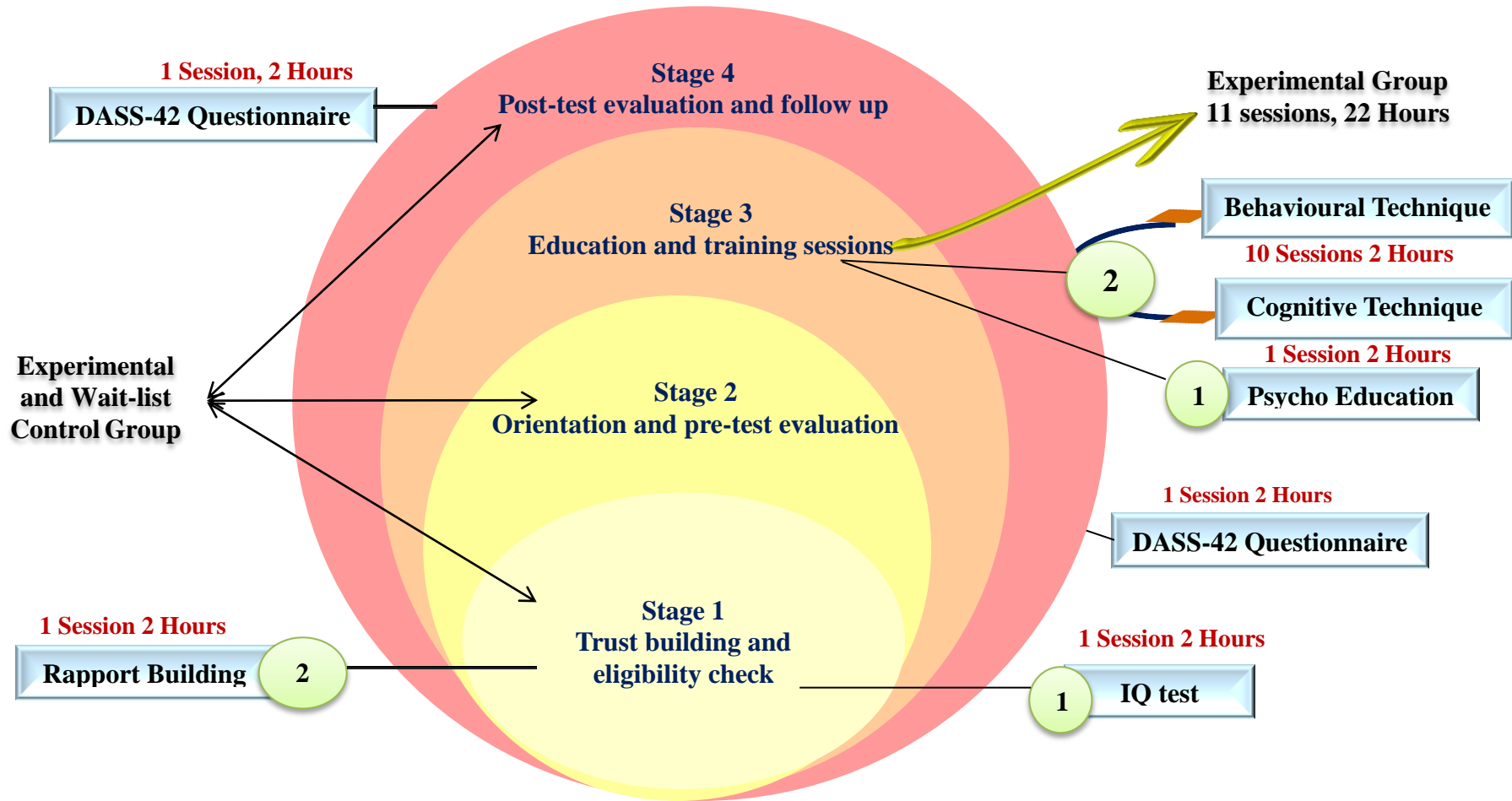


Figure 11

C. CONDUCT OF THE STUDY

The conduct of the study based on the two defined phases as detailed below:

Phase I: Identify the levels of Depression, Anxiety and Stress (DAS), their interrelationship, and their determinants

Phase I was conducted in three steps as explained below:

- a) ***Permission from the higher authorities:*** Certain inclusion and exclusion criteria were set to identify the schools of study. With the schools identified for the school, the criteria for the selection of the sample were also set. All students enrolled in classes 8th and 9th standard within the age ambit of 12-15 years constituted the sample. Hence the investigator attempted to personally meet the higher authorities of all the schools and explained the importance of the study.
- b) ***Building up rapport for collecting preliminary data:*** For any survey to be conducted, establishing rapport with the people where the survey was to be carried out was essential, to convince the sample of their benevolence. Since the survey consisted of questions regarding depression, anxiety and stress, developing a sense of confidentiality was important. Hence before the study, efforts were made by the investigator to establish a good rapport with the administrator and teachers in general and the school-going adolescents in particular, so that the survey could be carried out smoothly with a maximum level of valid responses.
- c) ***Administration of tools:*** After establishing rapport, the investigator distributed the three tools as explained under the section, selection of tools (General Questionnaire, Standardized Depression, Anxiety, and Stress Scale DASS-42 and Determinants of Depression Anxiety and Stress Scale). Appropriate efforts were taken by the researcher to clarify doubts, if any were raised by the respondents while filling out the tools. Necessary information on the procedure to fill was also mentioned on the tools distributed to them.

Phase II: Effectiveness of the formulated preventive intervention

Phase II of the study was conducted in four stages as described in the blueprint of CSIT-DAS in the previous sub-section. Out of these four stages the first two stages were carried out with both the experimental (60) and wait-list control group (60) of the respondents. The whole intervention programme was carried out for four months

segregated into 15 sessions, with every session for two hours. Stage-wise conduct of the study was detailed below:

Stage 1 - Trust building and Eligibility check: 2 Sessions (4 hours)

- ✓ *Session 1:* Certain ice-breaking activities like balloon bursting, holding hands to form a circle without breaking the lines, etc. were organized to kick start the intervention. In the same session towards the end, the general profile questionnaire was administered and the forms were collected back.
- ✓ *Session 2:* IQ test was conducted for both the experimental and wait-list control group of respondents with Ravens Progressive Matrices (RPM) to find out whether the students had normal IQ levels.

Stage 2 - Orientation and Pre-test evaluation: 1 Session (2 hours)

- ✓ *Session 3:* The DASS-42 questionnaire was administered to find out the level of DAS among the experimental and wait-list control group of respondents.

Stage 3 - Education and training sessions: 11 Sessions (22 hours)

Stage 3 encompasses two sub-stages i) Psycho-Education (1 session) and ii) Behavioural and cognitive techniques (10 sessions). Altogether, stage 3 comprises 11 sessions and as each session was for two hours, it accounted for a total of 22 hours. The session-wise implementation details were as below:

i. Psycho-education (1 Session, 2 hours)

- ✓ *Session 4 (Psycho-Education):* The respondents were subjected to the psycho-education session where the respondents were given an orientation of what the programme was about and were informed about the concept of depression, anxiety, and stress, their possible triggers, and the signs and symptoms they experience based on the pretest findings. The main objective of psycho-education was to provide preparatory information about potential stressful events and what symptoms they may experience after trauma. The psycho-education was also to facilitate the respondents to realise their ability to perceive stressful situations as less disturbing and enable them to recognise that the symptoms were part of a normal reaction.

ii) Behavioural and cognitive techniques (10 sessions, 20 hours)

This part of the intervention involves sessions 5 to 14. It was a combined training session of both behavioural and cognitive techniques for a total of 10 sessions. The key objective was to enable the students to understand the relationship between behavioural and cognitive techniques and facilitate them to correlate by realising an effect and consequences on each other.

- ✓ *Sessions 5 and 6:* It started with the demonstration of the relaxation technique which includes Pranayama (breathing exercise), a Behavioural technique, that the students were allowed to practice after observing the procedure. Followed with the demonstration a lecture on the concept of body and mind was held.
- ✓ *Session 7:* Thought Dairy that includes (Date/Time/Situation/Thought/ Emotion), a technique of CBT and the practice of challenging tasks were held and the respondents were asked to write a recent incident in their daily life and were given the freedom to write anything so that the emotions the students went through can be completely analysed. The main motive was to understand whether they were able to identify the exact emotions within them. Moreover, by penning the thought dairy, the respondents can share things that they were not able to share with others and it mainly helps to elicit negative thoughts that come into their mind. They were asked to maintain one thought dairy at home and were instructed to write their daily activities and bring them to the next class. The main rationale behind this practice was to understand the thought process of the respondents as we know the events, their feelings, and thoughts were interrelated in a way that positive thoughts can bring positive feelings and negative thoughts can elicit negative feelings.
- ✓ *Session 8:* Started with breathing exercises and repetition of the previous sessions, to find out whether the respondents were penning the thought dairy in the right way and they were also clarified of any doubts in maintaining the same.
- ✓ *Session 9:* This session introduced a technique called ‘Thought Validation’ through the practice of thought dairy. This technique was deployed to help the respondents understand if they have a negative statement in their mind and were aided to challenge their thoughts by thinking for and against the negative statement. They were asked to remember some problems from their daily life experiences like exam fear, fear of failure, etc. In one such event, the researcher asked them to imagine the negative consequences - “What if I fail”, and were asked to list down the points both for and

against the situation. It was very interesting to see that more positive thoughts came against the situation. This sort of exercise was to make the respondents understand that there was a two-way solution for every problem that they faced, and hence make them realise that one should always think of an alternate solution which was called “Thought Reattribution”. In other words, these exercises were to make them think in an alternative perspective (Positive thoughts).

- ✓ *Session 10:* It started with the practice of thought reattribution and a detailed explanation of the differences between thought validation and thought attribution was provided by a lecture to enable respondents to understand their listed solutions, weigh out their positive and negative thoughts, choose the solution, and implement them.
- ✓ *Session 11:* This session was meant to rehearse the skills learned in new and different situations through activities like role play, brainstorming, etc.
- ✓ *Session 12:* The session started with breathing exercises and the respondents were imparted with two techniques simultaneously i.e., cognitive rehearsal technique as well as social behaviour practice. Role play was the key method adopted to facilitate the respondents to perform the task. The cognitive rehearsal technique helped them to increase self-efficacy, alleviate negative thoughts and help to tackle the situation positively, whereas the social behaviour technique, dealt with understanding and developing communication skills that included verbal, and non-verbal communication as well as listening skills.
- ✓ *Session 13 and 14:* For the last two days of the programme repetition of the above techniques with simultaneous inculcation of new skills like assertive skills and conflict resolution were carried out.

Stage 4 - Post-Test Evaluation and follow-up: 1 Session (2 hours)

- ✓ *Session 15:* The DASS-42 questionnaire was administered again to the experimental and wait-list control group respondents to find out the level of DAS after the intervention period since one of the objectives was to evaluate the effectiveness of CSIT-DAS in reducing the level of DAS.

After the completion of the four months of the intervention programme, the first follow-up session was held after a gap of one week for the experimental lot of respondents, where the main motive was to see whether the respondents were able to practice the skills

learned. The experimental lots of respondents were also asked to fill in DASS-42. Similarly, after one month of follow-up 1, follow-up 2 was organized with an hour of interaction with the experimental group of respondents, followed by the administration of the DASS-42 scale.

D. ANALYSIS OF DATA

The data analysis and method of computation for the two phases of the study were as below:

Phase I: Identify the levels of Depression, Anxiety and Stress (DAS), their interrelationship, and their determinants

The acquired data was statistically analysed. The Shapiro-Wilks test for normality was computed to know whether the data were normally distributed. The test results revealed that the dependent variables of phase 1 – the mean scores of Depression, Anxiety and Stress - were significantly deviating from a normal distribution. Therefore, non-parametric tests were performed. Percentage analysis was carried out to assess the prevalence in terms of the levels of Depression, Anxiety and Stress among the selected school-going adolescents. Spearman's correlation was carried out to determine the strength and the direction of the relationship between the three negative emotional states - Depression, Anxiety and Stress. Spearman Correlation statistics were also used to determine the direction and the strength of the potential determinants identified for all three mental states with their corresponding DAS score of the respondents.

To assess the effect of socio-demographic factors on the three negative emotional states – DAS – both qualitative and quantitative analyses were computed. The Chi-square test for association (Qualitative measure) was conducted to see the significant association between socio-demographic variables and levels of DAS. Mann-Whitney U test (Quantitative measure) was performed to test if two samples were likely to be derived from the same population, as in the case of gender and class of study in terms of DAS. Kruskal-Wallis's test was carried out to determine if more than two groups are different, such as in the case of the type of schools, type of family, type of residence, and educational qualification of parents concerning DAS. Further, post hoc tests were used after the results were statistically significant to predict where the differences in the results come from.

Phase II: Effectiveness of the formulated preventive intervention

The Shapiro-Wilks test for normality was also computed for the second phase of data and the test results revealed that it was not deviating from a normal distribution. Therefore, parametric tests were performed. To analyse the effectiveness of CSIT-DAS by comparison between pre-test and post-test DAS among the experimental and wait-list control group and for the sustainability of the preventive intervention formulated as a preventive strategy to alleviate DAS and abbreviated as CSIT-DAS among the experimental group and to evaluate the gender-based comparison among the experimental and wait-list control groups the analysis used was sequenced below:

To compare differences in mean score on DAS between experimental and wait-list control groups of respondents and to check if the intervention effect differs by time measures (Pre and Post) with an overall objective of evaluating the effectiveness of the CSIT-DAS in alleviating DAS, MANOVA of repeated measures [2 (experimental and wait-list control groups) x 2 (Pre and Post evaluation scores of the three dependent variables, Depression, Anxiety and Stress)] was computed. The Mahalanobis distance was figured for all three dependent variables in two repeated measures for the experimental group and the value was 20.920 which was less than the Chi-square value of 22.46 with $p = 0.0001$. In the same way, the Mahalanobis distance of the wait-list control group was 22.32 which was almost equal to the Chi-square value of 22.46 with $p = 0.0001$. Hence, the dataset of the dependent variable has met the assumption of MANOVA in having a Multivariate normal distribution.

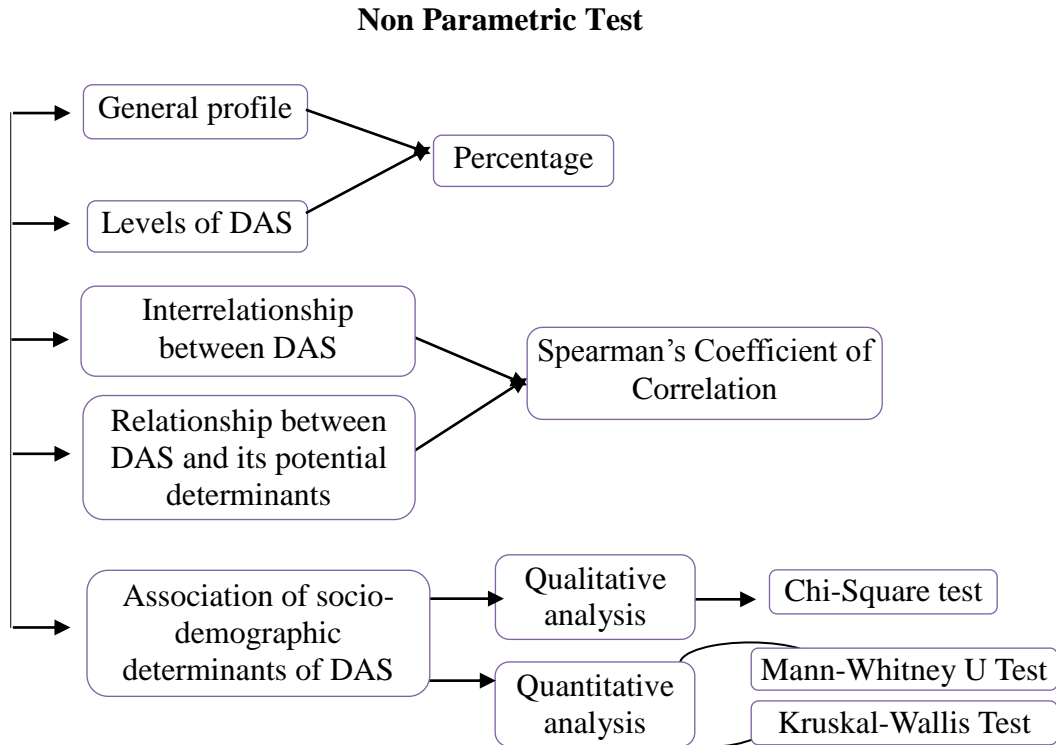
To evaluate the gender-based comparison, T-tests were deployed on the mean score between the experimental and wait-list control group, at both pre and post-intervention.

To examine the sustainability of the CSIT-DAS, the dependent variables (Depression, Anxiety, and Stress) were measured four times namely, Pre to intervention, Post to intervention, Follow up 1, and Follow up 2. As there were four-time scores for each dependent variable it was decided to use MANOVA of repeated measures.

Figure 12 gives a bird's eye view of the analysis of data used in the current study in both phases.

Analysis of data – At a glance

Phase I: Identify the levels of Depression, Anxiety and Stress, their interrelationship, and their determinants



Phase II: Effectiveness of the formulated Preventive Intervention

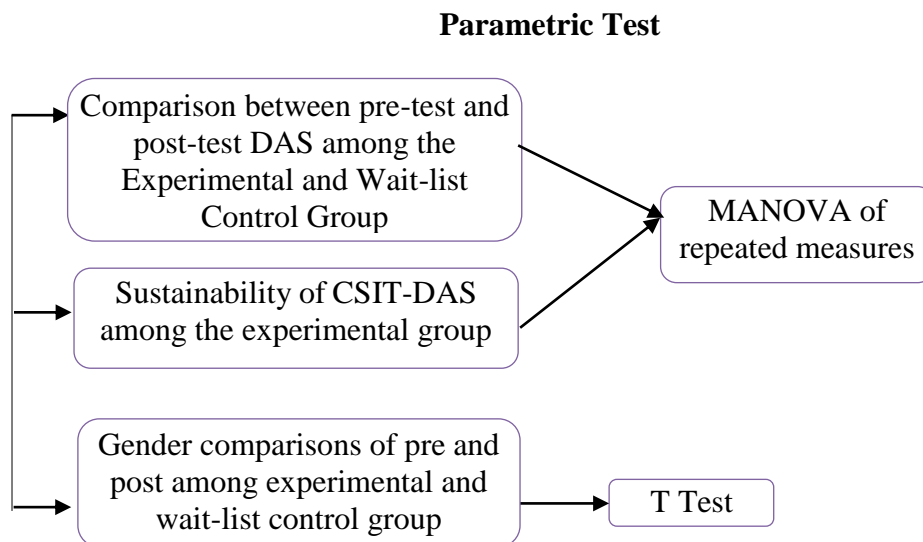


Figure 12

Glimpses of the Preventive Intervention Programme – Comprehensive School-based Intervention Training to alleviate Depression, Anxiety and stress (CSIT-DAS)



Ice breaking activities for Rapport Building



Forming circles without breaking the lines



IQ test – Filling Ravens Progressive Matrices (RPM)

Glimpses of the Preventive Intervention Programme – Comprehensive School-based Intervention Training to alleviate Depression, Anxiety and stress (CSIT-DAS)



→ Breathing exercises to begin the session



↓
Administration of DASS-42 for pre-test evaluation

Glimpses of the Preventive Intervention Programme – Comprehensive School-based Intervention Training to alleviate Depression, Anxiety and stress (CSIT-DAS)



Implementation of the third stage i.e. Education and training



Glimpses of the Preventive Intervention Programme – Comprehensive School-based Intervention Training to alleviate Depression, Anxiety and stress (CSIT-DAS)



Practice of breathing exercises



Post data collection

