Original Article

Development and Application of Critical-Thinking and Decision-Making Skills' Enhancement Module among School-Going Adolescents in Manipur: A Quasi-Experimental Study

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Abstract

Background: Life skills aid as a principal catalyst to promote healthy adolescent development by preventing key causes of death. Building critical-thinking and decision-making skills lays the foundation stone for unfolding all other essential life skills.

Objectives: To evaluate effectiveness of an educational intervention module on critical-thinking and decision-making skills of school-going adolescents in Imphal West district, Manipur.

Methods: Quasi-experimental study was conducted in co-educational state board schools of Imphal West district of Manipur among classes IX and XI from December,2020 to October,2022 with 210 students in intervention and 206 in control school. Structured questionnaire was self-administered at three time points. Health education module devised by researchers, comprised of four sessions given at three weeks interval to intervention school. Chi-square test, Independent sample-t-test and ANOVA were applied for analysis.

Results: Critical-thinking skills {Wilks's Lambda=0.061,F(2,208)=1602.82,p<0.001, $\eta 2$=0.94} and decision-making skills {Wilk's Lambda=0.11,F(2,208)=831.84,p<0.001, $\eta 2$=0.89} of the experimental group improved significantly across the three time points but not for the control group. Between the group comparison indicated that mean change in scores for both the skills was significantly greater for experimental group (p<0.001) when compared to control. Life skills intervention module had a large effect size for both the skills at both the post-tests

Conclusion: This study affirmed the effectiveness of the educational intervention with significant improvement in both skills for experimental school immediately after the intervention which was sustained till the third month.

Keywords: Critical-thinking skills, Decision-making skills, Life skills education

Introduction

WHO describes adolescence as phase transitioning amidst childhood and adulthood, aged 10-19 years, a critical stage for laying the foundations of good health throughout the life course.[1]

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Globally, ~1.5 million, aged 10-24 years died in 2019.[2] Probability of dying among youths in India was 6 per 1000 in 2020.[3] Being equivalent to 17.74% of the world population, India has world's highest number of 10–24-year-olds. In 2011, Manipur accounted for 0.24% of total adolescent population of India. India is experiencing demographic window of opportunity, a "youth-bulge" that will last till 2025. [4] Early and accelerated investment is needed to capitalize this advantage.

Admiration for greater autonomy, burden to conform with peers, expanded avenues of technology, socio-economic characteristics, engagement in experimental activities, psychological frailty in tackling conflicts and apprehension about future are host of factors making them susceptible to preventable risk-taking behaviours.

Life skills education based on participatory learning methods, is an indispensable vehicle in gearing up young people to mediate above risks. WHO defines life skills as the ability for adaptive and positive behavior that enable individuals to deal effectively with demands and challenges of everyday life.[5] Interventional studies conducted across India and globally have presented significance of varied life skill educational programs in overall enrichment of life skills,[6-15] improved academic achievement at schools,[16-18] and reductions in high-risk health behaviors like substance abuse, violence, insecure sexual behaviour, conduct problems, peer problems, suicidal expressions and improvements in prosocial behaviors, mental health and general self-efficacy. [19,20]

WHO enlists ten life skills. Critical-thinking skill is an ability to analyze information and experiences in an objective manner, helping them to appraise the factors that influence behavior. Decision-making skill is the potentiality to define a problem, think of the alternatives, identify consequences for each alternative, select one, and finally evaluate the decisions made.[5] Life skills education module encompassing these two skills as the prime ingredients will serve as a value-added primordial prevention program for the youth, moulding their way for development of supplementary life skills.

Role of schools in identity establishment, access to adolescents on a large scale, feasibility of encouraging environment, experienced teachers already in place, high credibility with parents, possibilities for long-term evaluation are some of the reasons why schools are deserved place for the commencement of life skills education.

Life skills enhancement module focussing on critical-thinking and decision-making skills will enable the acquisition of critical reflection on health-related issues, giving reflective access to the other two areas: communication-interpersonal skills and coping-self management skills. Hardly any known studies have been conducted in schools of Manipur in this regard. It is thus a need of the hour to determine their baseline skills and further appraise the impact of an interactive and engaging educational intervention module.

Materials and Methods

Objective: To evaluate the effectiveness of an educational intervention module on critical-thinking and decision-making skills of school going adolescents in Imphal West district, Manipur. Quasi-experimental study was conducted from December,2020 to October,2022. Students of co-educational, state board schools having both classes IX and XI were included and those who were absent on the day of data collection were excluded.

Sample size: Taking mean change score for decision-making skills as 0.05±0.35 for experimental and -0.09±0.35 for control group from study by Shukla et al, significance of 0.05, power of 85%, design-effect of 1.5 and non-response rate of 20%, minimum sample size was calculated as 202 for each group.[13]

Sampling: Of 617 schools of Imphal West district, 336 schools are co-educational, of which 28 have both IX and XI. Of these, twenty schools were under Manipur board. One school each was allocated to intervention and control group using purposive sampling such that the distance between them was ≥5 km. Grades IX and XI had two sections each in both the schools with average student strength of 55. Total eligible participants were 220. To reach the sample size of 202 in each group, both sections of both grades were included.

Study tool: Structured and pre-tested questionnaire was used to collect data. Critical-thinking and decision-making skills were assessed using the study tool developed by Claudia Mincemoyer and Daniel Perkins (2001) after taking due permission over email. Critical-thinking scale with reliability of 0.72 had 20 items based on five-point Likert scale (minimum: 20, maximum:100). Decision-making scale with reliability of 0.63-0.89 had five items based on four-point Likert scale (minimum:0, maximum:15). Higher scores indicated greater skills.

Intervention: Health education plan comprised of four sessions starting from the acquaintance with topic using slides, further elaboration of "how to think critically and decide" using pamphlets, case scenarios and role-plays followed by "importance of choices made in life" using short videos and group discussions, ending with quiz program on "adolescent risk-taking behaviours" and pledge singing in last session. Sessions were conducted in class rooms, 45 mins per session. Face and content validity of the intervention module was scrutinized by the experts.

Data collection: In Session I, questionnaire was self-administered to the students in both groups for pre-testing followed by life skills education initiation in intervention school. There was a gap of three weeks between subsequent sessions. Entire intervention was completed in nine weeks. There was no intervention or continuous reinforcement given to control group. Post-test I was held nine weeks after pre-test in the last session (Session IV) itself and post-test II was done three months after the post-test I for both the schools. After second post-test, the intervention materials were distributed in control school followed by briefing.

Data analysis: After checking for completeness and consistency, data were entered in IBM SPSS-26 and summarized using descriptive statistics. Distribution of data was assessed using Kolmogorov-Smirnov test. Chi-square for categorical and Independent sample-t-test for continuous variables were used to assess comparability between two groups. Repeated-measure ANOVA with post-hoc Bonferroni correction was used to assess mean change within the group across three timepoints. Effect size of the intervention was assessed using Cohen's d. P value of <0.05 was considered as statistically significant.

Ethical issues: Ethical approval was obtained from the Research Ethics Board, (No.A/206/REB-Comm(SP)/RIMS/2015/538/16/2019). Study was registered prospectively in Clinical Trial Registry of India (CTRI/2021/01/030274).Informed written consent from school principal, informed verbal consent from parents and assent from the students were obtained. Their roll numbers were taken as the unique code to ensure confidentiality.

Results

In the intervention and control school, six and eight students were respectively absent on the days of data collection. Study participants included in the analysis in intervention and control school were 210 and 206 respectively. The intended sample size was retained. Both the groups were comparable in terms of variables of interest (p>0.05) as highlighted in Table 1.

Critical-thinking skills of the experimental group differed significantly across the three time points {Wilks's Lambda=0.061,F(2,208)=1602.82,p<0.001, η^2=0.94}. Post-hoc, scores at post-test I (73.48±6.34) and post-test II (74.30±6.16) were significantly higher when compared with pre-test score (44.92±5.19) as shown in Table 2. Control group did not differ significantly across the three time points {Wilks's La mbda=0.976,F(2,204)=2.53,p=0.082,η^2=0.024}.

Decision-making skills of experimental group differed significantly across the three time points {Wilk's Lambda=0.11,F(2,208)=831.84,p<0.001, η^2=0.89}. Post hoc, scores at post-test I (4.22±1.93) and post-test II (11.16±1.73) were significantly higher when compared with pre-test score (11.24±1.72) as is shown in Table 2. Control group did not differ significantly across the three time points (Wilks's La mbda=0.961,F(2,204)=4.187,p=0.077,η^2=0.039).

There was no significant difference between the two groups at baseline for critical-thinking (p=0.453) or for decision-making skills (p=0.278). Table 3 indicates that mean change in scores of critical-thinking (28.56±7.48, p<0.001) and decision-making skills (6.94±2.48, p<0.001) was significantly higher for experimental group at Post-test I when compared

to control group. The influence of intervention on the experimental group was maintained uptill Post-Test II as compared to control group.

There was significant difference between the two groups in terms of self-perceived class performance assessment in latest test/ exam at Post-Test II ($p<0.001$). Greater proportion of students in the experimental group assessed their performance in class test as 'good' (43.3%), 'very good' (26.7%) or 'excellent' (11.4%) when compared to control group (37.9%, 13.6% and 2.9% respectively).

Intervention module had a large effect size of 4.74 at post-test I and 4.89 at post-test II for critical-thinking skills and 3.69 at post-test I and 3.72 at post-test II for decision-making skills.

Table 1: Comparison of background characteristics between groups (N=416)

Characteristics	Experimental Group (N=210)	Control Group (N=206)	p-value
	n (%)	n (%)	
Age (years)(Mean±SD)	15.52 ± 1.73	15.59 ± 1.80	0.693*
Gender			
Male	106 (50.5)	98 (47.6)	0.554†
Female	104 (49.5)	108 (52.4)	
Grade			
IX	103 (49.0)	97 (47.1)	0.689†
XI	107 (51.0)	109 (52.9)	
Address			
Urban	127 (60.5)	126 (61.2)	0.886†
Rural	83 (39.5)	80 (38.8)	
Family Type			
Nuclear	117 (55.7)	124 (60.2)	0.355†
Joint	93 (44.3)	82 (39.8)	
No. of Siblings			
<2	57 (27.2)	64 (31.1)	0.352†
2	61 (29.0)	66 (32.0)	
>2	92 (43.8)	76 (36.9)	
Birth Order			
1	66 (31.4)	65(31.6)	0.912†
2	69 (32.9)	64 (31.0)	
>2	75 (35.7)	77 (37.4)	
Father's Educational Status			
Illiterate	15 (7.1)	18 (8.7)	0.745†
Primary school	21 (10.0)	28 (13.6)	
High School	94 (44.8)	88 (42.7)	
Higher Secondary School	42 (20.0)	36 (17.5)	
≥Graduate	38 (18.1)	36 (17.5)	
Mother's Educational Status			
Illiterate	22 (10.5)	28 (13.6)	0.698†
Primary school	29 (13.8)	35 (17.0)	
High School	86 (41.0)	80 (38.8)	
Higher Secondary School	40 (19.0)	34 (16.5)	
≥Graduate	33 (15.7)	29 (14.1)	

Father's Occupation			
Employed	153 (72.9)	151 (73.3)	0.919†
Unemployed	57 (27.1)	55 (26.7)	
Mother's Occupation			
Employed	92 (43.8)	109 (52.9)	0.063†
Unemployed	118 (56.2)	97 (47.1)	
Self-perceived grading of class performance in latest test			
Excellent	8 (3.8)	7 (3.4)	0.523†
Very Good	30 (14.3)	27 (13.1)	
Good	81 (38.6)	72 (35.0)	
Fair	63 (30.0)	57 (27.7)	
Bad	20 (9.5)	31 (15.0)	
Very Bad	8 (3.8)	12 (5.8)	

*Independent sample-t-test

†Chi-square test

Table 2. Comparison of skills at three time points for experimental group (N=210)

Timepoint		Mean Difference (A-B)	P-value*
A	**B**		
Critical-thinking			
Pre-Test	Post-Test I	-28.56	<0.001
	Post-Test II	-29.38	<0.001
Post-Test I	Pre-Test	28.56	<0.001
	Post-Test II	-0.81	<0.001
Post-Test II	Pre-Test	29.38	<0.001
	Post-Test I	0.81	<0.001
Decision-making			
Pre-Test	Post-Test I	-6.94	<0.001
	Post-Test II	-7.02	<0.001
Post-Test I	Pre-Test	6.94	<0.001
	Post-Test II	-0.08	0.004
Post-Test II	Pre-Test	7.02	<0.001
	Post-Test I	0.08	0.004

* Repeated-measure ANOVA using Bonferroni correction

Table 3. Between group comparison of mean change in scores (N-416)

Timepoint	Experimental Group (n=210) (mean±sd)	Control Group (n=206) (mean±sd)	P-value*
Critical-thinking			
Post-test I-Baseline	28.56±7.48	0.40±3.82	<0.001
Post-test II-Baseline	29.38±7.50	0.30±3.78	<0.001
Decision-making			
Post-test I-Baseline	6.94±2.48	0.11±0.84	<0.001
Post-test II-Baseline	7.02±2.49	0.07±0.89	<0.001

*Independent sample-t-test

Discussion

In this study, both skills of experimental group improved significantly after the intervention. Pathania et al and Joseph et al perceived significant improvement in scores after intervention.[10,11] In 2020, Kannada district displayed significant betterment in critical-thinking by 5.3 and decision-making skills by 1.1.[7] Other studies explored coinciding outcomes. [8,14,15,19,21,22] Contrarily, Sangma et al in Meghalaya, found improvement (p=0.015) in critical-thinking but not in decision-making skills (p=0.598).[6] Variation in study population, intervention program, study tools and the time context might explain this dissemblance.

Experimental group of this study had significantly higher skills in post-test I compared to control group. Mansuri in her study at South Mumbai (p<0.001), Vashishtha et al in Agra city and Parvathy V et al in Kerala (p<0.05) examined coinciding results. [13,15,23] Further, both skills were still significantly higher three months after the post-test I in intervention school in this study. This can be backed by findings of Joseph et al and Daisy et al, where both the skills were significantly higher one month after the intervention.[12,17] Follow-up at six months after post-test I still showed significant improvement in the study by Ahuja et al.[16] This suggests combination of participatory and experiential learning techniques like brain-storming, skit, case scenarios, video presentations, quiz, debates, group discussions etc helps in enhancement, inculcation and retention of life skills.

After intervention, self-perceived class performance significantly differed between the two groups in this study (p<0.001) implying affirmative impact of the module on academic achievements. Daisy et al recognized that life skills intervention had developed the study skills thereby impacting positively on the academic performance.[17] Likewise, Srikala et al found that students receiving life-skills education in Bangalore were significantly better adjusted to schools and teachers (p<0.001) even at the end of one year.[22] This emphasizes the need to institutionalize school mental health program using life skills approach.

Strengths and limitations: Amalgamation of innovative learning techniques, use of validated questionnaire and large effect size of the intervention were some of the strengths. COVID-19 pandemic during the timeframe ensuing in school closure served as hindrance. Out-of-school or drop-out children were not addressed. Self-administering the questionnaire might have given rise to social desirability bias.

Conclusion: Study affirmed the effectiveness of the self-designed educational intervention module. Orientation programs sensitizing parents and teachers who are responsible to equip adolescents with permissive circumstances at homes and schools is a prerequisite at this moment.

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