The effectiveness of stress management intervention in a community-based program: Isfahan Healthy Heart Program

Hamidreza Roohafza[(1)], **Nizal Sarrafzadegan**[(2)], **Masoumeh Sadeghi**[(3)], **Mohammad Talaei**[(4)], **Mehrdad Talakar**[(5)], **Masoud Mahvash**[(4)].

Abstract

BACKGROUND: This study was designed to assess the effectiveness of stress management training in improving the ability of coping with stress in a large population.

METHODS: Five cross-sectional studies using multistage cluster random sampling were performed on adults aged ≥ 19 years between 2000 to 2005 in Isfahan and Najafabad (Iran) as intervention cities and Arak, Iran as the control city within the context of Isfahan Healthy Heart Program. Stress management training was adapted according to age and education levels of the target groups. In a 45-minute home interview, demographic data, General Health Questionnaire (GHQ) and stress management questionnaires were collected. Data was analyzed by t-test, linear regression and general linear model.

RESULTS: Trends of both adaptive and maladaptive coping skills and GHQ scores from baseline to the last survey were statistically significant in both intervention and reference areas (P < 0.001). While adaptive coping skills increased significantly, maladaptive coping skills decreased significantly in the intervention areas. Furthermore, stress levels decreased significantly in the intervention compared to the reference area.

CONCLUSION: Stress management programs could improve coping strategies at the community level and can be considered in designing behavioral interventions

Keywords: Stress Management, Community, Intervention, Coping Strategies.

Introduction

Various definitions have been offered for the concept of stress. Stress is defined as "the nonspecific result of any demand upon the body, be the effect mental or somatic".[1] Several studies, both in molecular science field and in clinical setting, have shown deleterious effects of stress on healthy people and various groups of patients with non-communicable diseases (NCDs) such as cancers, cardiovascular diseases and diabetes. However, the underlying mechanisms of these conditions are not clear.[2,3]

Stress management techniques, which have been developed to prevent, reduce and cope with stress, emphasized on adaptive techniques and reducing maladaptive behaviors. These techniques include problem solving, relaxation, time management techniques and lifestyle improvement.[4] Recent clinical trials have reported the effectiveness of training stress management techniques in various disease states, which act through physiological mechanisms or lifestyle modification.[5,6] Therefore, it may be effective for NCD primary preventive interventions. Moreover, few studies have been performed on the effect of stress and stress management interventions in the community level.[4]

In Iran, a recent study showed that 36.5% of the studied populations had experienced a high level of stress.[7] Therefore, strategies and plans to reduce stress level and to increase the population skills on how to cope with stresses in the Iranian community are required. The purpose of the present study was to investigate the effectiveness of a multi-component stress management training program to develop the

1. Assistant Professor, Isfahan Cardiovascular Research Center, Isfahan Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran
2. Professor, Cardiovascular Research Center, Isfahan Cardiovascular Research Institute , Isfahan University of Medical Sciences, Isfahan, Iran
3. Associate Professor, Psychosomatic Research Centre, Isfahan Cardiovascular Research Institute, Isfahan University of Medical Sciences, Isfahan, Iran
4. MSc, Cardiac Rehabilitation Research Center, Isfahan Cardiovascular Research Institute , Isfahan University of Medical Sciences, Isfahan, Iran
5. MSc, Psychosomatic Research Centre, Isfahan University of Medical Sciences, Isfahan, Iran
Correspondence To: Hamidreza Roohafza, Email: roohafza@crc.mui.ac.ir

coping strategies at the community level, as part of a comprehensive interventional study named "Isfahan Healthy Heart Program" (IHHP),[8] and to offer a model for including such trainings in health promotion programs for improving lifestyle behaviors in the population.

Materials and Methods

Data was available as part of the IHHP. The IHHP was a comprehensive integrated community-based program aiming to prevent NCDs through improvement of the lifestyle behaviors. It was designed by Isfahan Cardiovascular Research Center and Deputy of Health in Isfahan University of Medical Sciences, Iran. The details of the program have been described by Sarrafzadegan et al. previously.[8,9]

The IHHP started with a baseline survey in 2000-2001 in intervention (Isfahan and Najafabad) and reference (Arak) regions which finished in 2007. Four annual evaluations were performed on independent samples from 2002 to 2005. A total of 32271 subjects were studied. Multistage cluster random sampling method was conducted to stratify the studied population according to their distribution in the community. Written informed consents were obtained from all persons who contributed to the evaluation studies every year.

Because of the importance of the IHHP, Isfahan University of Medical Sciences carried out external evaluations of this program by international experts. External evaluations assessed the implementation of interventions and research components.[10]

Intervention strategies

The IHHP conducted integrated activities in health promotion, disease prevention, and rehabilitation. In all, the program comprised 10 distinct projects each targeting different groups.[11] Main intervention strategies of the IHHP were categorized in three groups of educational, environmental and legislative strategies. The rationales underlying these strategies included simplicity, feasibility, sustainability, possibility of integration into the current health system, applicability to a large population, and possibility of being evaluated.

A scientific committee consisted of a multidisciplinary team, who were expert in different fields including psychiatry, psychology and health education, designed the stress management courses with cooperation of principal investigators of each project. Although interventions had some differences according to target groups and sites of intervention, educational topics based on cognitive behavioral theme were similar. The topics included: 1) definition of stress and stressors; 2) good and bad stress; 3)

somatic symptoms of stress; 4) psychological symptoms of stress; 5) behavioral symptoms of stress; 6) stress and illness; 7) stress management techniques; 8) improvement of adaptive (positive) coping skills; and 9) reducing maladaptive (negative) coping skills. The educational core was formed by several members of each target group in each intervention site who acted as tutors of the group and as role models (Table1). Workshops were held to train members of the educational core. Various methods, including written materials like booklets, posters, and wallpapers, were used to train the target groups. Face-to-face and group education sessions including lectures, seminars and workshops were also organized. A booklet named "stress recognition and management techniques" was presented in three levels for physicians, the educational core and the public. Annual meetings and seminars were held to review and present continuing education and to offer new topics (Table 1).

Female health volunteers collaborated effectively in public education.[12] They were committed to offering education to their family, relatives and neighbors. They underwent monthly training courses by physicians of provincial deputy of health that reviewed educational topics with members and updated them. Mass media programs were also offered to the public by the provincial TV network, radio stations and newspapers covering a large number of audiences. The last two specifically covered housewives and those not exposed to other programs and extensively increased the number of people receiving educations (Table 1).

Measurements

All adults over 19 years old underwent a home interview by trained health professionals to record demographic characteristics, socioeconomic status, lifestyle behavior and medical histories. Although general health questionnaire (GHQ) was added in 2002, due to financial limitations, not all measurements were performed in the reference areas in the fourth evaluation.[9]

GHQ is a 12-item questionnaire that assesses psychological distress. Each item is rated on a four-point scale, with the 0-0-1-1 method yielding in scores between 0 and 12.[13,14]

Stress management questionnaire was also employed. It is a multicomponent 30-item self administered questionnaire that assesses adaptive and maladaptive cognitive and behavioral coping skills.[15] The questionnaire includes 20 adaptive and 10 maladaptive coping skills. Examples of adaptive items include positive self-instructions, situation control, humor, social support, relaxation, and referring to a consultant, psychologist or psychiatrist. Examples of

Table 1. Stress management educational activities of Isfahan Healthy Heart Program (IHHP)

Activities	Provider	Frequency
Schools (876 in Isfahan, 351 in Najafabad):		
No. of school health workers: 1306		
No. of students: 196326		
• Training students	school health workers	weekly
• Training parents (Recognition of stressors of children)	school health workers (parents and teachers meetings)	monthly
• Making wallpapers	students	Monthly
Universities (3 in Isfahan, 0 in Najafabad):		
• Training pupils to be a role model (workshop)	educational core	at the beginning of every educational year
• designing pamphlets and posters	students	bimonthly
• Training students about stress (of exams) and managing it	role models	every semester
Military training garrisons (3 in Isfahan, 1 in Najafabad):		
• Training military recruits and personnel	health worker	14 hours for each course
Iranian Red Crescent Society (IRC)		
No. of divisions: Isfahan: 2; Najafabad: 1		
No. of members of educational core: 50; Frequency of training courses: 500/yr; Frequency of trainers: ~ 14000/yr		
• Training volunteers of aid and rescue	educational core	6 hours in a 45-hour course
• Authorizing a multimedia package about healthy lifestyle	cooperation of IHHP and IRC	regular educational programs
Hospitals (13 in Isfahan, 1 in Najafabad):		
• Training physicians and nurses	IHHP scientific committee	annually
• Training patients and their families	physicians and nurses	during hospitalization
• Authorizing a booklet named *Healthy Heart* and handing to patients at discharge	educational core	continuous
Worksite		
No. of workshops/factories: Isfahan: 224; Najafabad: 56		
No. of organizations: Isfahan:120; Najafabad: 25		
• Training workers	health worker	monthly
• Seminars for workers and their families	health worker	seasonal
Medical Health Centers (241 in Isfahan, 53 in Najafabad):		
No of referees: 417925 in the past year		
• Providing a checklist of educational topics for families	IHHP scientific committee	
• Training one topic of the checklist in every visit (face to face)	health professional	continuous
• Training newly engaged couples (in pre-marriage counseling centers)	health professional	continuous
Mass media		
No. of provincial TV channels: 1; No. of provincial radio stations:1; No. of local newspapers: 3		
• *Radio programs*		
- *Morning and life*		15 minutes monthly
- *Question and answer program*		30 minutes weekly
• *Television programs*		
- a 26-part series program named *In the house,* a family program with cultural, educational and recreational parts		60 minutes weekly
- a 52-part series program named *Health Path (Gozare Tandorosti)*		30 minutes weekly
• *Local newspapers*		
- scientific column		continuous
- advertisement sections		
Health volunteers (2710 in Isfahan, 1479 in Najafabad)		
No. of covered families: Isfahan:118300; Najafabad:36745		
• Training families, friends and neighbors	health volunteers	continuous
• Recognition and referring cases needing consultation	health volunteers	continuous

maladaptive items are drug abuse, passive avoidance, rumination, aggression, more sleeping, and more smoking. Participants report frequency of using each strategy in a three item scale (never, sometimes, and often). Two scores are reported for adaptive and maladaptive coping skills. For scoring, number of items marked as "often" is divided by the sum of items marked as "often" and "sometimes". The final score is expressed as percent.[15]

Statistical analysis

Data entry was performed by Epi Info™ (Centers for Disease Control and Prevention; Atlanta, GA). The SPSS software version 11.5 (SPSS Inc, Chicago, IL) was used for data analysis. Scores of GHQ and adaptive and maladaptive coping skills were reported as mean $\pm$ SD. Trends of the adaptive and maladaptive coping skills and GHQ scores of the baseline survey and four annual evaluations were analyzed as continuous variables with analysis of variance (ANOVA). Student t-test was used to compare mean differences in time points between the intervention and reference populations. Multiple linear regression models were performed between GHQ scores as dependent variables and coping skills scores as independent variables.

The second part of the analysis was performed on data of the intervention area. Analysis consisted of univariate general linear model (GLM) for each coping skill score as dependent variable including the demographic factors (sex, educational level and age category), separately, and stages of study (baseline survey and annual evaluations; 5 time points totally) as fixed factors. GLM was computed to test the effects of time point and demographic factors (group) and their interaction (stage × group) with coping skills scores. P of 0.05 or less were considered statistically significant for all analyses.

Results

Demographic characteristics of the studied population in baseline survey and four evaluation phases are presented in table 2.

Figure 1 demonstrates the trend of adaptive coping skills scores in the intervention (df = 4; F = 73.77; P < 0.001) and reference (df = 3; F = 159.33; P < 0.001) areas, as well as maladaptive coping skills scores in the intervention (df = 4; F = 14.84; P < 0.001) and reference (df = 3; F = 33.59; P < 0.001) areas. As shown, the trend of adaptive and maladaptive coping skills had statistically significant differences. Figure 1 verifies that in the baseline survey, adaptive and maladaptive scores in the intervention and reference areas were statistically significant (P < 0.001). Mean differences

Table 2. Demographic characteristics of subjects in the reference and intervention area according to phases of program

			Baseline	1st evaluation	2nd evaluation	3rd evaluation	4th evaluation
		Int.	N = 6175	N = 2994	N = 2400	N = 3013	N = 3011
		Ref.	N = 6339	N = 2897	N = 2393	N = 3069	N = ----*
Sex (%)	Female	Int.	3167 (51.3)	1497 (50.0)	1207 (50.3)	1524 (50.6)	1548 (51.4)
		Ref.	3220 (50.8)	1477 (51.0)	1208 (50.5)	1568 (51.1)	---
	Male	Int.	3007 (48.7)	1497 (50.0)	1195 (49.8)	1488 (49.4)	1463 (48.6)
		Ref.	3119 (49.2)	1419 (49.0)	1184 (49.5)	1501 (48.9)	---
Residency (%)	Urban	Int.	4872 (78.9)	2437 (81.4)	1951 (81.3)	2401 (79.7)	2650 (88.0)
		Ref.	4222 (66.6)	1932 (66.7)	1555 (65.0)	2108 (68.7)	---
	Rural	Int.	1303 (21.1)	557 (18.6)	451 (18.8)	612 (20.3)	361 (12.0)
		Ref.	2117 (33.4)	965 (33.3)	837 (35.0)	960 (31.3)	---
Educational Level (%)	0-5 y	Int.	2735 (44.3)	1317 (44.0)	1042 (43.4)	1413 (46.9)	1454 (48.3)
		Ref.	3658 (57.7)	1718 (59.3)	1204 (50.3)	1768 (57.6)	---
	6-12 y	Int.	2705 (43.8)	1221 (40.8)	1042 (43.4)	1187 (39.4)	1186 (39.4)
		Ref.	2119 (33.3)	973 (33.6)	926 (38.7)	1000 (32.6)	---
	> 12 y	Int.	735 (11.9)	455 (15.2)	319 (13.3)	416 (13.8)	373 (12.4)
		Ref.	570 (9.0)	206 (7.1)	263 (11.0)	301 (9.8)	---
Age category (%)	19-25y	Int.	1130 (18.3)	599 (20.0)	482 (20.1)	476 (19.6)	427 (17.4)
		Ref.	1179 (18.6)	576 (19.9)	483 (20.2)	494 (19.4)	---
	26-35 y	Int.	1846 (29.9)	611 (20.4)	475 (19.8)	512 (21.1)	538 (22.0)
		Ref.	1813 (28.6)	591 (20.4)	492 (20.6)	528 (20.4)	---
	36-45 y	Int.	1365 (22.1)	611 (20.4)	482 (20.1)	506 (20.8)	511 (20.8)
		Ref.	1350 (21.3)	591 (20.4)	476 (19.9)	519 (20.4)	---
	46-55 y	Int.	821 (13.3)	584 (19.5)	472 (19.7)	521 (20.4)	509 (20.7)
		Ref.	811 (12.8)	553 (19.1)	474 (19.8)	509 (20.0)	---
	56≤ y	Int.	1013 (16.4)	593 (19.8)	488 (20.3)	413 (17.0)	496 (19.1)
		Ref.	1179 (18.6)	585 (20.2)	464 (19.4)	495 (19.4)	---

Int.: intervention area, Ref.: Reference area

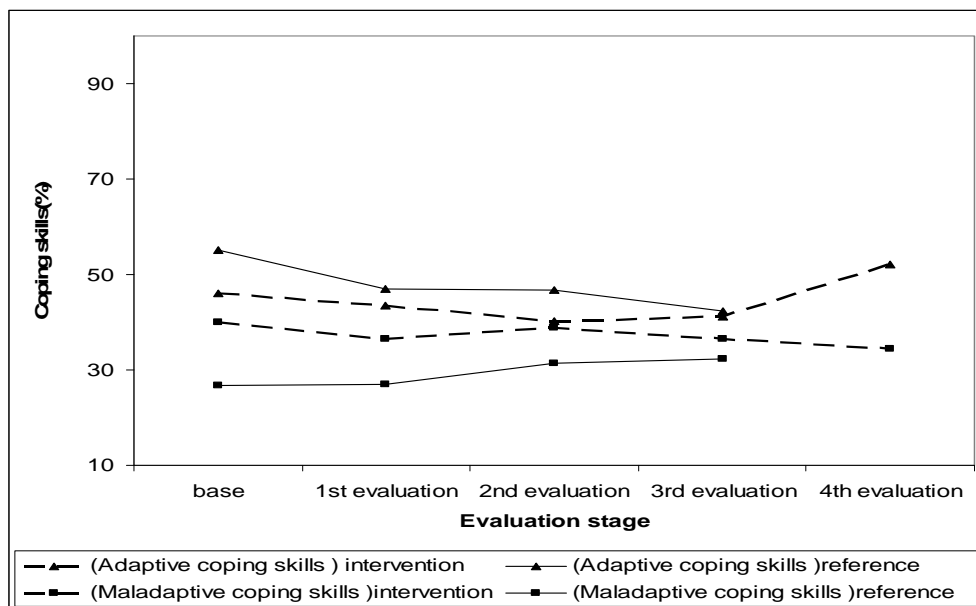* Measurements were not performed in the reference area in fourth evaluation due to financial limitations

Figure 1. Trend of adaptive and maladaptive coping skills in the intervention and reference areas from baseline (2000-2001) until the 4th evaluation (2005)
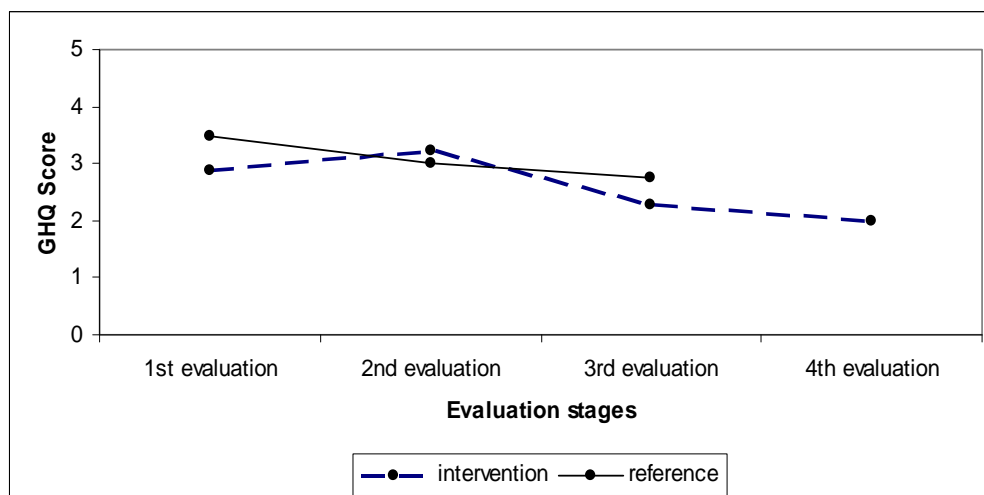

Figure 2. Trend of GHQ scores in the intervention and reference areas from baseline (2000-2001) until 4th evaluation (2005)

of adaptive and maladaptive coping skills differed significantly for each evaluation in the intervention and reference areas (all P ≤ 0.05).

Figure 2 shows the trend of GHQ scores in the years of study from the first to the fourth evaluation in both the intervention (df = 3; F = 101.37; P < 0.001) and reference areas (df = 2; F = 32.90; P ≤ 0.001). Comparison of mean differences of GHQ scores in the intervention and reference areas showed a significant difference (all P ≤ 0.05).

Both adaptive and maladaptive coping skills scores contributed to the model for predicting GHQ score significantly. According to multiple linear regression results, for each percent increase in adaptive coping skills score, the GHQ score decreased by 0.13

(t = -4.951; P = 0.042). Inversely, for each percent decrease in maladaptive coping skills score, the GHQ score decreased by 0.644 (t = 25.049; P < 0.001). The adaptive and maladaptive coping skills scores explained 40.4% of variance in GHQ score, i.e. they accounted for 40.4% improvement in the model.

table 3 shows coping skills in the intervention area by demographic characteristics and stage. Generally, the difference in adaptive and maladaptive coping skills scores was insignificant between women and men. Adaptive coping skills scores were higher in higher educational levels, and maladaptive coping skills were used more frequently by younger people. Throughout the intervention, an increment in adaptive coping skills and a decrement in using maladaptive coping skills

Table 3. Comparison of adaptive and maladaptive coping skills based on demographic factors and stage of evaluations in the intervention area

		Base	1st evaluation	2nd evaluation	3rd evaluation	4th evaluation	P		
		% Mean ± SD	% Mean ± SD	% Mean ± SD	% Mean ± SD	% Mean ± SD	group	stage	group × stage
Maladaptive coping skills									
Sex	Female	39.24 ± 29.14	36.88 ± 26.33	38.72 ± 24.88	38.00 ± 24.08	34.78 ± 20.06	0.390	< 0.001	0.069
	Male	40.73 ± 28.37	36.33 ± 26.28	39.06 ± 25.73	34.94 ± 22.56	34.16 ± 17.43			
Educational level	0-5 y	37.42 ± 28.52	35.53 ± 25.91	36.87 ± 24.63	35.52 ± 22.92	34.78 ± 19.26	< 0.001	< 0.001	0.011
	6-12 y	42.02 ± 29.05	38.63 ± 26.98	39.81 ± 25.65	37.99 ± 23.45	33.74 ± 18.53			
	> 12 y	41.90 ± 28.18	34.31 ± 25.39	42.42 ± 36.02	35.54 ± 24.54	35.67 ± 17.92			
Age category	19-25 y	41.45 ± 28.18	37.80 ± 27.01	37.47 ± 24.24	36.72 ± 22.67	34.40 ± 18.64	0.004	< 0.001	0.507
	26-35 y	39.34 ± 28.41	39.28 ± 26.31	40.51 ± 27.01	35.30 ± 22.96	34.50 ± 17.11			
	36-45 y	40.72 ± 28.95	36.14 ± 26.31	40.90 ± 25.01	39.82 ± 24.19	33.59 ± 19.60			
	46-55 y	39.82 ± 28.70	36.48 ± 26.25	39.64 ± 24.82	37.91 ± 24.22	36.78 ± 19.63			
	56≤ y	37.82 ± 28.45	33.83 ± 25.71	34.97 ± 24.63	35.24 ± 23.14	33.25 ± 18.51			
Adaptive coping skills									
Sex	Female	46.86 ± 22.23	45.51 ± 21.82	40.83 ± 17.56	43.87 ± 17.86	51.79 ± 15.14	0.089	0.004	< 0.001
	Male	45.36 ± 21.67	41.57 ± 22.75	39.69 ± 18.21	38.15 ± 26.68	52.19 ± 16.03			
Educational level	0-5 y	43.06 ± 21.15	40.38 ± 21.45	36.60 ± 16.79	39.06 ± 17.36	48.64 ± 15.82	< 0.001	< 0.001	0.668
	6-12 y	47.98 ± 22.82	45.79 ± 23.40	42.27 ± 18.30	42.28 ± 16.68	54.65 ± 16.10			
	> 12 y	50.80 ± 20.69	46.55 ± 21.26	45.78 ± 18.55	44.27 ± 19.24	56.52 ± 14.60			
Age Category	19-25 y	45.94 ± 21.91	46.43 ± 21.41	41.79 ± 17.01	41.83 ± 17.37	56.68 ± 15.47	< 0.001	< 0.001	0.003
	26-35 y	46.31 ± 21.82	46.96 ± 21.78	42.42 ± 18.20	45.11 ± 16.56	52.97 ± 15.31			
	36-45 y	45.80 ± 22.09	41.66 ± 23.24	40.36 ± 17.91	44.53 ± 17.57	53.02 ± 16.53			
	46-55 y	46.63 ± 21.78	41.97 ± 22.78	40.13 ± 18.23	40.17 ± 17.96	51.30 ± 16.26			
	56 ≤ y	46.04 ± 21.15	42.37 ± 22.62	36.48 ± 16.70	37.99 ± 17.08	49.45 ± 15.53			

based on sex, educational levels, and age categories were observed. However, an interaction between sex and stage or age category and stage increased adaptive coping skills significantly. The interaction of educational level and stage was significant for maladaptive scores.

Discussion

In this study, adaptive coping skills showed a positive trend and maladaptive coping skills showed a negative trend in the intervention area compared to the reference area. A consequent decrease in GHQ score was observed in the intervention area compared to the reference area. As the results indicated, the interventions were comprehensive with enough dimensions to affect genders, all age groups and all educational levels. However, adaptive coping skills were more promoted among men and younger people, and maladaptive coping skills showed more decrease in higher educational levels throughout the follow-up. These finding may support the effectiveness of this integrated community-based interventional program in improving coping strategies and reducing stress levels.

Stress management interventions have been widely used in different studies but in different ways and with different contents. This might explain different outcomes of various studies, and that the results are not easily comparable.[165] Most of these interventions have been secondary prevention strategies performed on small samples and with limited time period, while large community-based interventions similar to our study are scarce.[17] Although the present study did not compare different methods of stress management to recommend the most effective method, it seems that among different methods of stress management, coping skills training including multicomponent cognitive-behavioral skills is a good option as a primary prevention intervention in the community setting. This method is feasible, simple and flexible enough to be implementable considering the differences in culture, demographic characteristics and socioeconomic status of various target groups.[15]

In this study, for an appropriate understanding of community characteristics through the baseline survey, comprehensive interventions were designed to cover the whole population. In order to maximize the educational efficacy and to attract people ranging from illiterates to university graduates, appropriate audiovisual and writing methods were used according to educational level, interest and preferences of the target groups as well as their accessibility and jobs.[12]

Stress level indicated distinct improvement in the third and fourth years of the intervention. A possible explanation could be the gradual increase in the number of people involved in the interventions which increased the effectiveness of the intervention in the succeeding evaluations. A second explanation could be the fact that stress management strategies are culture bound and the modification takes time. For obtaining persistent effects, intervention seems essential.

Studies have shown that being female is a risk factor for impaired mental health.[18] Women use emotion-focused coping skills and men use problem-focused coping skills more frequently, but there is no difference among genders regarding stress response.[19,20] In the baseline survey, coping skills were not significantly different in men and women and an improvement in stress management skills was observed throughout the study. However, the effect of interventions in increasing the frequency of adaptive coping skills was more pronounced in men.

Due to underlying biological, cognitive, emotional and social context factors and type of stressors in youth, maladaptive coping skills such as passive avoidance, rumination, resignation, and aggression are known to be more frequently used than adaptive coping skills such as minimization and distraction, situation control, positive self-instructions, and seeking for social support.[21,22] Similarly, in our study, maladaptive coping skills were more frequently used by young people. On the contrary, adaptive coping skills were more frequently used by older people. Obviously, all age groups, especially younger people that are more compliant and ready for change,[23,24] showed improvements in stress coping skills.

Low educational level has been shown to be a risk factor of impaired mental health.[18] We also found that those with high educational levels (> 12 years) used both adaptive and maladaptive coping skills more frequently compared to those with low educational levels. It seems that due to a lack of adequate cognitive development and correct perception of stressors, these people are not able to benefit from coping skills.

People who were not quite familiar with life stressors were more affected by them. Apparently, the term "life stressor" is generally used by people to point to major events such as serious financial problems, natural disasters, divorce, imprisonment, dismissal and unemployment. Interestingly, the meaning of the concept of stress among the population differed. From the authors' point of view, providing such insights is one of the factors that improved the efficiency of this intervention.

Limitations of this study

In spite of the noticeable achievements in some cooperative governmental and nongovernmental organizations, similar to other community-based studies, the large sample size of the current study could have not been covered perfectly. The second

limitation of the present study was the baseline difference of stress levels and coping strategies between the intervention and reference groups.

Conclusion

Primary prevention programs targeting definition of stress and improving coping strategies should be promoted. This interventional program could have impacts on all educational levels, and the effect was greater on higher educational levels due to better readiness and compliance of the target group. It provides support for further research and practice in primary preventions for recognition of underlying social and environmental risk factors that surely help prioritize interventions through targeting those at higher risk of impaired mental health.

Conflict of Interests

Authors have no conflict of interests.

References

1. Gates DM. Stress and coping. A model for the workplace. AAOHN J 2001; 49(8): 390-7.
2. Simonsick EM. Personal health habits and mental health in a national probability sample. Am J Prev Med 1991; 7(6): 425-37.
3. Roohafza H, Sadeghi M, Sarraf-Zadegan N, Baghaei A, Kelishadi R, Mahvash M, et al. Relation between stress and other lifestyle factors. Stress and Health 2007; 23(1): 23-9.
4. Timmerman IG, Emmelkamp PM, Sanderman R. The effects of a stress-management training program in individuals at risk in the community at large. Behav Res Ther 1998; 36(9): 863-75.
5. Blumenthal JA, Sherwood A, Babyak MA, Watkins LL, Waugh R, Georgiades A, et al. Effects of exercise and stress management training on markers of cardiovascular risk in patients with ischemic heart disease: a randomized controlled trial. JAMA 2005; 293(13): 1626-34.
6. Spence JD, Barnett PA, Linden W, Ramsden V, Taenzer P. Lifestyle modifications to prevent and control hypertension. 7. Recommendations on stress management. Canadian Hypertension Society, Canadian Coalition for High Blood Pressure Prevention and Control, Laboratory Centre for Disease Control at Health Canada, Heart and Stroke Foundation of Canada. CMAJ 1999; 160(9 Suppl): S46-S50.
7. Roohafza HR, Salehi B, Sadeghi M. Prevalence and severity of emotional stress in Iran, 1991-2000. Arak Medical University Journal 2007; 10(2): 22-30.
8. Sarraf-Zadegan N, Sadri G, Malek AH, Baghaei M, Mohammadi FN, Shahrokhi S, et al. Isfahan Healthy Heart Programme: a comprehensive integrated community-based programme for cardiovascular disease prevention and control. Design, methods andinitial experience. Acta Cardiol 2003; 58(4): 309-20.
9. Sarrafzadegan N, Baghaei A, Sadri GH, Kelishadi R, Malekafzali H, Boshtam M, et al. Isfahan healthy heart program: Evaluation of comprehensive, community-based interventions for non-communicable disease prevention. Prevention and Control 2006; 2(2): 73-84.
10. Isfahan Healthy Heart Program (*IHHP*) External evaluation [Online]. 2009; Available from: URL: http://ihhp.ir/IHHP/display.aspxid=1656/
11. Sarrafzadegan N, Kelishadi R, Esmaillzadeh A, Mohammadifard N, Rabiei K, Roohafza H, et al. Do lifestyle interventions work in developing countries? Findings from the Isfahan Healthy Heart Program in the Islamic Republic of Iran. Bull World Health Organ 2009; 87(1): 39-50.
12. Yasamy MT, Shahmohammadi D, Bagheri Yazdi SA, Layeghi H, Bolhari J, Razzaghi EM, et al. Mental health in the Islamic Republic of Iran: achievements and areas of need. East Mediterr Health J 2001; 7(3): 381-91.
13. Goldberg DP. GHQ (General Health Questionnaire) [Online]. 1992; Available from: URL:http://www.mapitrust.org/services/questionnaire licensing/cataloguequestionnaires/52-GHQ/
14. Montazeri A, Harirchi AM, Shariati M, Garmaroudi G, Ebadi M, Fateh A. The 12-item General Health Questionnaire (GHQ-12): translation and validation study of the Iranian version. Health Qual Life Outcomes 2003; 1: 66.
15. Office of Disease Prevention and Health Promotion, IOX Assessment Associates, Center for Health Promotion and Education. Program evaluation handbook: stress management. Washington (DC): United States Centers for Disease Control; 1988.
16. Ong L, Linden W, Young S. Stress management: what is it? J Psychosom Res 2004; 56(1): 133-7.
17. Linden W, Lenz JW, Con AH. Individualized stress management for primary hypertension: a randomized trial. Arch Intern Med 2001; 161(8): 1071-80.
18. Harpham T, Grant E, Rodriguez C. Mental health and social capital in Cali, Colombia. Soc Sci Med 2004; 58(11): 2267-77.
19. Petcek JT, Smith RE, Zanas J. Gender, appraisal, and coping: a longitudinal analysis. Journal of Personality 1992; 60(4): 747-70.
20. Lengua LJ, Stormshak EA. Gender, gender roles and personality: Gender differences in the prediction of coping and psychological symptoms. Sex Roles 2000; 43(11-12): 787-820.
21. Hampel P, Petermann F. Perceived stress, coping, and adjustment in adolescents. J Adolesc Health 2006; 38(4): 409-15.
22. Connor-Smith JK, Compas BE, Wadsworth ME, Thomsen AH, Saltzman H. Responses to stress in adolescence: measurement of coping and involuntary stress responses. J Consult Clin Psychol 2000; 68(6): 976-92.
23. Hampel P. Brief report: Coping among Austrian children and adolescents. J Adolesc 2007; 30(5): 885-90.
24. Donaldson D, Prinstein MJ, Danovsky M, Spirito A. Patterns of children's coping with life stress: implications for clinicians. Am J Orthopsychiatry 2000; 70(3): 351-9.