International Journal of Computer Applications Technology and Research
Volume 3– Issue 12, 762 - 768, 2014, ISSN:- 2319–8656

Analysis the Effect of Educational Package on Promotion of Protective Behaviors in Exposure to Dust Phenomenon by SPSS Software

Ali Ramezankhani[1]
Department of Public Health, Faculty of Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Kobra Doostifar[2*]
Department of Public Health, Shushtar Faculty of Medical Sciences, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

Saeed Motesaddi Zarandi[3]
Department of Environmental Health, Faculty of Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Tayebeh Marashi[4]
Department of Public Health, Faculty of Health, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Nezhat Shakeri[5]
Department of Biostatistics, Faculty of Paramedicin, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Maryam Parsanahad[6]
Department of nutrition, Shushtar Faculty of Medical Sciences, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran

* Corresponding Author: Kobra Doostifar, Department of Public Health, Shushtar Faculty of Medical Sciences, Ahvaz Jundishapur University of Medical Sciences, Ahvaz, Iran.

ABSTRACT

Background: dust phenomenon, especially in the summer, is a serious problem in Khuzestan province and has adverse effects on health, environment and economic. Behavior change is the base for health associated risks prevention and one of the models for behavior change in individual level is Health Belief Model. The aim of this study was to analyze the effect of educational package on promotion of protective behaviors in exposure to dust phenomenon in Ahvaz teachers by SPSS software.

Methods: This was an experimental study in which 200 teachers randomly were divided into two groups, case and control groups [n=100, in each group]. Data were collected by a Health Belief Model questionnaire whose validity and reliability were confirmed by content validity method and Cronbach's Alpha test. Before the educational intervention, questionnaire was completed by two groups and educational requirements of subjects were detected and an educational package was designed and implemented for 4 week. The control group received no intervention. After a month the effect of educational package on study variables was evaluated. Data were analyzed with SPSS statistical software version 17, by descriptive and analytical tests.

Result: Mean age of case and control groups were 39.75±6.95 and 39.78±7.02 years, respectively. There was no significant association between marriage and behavior, but there was a significant association between employment number of years and behavior [p=0.03], education and behavior [p=0.03]. Based on the findings of this study there was a significant association between the knowledge, health belief model components and behavior of the study subjects, before and after the intervention [p< 0.001].

Conclusion: designing and implementation of an educational package based on health belief model can promote the knowledge and protective behaviors in exposure to dust particles effectively.

Keywords: education, educational package, protective behaviors, dust phenomenon

1. INTRODUCTION

Scientific researches in the past two decades have shown that particles are one of the specific pollutants [1]. Results of a study by the World Health Organization in Berlin, Copenhagen and Rome showed that particles smaller than 2.5 microns in diameter, seriously affect the health and increase death due to respiratory disease, cardiovascular disease and lung cancer [2]. According to the World Health Organization report over 2 million people developing premature death in every year [3]. Most important effects of dust are allergy of eyes, nose and throat, respiratory tract infections, headache, nausea, allergic reactions, chronic respiratory disease, lung cancer, heart disease and damage to other organs of the body. Dust in the long-term can change the mood. Aggression and depression are also other effects of dust [4]. Annette peters showed an association between heart disease and air particles based on epidemiological evidences. This study showed that daily changes in air particles concentration are closely associated with cardiovascular related deaths, hospital admit, cardiovascular disease symptom exacerbation [5]. Chinese researchers in 2007 investigated the impact of particles smaller than 2.5 microns in samples that collected from Asian dust on macrophage and lung cells DNA of mice.

The results showed that extract of these particles leaded to DNA damage in these cells [6]. In a study on students of 850 schools in United Arab Emirates the prevalence of asthma and allergy were 13.6% and 73%, respectively and there was a significant association between dust and mentioned diseases [7]. Some recent epidemiological studies suggested that long-term transport of dust particles is associated with increased daily mortality in Seoul [8] and Taipei and Taiwan [9] and respiratory and cardiovascular diseases [8]. although , the dust particles contribute to drinking water contamination and therefore gastrointestinal disease [10].

Dust occurrence increases some heavy metals such as lead concentrations up to 3-fold [11]. Also the concentration of toxic metals, mercury and arsenic, greatly increased [12]. Air -borne microorganisms concentration in dusty days increase and most of these microorganisms are pathogen and cause disease.

Iran is located in an area with a dry climate and over 30% of the country is arid and semi-arid area [14]. In the past few years the country has been exposed to the dust phenomenon. This country because of neighboring with the wide expanse of desert is adversely affected by this phenomenon. One of the areas that has been affected by this phenomenon is Khuzestan province that is located in southwestern of Iran [15]. This phenomenon has been associated with some problems and rise in adverse effects on health, environment and economic [15]. In the dusty days, admit of patients with pulmonary disease to health centers in Ahvaz has showed 70 percent increase [1]; One way for reducing the incidence of diseases caused by dust is educational interventions. Health education experts use the appropriate models in order to health education interventions design, one of this models is Health Belief Model. The aim of this study was design and implementation of educational package based on health belief model and evaluation of its effects on protective behaviors in teachers by SPSS software. In this study educational package was an educational program that has been designed based on educational needs of subjects in order to prepare the subjects for implementation of protective behaviors in exposure to dust phenomenon.

2. METHODS

This was an experimental and analytical study [before and after] that has been conducted in Ahvaz. Two hundred teachers randomly were divided into two groups, case and control groups [n=100, in each group]. The inclusion criteria included: employment for at least three years, lack of respiratory disease and cardiovascular disease and satisfaction for participation in the study. Exclusion criteria included: unsatisfaction for participation in the study and nonparticipation in the educational sessions. Data were collected by a questionnaire that was designed according to the health belief model constructs. The questionnaire contained 78 questions in four parts. This parts included questions regarding to individual characteristics [19 questions], knowledge [14 questions, score range=14-32], health belief model constructs [34 questions] and protective behaviors in exposure to dust phenomenon [11 questions, score range=11-55], respectively. In part 3, questions included: perceived susceptibility, perceived severity and perceived benefits each with 7 questions [score range = 7-35], perceived barriers with 6 questions [score range = 6-36], cue to action with 2 questions [score range = 2-10] and self-efficacy with 4 questions [score range = 4-20].

The validity of questionnaire was evaluated by means of face validity and content validity methods. Face validity was evaluated by means of relevance, simplicity and clarity of questions. Questionnaire was evaluated by 10 experts [included 5 experts in health education, 5 experts in environmental health, 1 epidemiologist and 2 experts in Biostatistics]. Content validity was evaluated by means of Lawshe' s technique. Questionnaire reliability was evaluated by means of Cronbach's Alpha test in 20 teachers that were same with study population in demographic characteristics.

Cronbach's Alpha coefficient of questionnaire parts was detected: Knowledge: 0.76, perceived susceptibility: 0.73, perceived severity: 0.88, perceived benefits: 0.72, perceived barriers: 0.77, cue to action: 0.71, perceived Self-efficacy: 0.71 and protective behaviors: 0.71.

The questionnaire was used before and after the educational package implementation to determine the perceived knowledge, sensitivity, severity, benefits, barriers and self-efficacy, and behavior of subjects. Data were collected by a questionnaire in interview method before intervention in case and control group. Then data were analyzed and the educational needs of subjects were detected and educational package was designed. Educational package included an educational booklet, pamphlet and CD that represented essential information in relation to dust particles, disease prevention and protective behaviors. Then researcher represent educational package to the case group in four sessions [each sessions was 90 minutes]. Educational methods were the lecture, questioning and responding and showing the video clip. Immediately and two months after the educational intervention, subjects data were collected by questionnaire and were analyzed. The control group received no intervention. Data were analyzed with SPSS statistical software version 17, by frequency distribution, correlation coefficient, t-Student, Chi-square, Mann-Whitney and Repeated measures tests.

3. RESULTS

Two hundred teachers were participated in this study. Mean age of case and control groups were 39.75±6.95 and 39.78±7.02 years; respectively. Age 40-49 years had the most frequency in the case group [46%] and the control group [45%]. In the two groups more present of subjects were married [82% in the case group and 81% in the control group]. In the two groups most of subjects had Bachelor's degree. More present of subjects had two children [47% in the case group and 46.3% in the control group] and less present of subjects had four children. Most subjects didn't receive education about dust phenomenon and protective behaviors. Age, marriage, education,

Number of children and previous education about dust phenomenon were not significantly difference between cases and controls.

There was no significant association between marriage and behavior but there was a significant association between employment number of years and behavior (p=0.03) and also between education and behavior (p=0.03). In the two groups the most used sources for information about protective behaviors in the exposure to dust particles were radio and television and there was no significant difference between two groups table 1.

Table 1. Information sources regarding the dust phenomenon in teachers, Ahvaz

Groups / Information source	cases		controls		p-value
	yes	no	yes	no	
Radio & television	93	7	95	5	0.552
Newspaper & magazine	43	57	40	60	0.667
family	58	42	58	42	1
coworkers	57	43	58	42	0.886
friends	55	45	57	43	0.776
Book & booklet	32	68	31	69	0.115
Physician and staff of health center	36	64	35	65	0.077
internet	47	53	45	55	0.777

The mean of knowledge, perceived susceptibility, perceived severity, perceived benefits, perceived barriers, perceived self-efficacy, cue to action and behavior score were not significantly different between cases and controls before intervention. Whereas, immediately and two months after the educational intervention there was a significant difference between cases and controls in mentioned variables [p=0.001] [table 2, 3].

Before the intervention, 16% of cases often didn't leave the home in dusty days but after the intervention 57% of cases often didn't leave the home in dusty days. Before the intervention 70% of cases sometimes educated their students in relation to air pollution but after the intervention 75% of cases often educated their students. Before the intervention, only 2% of cases have been eaten more amount of fruit and vegetable in dusty days but after the intervention the rate increased to 41%. Before the intervention, only 3% of cases have been eaten more amount of milk in dusty days.

4. DISCUSSION

One of the most important air pollutants are dust particles and high concentrations of particles in dust storms causing sinusitis, bronchitis, asthma, allergy and damage to the defensive function of macrophages, thereby leading to an increase in hospital infections [19]. The purpose of the present study was implementation of protective behaviors when dust phenomenon occurs. To the best of our knowledge the effect of this educational method on protective behaviors in exposure to dust particles has not been investigated in previous studies.

Before the intervention, protective behaviors of teachers in exposure to dust phenomenon were in intermediate level. But significant difference between behavior score of cases and controls after intervention showed the positive effect of educational package on promotion of protective behaviors in case group. In Araban et al. study after the intervention behavior score was significantly different between case and control groups [20]. The results of Giles et al. meeting in Canada on strategies for reducing the adverse effects of air pollution on health, entitled "The decision to effective intervention", showed that personal behavior modification and pollutants exposure reduction are appropriate approaches for reducing the adverse effects of air pollution [21]. Sexton study showed that on dusty days persons changed their behavior by reducing time spent outdoors by 18% or 21 minutes [22].

In the present study before the intervention the two group's sources of information about protective behaviors in the exposure to dust particles were radio, television and family. Significant difference between knowledge score of two groups after the educational intervention was due to the educational sessions about protective behaviors in exposure to dust phenomenon and this educational sessions promoted the knowledge of case group about protective behaviors. These results are in line with the use of Health Belief Model in researches about diabetes control and self-care and promotion of knowledge after the educational intervention [23, 24]. Boonkuson et al. showed that protective behaviors in exposure to health problems depends on the knowledge and attitude [25]. Pazira et al. reported that a part of Tehran population knowledge about air pollution and protective behaviors was in low level [26].

In the health belief model constructs the perceived susceptibility score before intervention was the same in both groups. After intervention perceived susceptibility score was significantly different between case and control groups [p=0.001]. This finding is consistent with increased perceived susceptibility in researches about the osteoporosis prevention [27] and diet care [24].

Also, perceived severity score before intervention in two groups showed that teacher's perception from seriousness of illnesses caused by dust particles was over the average, probably due to the illness of friends or coworkers or damages caused by dust particles. The dramatic increase in the perceived severity score of the case group seems to be due to the teachers' participation in educational sessions

and providing educational package included showing video clip, booklet and pamphlet, mention to importance of protective behaviors on the dusty days, high cost of pulmonary, cardiovascular and gastrointestinal tract diseases. In the other studies perceived severity has been increased similarly [23, 27]. Also in the Praphant et al. study perceived severity was in moderate level [60.6%] [28].

Table 2. Comparing knowledge and behavior scores regarding the protective behaviors in exposure to dust phenomenon in teachers, Ahvaz

variable	group	Before intervention mean± SD	Immediately after intervention mean±SD	2 month after intervention mean±SD	Repeated Measures test
knowledge	Case	53.81 ±3.43	58/77 ±1/44	58.13 ± 2.54	P <0.001
	Control	53.65 ±3.5	53/15 ±2/66	53.48 ± 3.64	P< 0.2
	Independent sample t test	P <0.745	P <0/001	P <0.001	
behavior	Case	33 ±4.14	37/81 ±3/77	38.98 ± 2.97	P <0.001
	Control	34.13 ±4.7	34/99 ±4/08	34.22 ± 4.66	P <0.176
	Independent sample t test	P <0.073	P <0/001	P <0.001	

Table 3. Comparing health belief model constructs scores regarding the protective behaviors in exposure to dust phenomenon in teachers, Ahvaz

variable	group	Before intervention mean± SD	Immediately after intervention mean±SD	2 month after intervention mean±SD	Repeated Measures test
Perceived susceptibility	Case	27.02 ±2.58	29.6 ±2.29	29.6 ± 2.28	P <0.001
	Control	27.38 ±2.74	27.35 ±2 .74	27.41 ± 2.78	P <0.988
	Independent sample t test	P <0.341	P <0.001	P <0.001	
Perceived severity	Case	28.75 ±1.97	31.7 ±2.43	31.46 ± 2.23	P <0.001
	Control	29.03 ±2.4	28.84 ±2.47	29.04 ± 2.44	P <0.792
	Independent sample t test	P <0.369	P <0.001	P <0.001	
Perceived benefits	Case	28.09 ±2.87	30.54 ±3.02	30/39 ± 2/95	P <0.001
	Control	28.75 ±2.91	28.71 ±2.94	28/66 ± 2/89	P <0.978
	Independent sample t test	P <0.109	P <0.001	P <0.001	
Perceived barriers	Case	16 ±4.51	18.12 ±4.73	18.19 ± 4.51	P <0.002
	Control	16.37 ±4.62	16.36 ±4.57	16.27 ± 4.55	P <0.943
	Independent	P <0.557	P <0.011	P <0.006	

	sample t test				
Perceived self-efficacy	Case Control Independent sample t test	12.51 ±2.15 13.07 ±2.49 P <0.091	15.19 ±2.2 13.02 ±2.57 P <0 .001	15.07 ±2 .27 12.98 ± 2.52 P <0.001	P <0.001 P <0.97
Cue to action	Case Control Independent sample t test	7 ±1.22 7.06 ±1.48 P <0.755	7.4 ±1.1 7.06 ±1.48 P < 0.041	7.45 ± 1.11 7.04 ± 1.32 P <0.049	P <0.007 P <0.13

The results showed that before the intervention teachers' perceived benefits of protective behaviors in dusty days in both groups were in good condition but after the intervention perceived benefits score has increased in the case group. Because the protective behaviors in the exposure to dust phenomenon are not time consuming and expensive and are simple and don't need the physician visit, can be useful in promotion of perceived benefits. Araban et al. showed that perceived benefits increased by improvement in stage of change [20]. Qaderi et al. reported that perceived benefits score increased in the case group after the intervention [29].

Perceived barriers of protective behaviors in both case and control groups were moderate before intervention; but there were significant differences between the perceived barriers of the two groups after the intervention due to the effect of the education. Most of the teachers' perceived barriers for protective behaviors in exposure to dust phenomenon included the unavailability of respiratory mask, discomfort and shortness of breath and nose sweating because of the mask, financial difficulties in buying more fruit and vegetable in a dusty days, financial difficulties due to stay at home and problems related to communication with coworkers. in Araban et al. study two barriers , delay in doing things and need to enter the crowded areas of city, After education in the intervention group changed, while these barriers in the control group was not significant [20]. Koch showed that elimination of perceived barriers increased walking in diabetic patients [30].

Other Health Belief Model construct was perceived self-efficacy. Self-efficacy is the beliefs of person about their abilities to control events that affects their life [31]. Teacher's self-efficacy score was in low level in case and control groups before intervention. But Teacher's self-efficacy score was significantly different between cases and controls after intervention that this was due to the effect of education on self-efficacy and promotion of protective behaviors in the case group. Araban et al. reported that self-efficacy was significantly higher in case group after the intervention [20].

Education based on Health Belief Model promoted the teachers protective behaviors in exposure to dust phenomenon by promoting the perceived susceptibility, severity, benefits and barriers using a variety of educational methods and educational package. On the other hand, Stimuli or cues to action encouraged teachers to the protective behaviors. Also, present study showed that the media played an important role in attracting teachers to protective behaviors. Drakshyani et al. in their study on schools and colleges teachers in India showed the Necessity of public health education programs through the mass media [32]. Khorsandi et al. reported that radio and television programs are the most important cues to action in reducing the risk of osteoporosis [33] .The present study designed an educational package in order to promote the teachers behaviors but similar research should be conducted in other parts of the country.

5. CONCLUSION

The findings of this study showed that the designed educational package was effective in promoting the knowledge and protective behaviors in teachers. Therefore, health behavior education in other people, especially in high-risk groups is important to maintenance of protective behaviors in exposure to the dust phenomenon.

6. ACKNOWLEDGEMENT

The source of data used in this paper was from MSc thesis. The authors express sincere thanks to the teachers because of participation and cooperation in the study.

11. REFERENCES

1. Colls J. Air pollution.2nd ed Taylor, Francis, Inc, London and New York. 2003.p.4.

2. World Health Organization. Particulate matter air pollution: how it harms health. 2005 April. Fact sheet EURO/04/05. Available from: http: //www.euro.who.int /document/ mediacentre/ fs0405e.pdf. Accessed July 16, 2013.

3. Department of Public Health and Environment. World Health Organization Geneva Switzerland. Urban outdoor air pollution database. 2012. Available from: http: // www. who. int/ phe 2012. Accessed Jul 30, 2012.

4. Griffin DW, Kellogg CA. Dust storms and their impact on ocean and human health: dust in Earth's atmosphere. EcoHealth. 2004;1[3]:284-95.

5. Peters A. Particulate matter and heart disease: evidence from epidemiological studies. Toxicology and applied pharmacology. 2005;207[2]:477-82.

6. Meng Z, Zhang Q. Damage effects of dust storm PM< sub> 2.5</sub> on DNA in alveolar macrophages and lung cells of rats. Food and chemical toxicology. 2007;45[8]:1368-74.

7. Bener A, Abdulrazzaq Y, Al-Mutawwa J, Debuse P. Genetic and environmental factors associated with asthma. Human biology. 1996:405-14.

8. Kwon H-J, Cho S-H, Chun Y, Lagarde F, Pershagen G. Effects of the Asian dust events on daily mortality in Seoul, Korea. Environmental Research.2002;90[1]:1-5.

9. Ichinose T, Yoshida S, Hiyoshi K, Sadakane K, Takano H, Nishikawa M, et al. The effects of microbial materials adhered to Asian sand dust on allergic lung inflammation. Archives of environmental contamination and toxicology. 2008; 55[3]: 348-57.

10. Kellogg CA, Griffin DW, Garrison VH, Peak KK, Royall N, Smith RR, et al. Characterization of aerosolized bacteria and fungi from desert dust events in Mali, West Africa. Aerobiologia. 2004;20[2]:99-110.

11. Viana M, Kuhlbusch T, Querol X, Alastuey A, Harrison R, Hopke P, et al. Source apportionment of particulate matter in Europe: a review of methods and results. Journal of Aerosol Science. 2008;39[10]:827-49.

12. Wang Y, Zhang X, Arimoto R, Cao J, Shen Z. Characteristics of carbonate content and carbon and oxygen isotopic composition of northern China soil and dust aerosol and its application to tracing dust sources. Atmospheric Environment. 2005;39[14]:2631-42.

13. Schlesinger P, Mamane Y, Grishkan I. Transport of microorganisms to Israel during Saharan dust events. Aerobiologia. 2006;22[4]:259-73.

14. Modarres R. Regional maximum wind speed frequency analysis for the arid and semi-arid regions of Iran. Journal of Arid Environments. 2008;72[7]:1329-42.[In persian]

15. Zarasvandi A, Moore F, Nazarpour A. Mineralogy and morphology of dust storms particles in Khuzestan province: XRD and SEM analysis concerning. Iranian journal of crystallography and mineralogy. 2011;19[3]:511- 8.[In persian]

16. Hossein Gholizadeh N. A effect of intervention based on HBM on improving of knowledge, attitude and practice among students in Tehran [dissertation]. School of public health: Tehran university of medical sciences, 2010.[In persian]

17. Mirzaei E. Health education and health promotion in textbook of public health. Tehran: Rakhshan. 2004.[In persian]

18. Taheri Aziz M. Effectiveness of Designed Health Education Package on Healthy Behaviors of Patients with Tuberculosis at Pasteur Institute of Iran [dissertation]. Tehran: Tarbiat modares of Medical sciences; 2004. p.67-8.[In persian]

19. Al-Hurban AE, Al-Ostad AN. Textural characteristics of dust fallout and potential effect on public health in Kuwait City and suburbs. Environmental Earth Sciences. 2010;60[1]:169-81.

20. Araban M. Design and Evaluation of a Theory-Based Educational Intervention on Behavioral Improvement in Pregnant Women in Terms of Exposure to Air Pollution [Dissertation]. Tehran: Tarbiat Modares University, Faculty of Medical Sciences; 2013. [Text in Persian]

21. Giles LV, Barn P, Kunzli N, Romieu I, Mittleman MA, van Eeden S, et al. From good intentions to proven interventions: effectiveness of actions to reduce the health impacts of air pollution. Environmental health perspectives. 2011; 119[1]:29.

22. Sexton AL. Responses to Air Quality Alerts: Do Americans Spend Less Time Outdoors? [Dissertation]. Minnesota: Department of Applied Economics, University of Minnesota; 2011.

23. Mohebi S, Sharifirad G, Hazaveyee S. The effect of educational program based on Health Belief Model on diabetic foot care. Int J Diab Dev Ctries. 2007; 27:18-23.[In persian]

24. Kamrani A. The effect of educational diet on nutrition type2 diabetes based on Health Belief Model [Dissertation]. Faculty of Public Health, Isfahan University of Medical Science ,2006.[In persian]

25. Boonkuson T. Comparisons of behavior on protection of health problems caused by rock dust of the population with difference on personal factors and social and economic factors in the rock crusher plants, Saraburi province. [dissertation]. Project joint research of nursing college attached to institute of development of public health personnel, 1994.

26. Pazira M,Ghanbari R, Askari E. Survey of knowledge, attitude and practice about air pollution among of people lives in Tehran and some activity of emergency. Conference on air pollution and effects on health. 2005 Feb:1- 2; Tehran, Iran.

27. Saeedi M. The survey of educational program based on health belief model on preventive osteoporosis [Dissertation]. School of Public Health: Isfahan University of Medical Science, 2005.[In persian]

28. Praphant A. Preventive behaviors form dust among workers in lime factories and stone crushing mills, Nakhon Si Thammarat province. [dissertation]. College of Public Health: Chulalongkorn University. 2003.

29. Amal KA, Dalal MAR, Ibrahim KL. Effect of educational film on the health belief model and self-examination practice. East Mediterr Health J. 1997;3[3]:435-44.

30. Koch J. The role of exercise in the African-American woman with type 2 diabetes mellitus: application of the health belief model. J Am Acad Nurse Pract 2002;14[3]:126–9.

31. Kazdin AE. Encyclopedia of Psychology. New York: Oxford University Press; 2000. p. 212–3.

32. Drakshyani Devi K, Venkata Ramaiah P. Teacher's knowledge and practice of breast self examination. Indian J Med Sci 1994;48[12]:284–7.

33. Khorsandi M, Shamsi M, Jahani F. The Survey of Practice About Prevention of Osteoporosis Based on Health Belief Model in Pregnant Women in Arak City. Journal of Rafsanjan University of Medical Sciences. 2013;12[1]:35-46.