

Original Article

## The effectiveness of cognitive behavioral stress management training on mental health, social interaction and family function in adolescents of families with one Human Immunodeficiency Virus (HIV) positive member\*

Maryam Keypour<sup>1</sup>, Soroor Arman<sup>2</sup>, Mohammad Reza Maracy<sup>3</sup>

### Abstract

**BACKGROUND:** This study evaluated stress management training to improve mental health, social interaction and family function among adolescents of families with one Human Immunodeficiency Virus (HIV) positive member.

**METHODS:** There were 34 adolescents (13-18 years old) with at least one family member living with HIV from whom finally 15 attended the study and participated in 8 weekly sessions of stress management training. The tests used in this study were: Strengths and Difficulties Questionnaire (self and parent report), General Health Questionnaire-28 (GHQ-28) and Family Assessment Device (FAD), conducted before, after and three months after the intervention. The collected data were analyzed by repeated measure test using SPSS software (Version 18.0).

**RESULTS:** Adolescents with one HIV positive family member showed high level of emotional problem (40%) and conduct problem (33.3%). There was a significant difference between before, after and 3months after intervention based on GHQ-28 mean scores and FAD mean scores ( $p < 0.001$ ). There was a significant difference between mean scores of peers' relationship based on SDQ (self report and parents report forms) before and after intervention, but there was no significant difference between mean scores of pro social behavior based on SDQ (self report and parents report forms) in all three stages (before, after and three months after intervention).

**CONCLUSIONS:** Stress management training is effective in improving mental health, family function and social interaction among adolescents living with parents infected with HIV/AIDS.

**KEYWORDS:** Social Interaction, Mental Health, Family Function, HIV, Stress Management Training, Adolescents.

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**H**uman Immunodeficiency Virus (HIV) is a worldwide pandemic. Based on the reports, by the end of 2007 about 33.2 million people were living with HIV/Acquired Immunodeficiency (AIDS).<sup>1</sup>

It has been estimated that by the end of year 2007, about 4.9 million people were living with HIV in Asia.<sup>1</sup> Based on the last reports of Iranian Ministry of Health, Treatment and Medical Education issued in 2008, up to that time,

18,881 Iranians had been involved in HIV.<sup>2</sup> The epidemic of AIDS and HIV is a great worldwide crisis affecting the health and psychological well being, causing devastation among families, and threatening social welfare in various societies.<sup>3</sup>

On the other hand, over 15 million children lost their parents due to HIV and AIDS. They have been deprived from having a family, parents, affective relationships, medical care, edu-

\* This paper derived from a Specialty thesis in Isfahan University of Medical Sciences.

1- Resident of child and adolescent psychiatry, Department of Psychiatry, Behavioral Science Research Center, School of Medicine And Student Research Committee, Isfahan University of Medical Sciences, Isfahan, Iran.

2- Associate professor, Department of Psychiatry, Behavioral Science Research Center, School of Medicine, Isfahan University of Medical Sciences, Isfahan, Iran.

3- Associate professor, Department of Epidemiology and Biostatistic, School of Health, Isfahan University of Medical Sciences, Isfahan, Iran.

Corresponding Author: Soroor Arman

E-mail: arman@med.mui.ac.ir

cation, (good) nutrition and hygiene.<sup>3</sup> Children and adolescents, either directly or indirectly, are often affected by HIV disease in the family and are at a high risk for mental health problems, which is commonly ignored by health care systems.<sup>4</sup>

Various studies have reported that children and adolescents, losing their parents due to HIV, manifest and experience more symptoms of depression and suicidal thoughts compared to other orphans.<sup>3,5,6</sup> Bereavement among sisters or brothers of the lost ones due to AIDS is more intense and more prolonged than that of other reasons.<sup>7</sup> Another problem that affects families is the high costs of treatment and low family income because of the job loss of the infected member resulting in a financial shortage in fulfillment of basic needs.<sup>8,9</sup> A chronic disease in a family on one hand, can make a role change and on the other hand, isolates family members because of severe anger or guiltiness.<sup>10</sup> This issue reflects the crucial necessity to investigate family function and to intervene in order to promote it.

The families with one infected member are influenced by the stigma made by the disease, which is associated with feeling of shame, losing family face, disruption within-family relationships and broader social network, have major impact on family identity and interactions.<sup>11</sup> In a study by De La Revilla, 46% of asymptomatic seropositive patients had family dysfunction.<sup>12</sup> Geromanos et al reported that HIV disease, like other chronic diseases, put children and families at the risk of depression and social isolation.<sup>13</sup> Adolescents in these families need special attention as they are going through puberty period that is associated with its own stress and mental pressure, and also because they are in the age of personality formation.<sup>14</sup> Cognitive and behavioral stress management training is a branch of stress management that focuses on cognitive behavioral approach. Stress management brings about individuals' ability to diminish stress and increase their adaptation based on a stressful situation.<sup>15,16</sup> This intervention includes increased awareness about stress, relaxation

technique, unhelpful thoughts detection, cognitive reconstruction, problem solving, assertiveness skills training and anger and time management.<sup>15</sup>

The intervention on families with one HIV positive members is very limited. Studies showed that stress management training for the HIV infected persons and their families can be useful.<sup>17,18</sup> The present study investigate the effect of cognitive behavioral stress management training on these issues, aiming to determine family mental health status, social interactions and family function among the adolescents of families with a HIV positive member.

## Methods

This is a self control clinical trial. The target population comprised of families with one HIV positive member. Inclusion criteria were adolescents (13-18 years old) with at least one family member living with HIV, adolescents knowing about the HIV disease of the involved member, Intelligence Quotient (IQ) higher than 80, no learning disorder, no drug abuse and psychosis, yielding informed written consents, no problem that interferes with attending the classes. Firstly, the families and the involved members were requested for two informed written consents, based on Helsinki ethical code and approval of ethical committee of Isfahan university of Medical Sciences. The sampling method was census sampling by which all adolescents aged 13-18 years from the families with one HIV positive member were selected in AIDS clinics. Thirty four adolescents were primarily invited but finally fifteen attended the study. The 19 samples who did not accept to attend the study, 6 (32%) of whom were sisters or brothers of the infected member, 8 (42%) were children of the infected ones who had moved out and their spouses were not available or had not permitted their children to attend the educational classes and five samples (26%) left the study due to address change and leaving no contact number.

In addition, one sample attended only one session and then quited the study, so finally fourteen cases attended all sessions. Pre-tests

were taken before starting the intervention. Then, eight weekly sessions (90 minutes each) were held by a child and adolescent psychiatrists. Cognitive behavioral stress management training included increase in awareness about stress, relaxation, unhelpful thoughts, cognitive reconstruction, problem solving, assertiveness skills training and anger and time management (table 1).<sup>15</sup> The first 45 minutes of each session were devoted to education and group discussion, then 10 minutes of free discussion and after that there was a break and finally the rest of the time was teaching theoretical and skill materials. At the end of each session, participants were given homework to be checked for the following session.

After eight sessions, the first post test was taken and three months after the last session, a booster session was held to review educational sessions, to practice the skills and also to answer the questions. Finally, the post test was taken. Parallel to the sessions of the adolescents, three educational sessions (parallel to the first, fourth and eighth session) were held for the parents. Information including route of transmission, stage of disease, Hepatitis C, substance abuse and CD4 cell was derived from patients' recorded documents in clinic. The research measurement tools included demographic data form filled for the infected member and the adolescent, General Health Questionnaire-28 (GHQ-28), Strengths and Difficulties Questionnaire (SDQ) and Family Assessment Device (FAD).

GHQ is one of the most widely used questionnaires to screen for psychiatric morbidity and includes 28 questions with 4 subscales of somatic symptoms, anxiety and insomnia, depression and social dysfunction. The sum of four subscales is the total GHQ score. Each question is scored from 0 to 3, so that the lower the score of each subscale and total GHQ, the better the general health.<sup>19</sup> This questionnaire had been standardized in Tehran Psychiatry Institute.<sup>20,21</sup>

FAD is a self-report instrument developed to measure perception of family function. The

version we used was a 60 item questionnaire made by Epstein, Baldwin and Bishop to measure family function based on McMaster model.<sup>22</sup> The questions were scored in form of 7 subscales including problem solving, communication, roles, affective responsiveness, affective involvement, behavior control and general function.<sup>23,24</sup> This tool has a good reliability in each of its sub scales.<sup>23</sup> Each question was scored from one to four. It was so that the lower the score of any subscale, the better family functions.

SDQ is a structured questionnaire which is commonly used for behavioral and emotional problems as well as children and adolescents' relationship. This questionnaire was designed by Goodman in 1997 and includes 25 questions with 5 subscales of emotional problems, hyperactivity, peer problems, conduct problems or pro-social behavior, in which five items are included.<sup>25</sup> Each item was given a score of 0 to 2. The total score of each subscale was from 0 to 10 classified to three categories (normal-borderline and abnormal) and it is available on the Internet at [www.sdqinfo.com](http://www.sdqinfo.com). Total problem score was calculated by adding the first four subscales ranking from 0 to 40.<sup>25</sup> This questionnaire has three forms for parents, teachers and self report for adolescents over 11 years of age. Tehranidoost et al evaluated this test and reported that it to have an acceptable reliability and validity in Iranian population.<sup>26</sup> In the present study, social interactions have been evaluated based on subscales of pro social behavior and peer relationship SDQ. Self report and parent report SDQ, GHQ-28 and FAD were used before (T1), after the end of intervention (T2) and three months after last session (T3). The data were analyzed by descriptive statistics (frequency distribution, mean and SD) and analytical statistics of repeated measure with option of Green house-Geisser to compare mean scores of outcomes such as FAD, GHQ and SDQ (self and parent report) using SPSS (version 18). Bonferroni test was used to assess any significant difference between T1 and T2, T1 and T3, and T2 and T3.

## Results

Fifteen adolescents aged 13-18 years from families with one HIV positive member attended this study. Nine of them were male (60%) and 6 were female (40%). Mean age of the adolescents was  $15.9 \pm 1.9$  and mean age of their parents was  $42.5 \pm 8.7$ . Some other demographic characteristics have been presented in table 2.

Number, percentage, borderline and abnormal values of each subscale and total scores of impact score before, after and three months after cognitive behavioral stress management intervention based on SDQ self report and parents report have been presented in table 3. The most abnormalities in subscale of emotional problem were for self report in SDQ (40%) and conduct problem (33.3%) respectively. The lowest was reported for social behavior problems (0%).

In parent report SDQ, the highest abnormalities were for subscales of conduct problems (53%) and peer relation and emotional problems (40%). The lowest rate was for social behavior problems (13.3%).

Based on the study analysis, mean scores of

mental health (mean  $\pm$  SD) obtained by GHQ questionnaire, family function obtained by FAD questionnaire and social interactions obtained by SDQ questionnaire, before intervention (T1), after the intervention (T2) and three months after the intervention (T3) were calculated and presented in table 3. There were significant differences between T1, T2 and T1, T3 GHQ-28 mean scores ( $p < 0.001$ ). However, there was no significant difference between just post intervention (T2) and three months after the intervention (T3) mean scores ( $p = 0.4$ ).

There was a significant difference between mean scores of family function based on FAD in T1 and T2 and between T1 and T3 ( $p < 0.001$ ), but there was no significant difference between mean scores T2 and T3 ( $p = 0.12$ ). Also, there was no significant difference between mean scores of pro social behavior based on SDQ (self report and parents report forms) in all three stages ( $p > 0.05$ ).

There was a significant difference between mean scores of peers relationship based on SDQ (self report and parents report forms) before and after intervention and also between

**Table 1.** subject and outlines of cognitive behavioral stress management training sessions

Session	Outline
First	Introduction, group member greeting, explaining group rules, time and number of sessions, concept of stress, conducting pre-tests, giving homeworks
Second	Reviewing the previous session homework, educating the group about the causes and outcomes of stress, how to manage stress, teaching relaxation techniques with practical exercise, homework
Third	Review the previous session homework, introduction to automatic thought, role of thought in causing stress, association of thoughts with emotions and behavior, how to manage thoughts.
Fourth	Challenge with thoughts and illogical beliefs
Fifth	Review the previous session homework, teaching problem solving method
Sixth	Teaching communication skills, self expression and self confidence
Seventh	Teaching time management and planning activities
Eighth	Practice the already learned skills from past sessions, implication of these skills in stressful situations, conducting post-tests
Three month after intervention	Review of already learned skills, answer the questions, conducting post-tests

**Table 2.** Frequency and percentage distribution of some characteristics of children

and families with HIV* positive members		N (%)
Adolescent Sex	Boy	9 (60)
	Girl	6 (40)
HIV infected Sex	Male	10 (66.7)
	Female	5 (33.3)
Relation with adolescent	Father	8 (53.3)
	Mother	3 (20)
	Father and mother	4 (26.7)
	Sibling	0 (0)
Adolescent's education	middle school	3 (20)
	High school	12 (80)
HIV infected person education	Uneducated or Primary school	8 (53.3)
	middle and high school	7 (46.7)
	High educated	0 (0)
HIV infected person's Job status	employee	4 (73.3)
	unemployed	11 (26.7)
HIV infected person Living status	with adolescent	12 (80)
HIV infected person marriage	Separate	3 (20)
	Married	8 (53.3)
Stage of disease	Divorce	6 (40)
	widow	1 (6.7)
	HIV positive	3 (20)
HIV transmission route	AIDS	12 (80)
	Injection	3 (20)
	Sex	9 (60)
Hepatitis c in HIV infected member	Unknown	3 (20)
	Positive	3 (20)
Substance abuse in infected person	Negative	12(80)
	Positive	4(26.7)
CD4 cell**	Negative	11(73.3)
	> 500 cells/ $\mu$ l	4(26.7)
	200-499 cell/ $\mu$ l	5(33.3)
	< 200 cell/ $\mu$ l	6(40)

\*HIV: abbreviation of Human Immunodeficiency Virus

\*\* CD4: cluster differentiation 4

pre and three months post intervention ( $p = 0.021$  and  $p = 0.003$ , respectively), but there was no significant difference between mean scores of post and three months post intervention.

## Discussion

The findings of this study showed that there were affective and emotional problems among the samples so that cognitive behavioral stress management intervention had a helpful effect, which lasted for three months.

About 56% of the qualified persons did not attend the study. Since most of them (42%) were from the families in which the spouse had left with the children after the diagnosis of

HIV in the infected member or they were not available for the treatment or rejected to join. It can be due to the fact that the stigma made by the disease. The second group (32%) was the brothers or sisters of those involved, who rejected the treatment and did not have any cooperation to solve any problem related to the involved member. This fact also reflects the "stigma" as a result of the disease and cultural problems. The rest (26%) were not available because of other reasons. About 41% of the qualified persons finished the (educational) sessions successfully. In a study conducted by Rotheram- Borus et al (2001) in New York, 10.7% of the adolescents' parents rejected the treatment and 15.2% were not available.<sup>27</sup> Both

these values are less than those obtained by the present study possibly as a result of cultural

**Table 3.** Total problem and subscales scores of self report and parent report Strengths and Difficulties Questionnaire(SDQ)

SDQ subscale		SDQ-Self report			SDQ-Parent report		
		Before intervention Frequency (%)	After intervention Frequency (%)	3 months After intervention Frequency (%)	Before intervention Frequency (%)	After intervention Frequency (%)	3 months After intervention Frequency (%)
Emotional problem	Normal	5 (33.3)	13 (92.9)	13 (92.9)	3 (20)	9 (64.3)	8 (57.1)
	Borderline	4 (26.7)	1 (7.1)	1 (7.1)	1 (6.7)	4 (28.6)	0 (0)
	Abnormal	6 (40)	0 (0)	0 (0)	11 (73.3)	1 (7.1)	6 (42.9)
Conduct problem	Normal	6 (40)	12 (85.7)	11 (78.6)	5 (33.3)	5 (35.7)	5 (35.7)
	Borderline	4 (26.7)	2 (14.3)	1 (7.1)	2 (13.3)	5 (35.7)	4 (28.6)
	Abnormal	5 (33.3)	0 (0)	2 (14.3)	8 (53.3)	4 (28.6)	5 (35.7)
Hyperactivity Problem	Normal	9 (60)	10 (71.4)	11 (78.6)	9 (60)	8 (57.1)	9 (64.3)
	Borderline	3 (20)	2 (14.3)	2 (14.3)	2 (13.3)	2 (14.3)	2 (14.3)
	Abnormal	3 (20)	2 (14.3)	1 (7.1)	4 (26.7)	4 (28.6)	3 (21.4)
Peer relation Problem	Normal	9 (60)	10 (71.4)	12 (85.7)	3 (20)	8 (57.1)	9 (64.3)
	Borderline	4 (26.7)	4 (28.6)	2 (14.3)	6 (40)	2 (14.3)	1 (7.1)
	Abnormal	2 (13.3)	0 (0)	0 (0)	6 (40)	4 (28.6)	4 (28.6)
Prosocial Behavior	Normal	14 (93.3)	14 (100)	14 (100)	11 (73.3)	10 (71.4)	11 (78.6)
	Borderline	1 (6.7)	0 (0)	0 (0)	2 (13.3)	1 (7.1)	2 (14.3)
	Abnormal	0 (0)	0 (0)	0 (0)	2 (13.3)	3 (21.4)	1 (7.1)
Total difficulty score	Normal	3 (20)	11 (78.6)	11 (78.6)	4 (26.7)	6 (42.9)	7 (50)
	Borderline	7 (46.7)	3 (21.4)	1 (7.1)	2 (13.3)	3 (21.4)	2 (14.3)
	Abnormal	5 (33.3)	0 (0)	2 (14.3)	9 (60)	5 (35.7)	5 (35.7)

differences, better health system for follow-ups and more awareness of the families. In the present study, the highest abnormalities were for self report SDQ questionnaire subscale, emotional problems (40%) and conduct problems (33.3%), which are consistent with Doku's study (2009) carried out in Ghana reporting the highest abnormalities for emotional problems (43%) and conduct problems (20%) respectively.<sup>28</sup>

In the present study, cognitive behavioral stress management training in qualified families was effective on their mental health status based on GHQ and SDQ (self report and parents report form) and sustained for three months.

Mental problems especially Major Depressive Disorder (MDD) in HIV infected persons occur frequently,<sup>29,30</sup> and if they are a parent, that can affect their children's mental health.<sup>31</sup> This fact shows the importance of detecting

people at risk and conducting early intervention. Jemmott et al (2000) showed that skill-building cognitive behavioral intervention, like other HIV related interventions, has been successful in adolescents.<sup>32</sup>

Rotheram-Borus et al reported that intensive intervention (including coping with stigma, emotional reaction to AIDS and their anxiety about their welfare) was significantly effective on decreasing emotional distress, conduct problems, multiple problem behaviors and increase of self-esteem (27, 33). In another study conducted by them (2004), a six year skill based intervention diminished psychosomatic symptoms, high risk behavior (drinking and smoking) and caused better problem solving in adolescents (34). Kessler (2000) reported that stress management in adolescents aged 11-18 years, reduced a broad range of psychiatric symptoms.<sup>35</sup> In the present study, the intervention based on FAD questionnaire was effective

on family function and the effect lasted for three months. In a study, conducted in New York in 2001, intensive interventions reduced the stressors related to the families.<sup>27</sup>

**Table 4.** Indicators of the Mean  $\pm$  SD and Median of General Health Questionnaire-28 (GHQ-28) and Family assessment Device (FAD) and their subscales based on self and parent report of Strengths and Difficulties Questionnaire( SDQ) before, just after and 3 month after intervention

	Before intervention		After intervention		After 3month	
	Mean $\pm$ SD	Median	Mean $\pm$ SD	Median	Mean $\pm$ SD	Median
Somatic	7.8 $\pm$ 4.1	7	3.8 $\pm$ 2.8	3.5	4.3 $\pm$ 2.6	4
Anxiety and insomnia	11.7 $\pm$ 2.6	12	5 $\pm$ 3.2	5	6.6 $\pm$ 4.2	6.5
Depression	7.1 $\pm$ 3.4	7	2.5 $\pm$ 2.8	1.5	2.6 $\pm$ 2.4	2
Social impairment	8.6 $\pm$ 2.8	9	5.9 $\pm$ 1.8	5.5	6.2 $\pm$ 1.5	6
Total GHQ	35.1 $\pm$ 9.4	34	17.3 $\pm$ 8.7	17	19.7 $\pm$ 8.4	18
P-value(total GHQ)*			< 0.001			
Problem solving	14.2 $\pm$ 2.4	14	11.9 $\pm$ 2.2	11	12.5 $\pm$ 2.4	12.5
communication	18.7 $\pm$ 2.7	19	15.6 $\pm$ 2.1	15	18.1 $\pm$ 8.1	15.5
Role	25 $\pm$ 3.1	24	21.4 $\pm$ 3.5	21.5	22.4 $\pm$ 3.4	22
Responsiveness	23.1 $\pm$ 2.2	23	20 $\pm$ 2.3	20	20 $\pm$ 1.9	20.5
Involvement	22 $\pm$ 2.4	22	17.4 $\pm$ 2.7	17	17.7 $\pm$ 3.1	17
Behavioral control	24.3 $\pm$ 2.8	24	22.1 $\pm$ 3.4	21.5	21.5 $\pm$ 3.1	21.5
General function	33.6 $\pm$ 5.3	33	29.1 $\pm$ 4.8	28.5	30.9 $\pm$ 4.4	31
Total FAD:	160.9 $\pm$ 13	157	137.7 $\pm$ 14.6	134.5	143.1 $\pm$ 14.8	140
p-value(total FAD)*			< 0.001			
Prosocial behavior self report	7.8 $\pm$ 1.5	8	8.2 $\pm$ 1	8	8.6 $\pm$ 1.3	8.5
p-value			0.079			
Prosocial behavior parent report	6.4 $\pm$ 1.9	7	6.8 $\pm$ 2.1	7	7.1 $\pm$ 1.6	7.5
p-value*			0.18			
Peer problem self report	3.2 $\pm$ 1.6	3	2.3 $\pm$ 1.3	2	2.2 $\pm$ 1	2
p-value*			0.021			
Peer problem parent report	4 $\pm$ 1.8	3	2.6 $\pm$ 1.8	2	2.4 $\pm$ 1.7	2
p-valu*			0.003			
Total difficulty score self report	18.2 $\pm$ 4	18	11.7 $\pm$ 4.2	11	11.5 $\pm$ 5.7	11
p-value*			< 0.001			
Total difficulty score parent report	19.4 $\pm$ 5.9	19	13.2 $\pm$ 6	14	13.8 $\pm$ 6.1	14
p-value*			< 0.001			

\*Analysis of repeated measure test

In the present study, social interactions have been evaluated based on subscales of pro social behavior and peer relationship SDQ. Mean scores of pro social behavior before, after and three months after intervention showed no change, which could possibly be the result of low percentage of abnormal social behavior from the very beginning of the study with no change by intervention. In Doku's study, ab-

normality percentage of this subscale was low.<sup>28</sup> But in Rotheram-Borus' study, intervention made personal benefits and more positive social trajectories.<sup>34</sup> Intervention was effective on subscale of peer group problem in SDQ questionnaire (both forms of self and parent report) before and after intervention and three months after that. Kerig showed that intervention in adolescents of these families could promote the

quality of relationships and problem solving.<sup>36</sup> This ability can reduce peer group problems.

The limitation of this study included low number of participants and unavailability of those people having no file in AIDS clinic. Lack of a control group as a result of the low number of qualified people was another limitation to the study. Intervention is suggested to be done on more cases with a longer follow up.

### Conclusion

In conclusion, present results demonstrate that stress management training are effective in

adolescent living with parents infected with HIV/AIDS, but still further studies and researches are needed to confirm the results.

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### Conflict of Interests

Authors have no conflict of interests.

### Authors' Contributions

MK and SA carried out the design and coordinated the sessions of adolescents and parents, completed the questionnaires, collected data and prepared the manuscript. MRM statistically analyzed the data and participated in writing manuscript. All authors have read and approved the content of the manuscript.

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