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## The Impact of Education Program on Smoking Prevention: An Intervention Study among 16 to 18 Years Old in Palestine

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**Abstract:** The use of tobacco is a growing public health problem in Palestine. School-based smoking prevention programs are effective in increasing knowledge of health-related aspects of smoking. The study assessed the effects of health education intervention on knowledge of tobacco consumption among high school students, in Tarqumia, Palestine. This is an intervention study to evaluate the effectiveness of an educational program on smoking. The study was in 3 stages: pre-intervention, intervention and post-intervention. At the pre-intervention phase, 240 male and female students were selected in both of the intervention and control groups by stratified sampling technique. Anonymous self-administered questionnaire was used for data collection. The findings indicated no significant differences between the intervention and control groups in terms of mean knowledge score of health-related aspects of smoking ( $p = 0.807$ ) before the intervention. However, there was a significant difference ( $p < 0.001$ ) between the intervention and control groups. There was no significant difference between male and female students in both the intervention and control groups at post-test. The study demonstrated that health education is effective in increasing smoking knowledge. It is recommended that continuous community-based and school-based health education program on smoking should be implemented by health professionals.

**Key words:** Smoking, tobacco, effectiveness, Intervention, school-based, Palestine

### INTRODUCTION

Smoking continues to be an important public health problem globally. It is considered one of the primary causes of avoidable diseases, premature deaths and disabilities worldwide (Department of Health and Human Services, 2000). It is strongly linked to cardiovascular diseases, circulatory disease, heart attack, certain cancers and other respiratory diseases Schroeder (2010). According to the World Health Organization (WHO), more than one billion people smoke tobacco, of these smokers, 80% live in low-to-middle income countries. It has been estimated that tobacco-related diseases cause approximately 5 million deaths a year. The number is projected to reach 10 million by 2030 World Health Organization (2009). In developing countries such as those in the Mediterranean region, the general population tends to have misconception or poor knowledge regarding the hazards of cigarette smoking (Jha *et al.*, 2000; Kendel and Chen, 2000). Thus, youth smoking is of particular interest because several studies have shown that, smoking addiction begins in adolescence and the majority of smoking adults initiate their tobacco consumption during adolescence (Centers for Disease Control and Prevention, 2006; Ghrayeb *et al.*, 2013).

The Centers for Disease Control (CDC) recommend that, smoking prevention or cessation programs should be one of the main components of school-based smoking control programs (Centers for Disease Control and prevention, 1994). Extensive health education can cause a significant reduction in the demand for cigarette use (Jha *et al.*, 2000). School-based health education represents promise as an effective health intervention to protect health and improve quality of life through disseminating health information aiming to change unhealthy behaviors and abstain from adopting (Ghrayeb *et al.*, 2013).

Previous school-based health education intervention studies among school children in South Africa showed the effectiveness of the intervention programs in decreasing tobacco use among children in the intervention school compared with children at the control school (Hunter *et al.*, 1991a,b). Another anti-smoking health education studies has been found out that adolescents knowledge increased regarding knowledge of health-related aspects of smoking in Italy, While *et al.* (1997) Baltic republic (Charlton, 1996; McNeill, 1991). This intervention is developed and performed by the researcher after reviewing it by the study local supervisor and schools' pedagogical coordinators. Abundant

attention has been devoted to development and implementation of this intervention program in order to pass on knowledge and audiovisual material about smoking aiming to be subsequently included in the curriculum of health education. The present study was performed with the objective of measuring the effectiveness of such intervention program in a representative sample of public school adolescents, aged between 16 and 18 years, in Tarqumia, in Palestine.

## **MATERIALS AND METHODS**

**Study design and sample:** The present prospective intervention study examined the population of boy and girl students aged 16-18 years old, in the 11 and 12 grades of governmental high schools in Tarqumia, a rural area located in southern Palestine. All high schools were at the same level in terms of economic, social, cultural and educational conditions and were geographically close to each other. A stratified sampling was used in this study, in that Tarqumia had 2 boy and 2 girl high schools; all of them had 11 and 12 grades of diverse education track backgrounds (scientific and non-scientific). Therefore, all high schools in Tarqumia were qualified for the study, so the control and intervention schools were randomly assigned, two of the high schools (one girl and one boy) were randomly assigned to the intervention group and the other schools were considered as the control group. Of the four public schools of Tarqumia, a sample with probability proportional to the students' enrollment size and size of students in classes was selected to obtain a sample size of 240 students. This study was part of an 8-weeks research endeavor on a culturally tailored school-based health education curriculum. Data and interesting outcomes of this study were collected by anonymous questionnaire administered twice, one month before the intervention (pre-tests) and 3 months after the last lecture (post-tests).

**Ethical approval:** After approval of the study by the Ethical Committee of Palestinian Ministry of Education; signed consent form was obtained from all participants; the lack thereof was a criterion for exclusion from this study. Student participation was voluntary and students could withdraw from the study at any time.

**Demographic information:** Information was collected on sex, age (in years), class of study (11 or 12th grade) and education track (scientific or non-scientific).

**Pre-intervention phase/health knowledge:** Smoking-related knowledge was assessed from the sum of correct answers to ten self-administered questions imbedded in the Health Knowledge Inventory Survey (HKI). The number of substance abuse-related

knowledge questions was 10, in a multiple-choice format. Each question had only one correct answer and the percentage-correct score was used as the knowledge score. Knowledge scores were assessed and then entered in the same SPSS data set. During the assessment, we referred to an answer key established previously. We scored responses dichotomously, with correct answers scoring "1" and wrong answers scoring "0." We then computed the percentage of correct scores and entered these values in the data set, for each participant, to indicate their understanding of smoking-related knowledge.

**Intervention:** The intervention was based on the TOBACCO education sessions from an 8-week progressive education intervention-the compelling the challenge (CTC) curriculum. CTC is a culturally tailored intervention for Palestinian adolescents, focusing on 10 dimensions of health behavior (including substance use and abuse) for chronic diseases prevention. The intervention started immediately after baseline measurements. The program curriculum consisted of five 45-minutes sessions, each educational session lasted approximately 45 minutes (to accommodate to school sessions) and it was comprised of the following: Power Point presentation of educational materials, Arabic print materials and brochures.

Each class size was approximately 25-35 students (2 classes were combined most of the times). At the end of the program, the educational materials that were used were distributed to all intervention group schools.

**Data analysis:** The data were analyzed using SPSS version 20 computer software. The independent t-test and two-way repeated measures ANOVA were used to calculate difference in knowledge. A P-value of  $<.05$  was considered significant. Investigators considered correct response  $\leq 59\%$  as poor, between 60-69% accepted 70-79% as good, 80-89% as very good and greater than  $\leq 90\%$  as excellent responses to questions.

**Post-intervention/health knowledge:** The post-intervention phase was conducted in late June, 2012, in the 4 schools of the study. The same instruments were re-applied. After the post-test, the educational materials that were used were distributed to all control group schools and a copy was given to schools' administrations.

## **RESULTS**

**Demographic characteristics:** A total of 240 students participated in the study, with 240 students completing the questionnaire at pretest and 236 students at post test (four students excluded from the intervention group). The analyzed data comprised participants who completed pre and post tests ( $n = 236$ ). Of these

Table 1: Socio-demographic characteristics of the respondents (n = 236)

Characteristics	Intervention group (n = 116)		Control group (n = 120)	
	No. of students (n)	(%)	No. of students (n)	(%)
<b>Age (years)</b>				
16	35	30.2	36	30.0
17	63	54.3	64	53.3
18	18	15.5	20	16.7
<b>Gender</b>				
Male	56	48.3	60	50.0
Female	60	51.7	60	50.0
<b>Stream of education track</b>				
Scientific	44	37.9	45	37.5
Non-scientific	72	62.1	75	62.5
<b>Grade in school</b>				
11th	116	100.0	00.0	0.00
12th	00.0	0.00	120	100.0
Total	116	100.0	120	100.0

Table 2: Comparing mean and standard deviation of knowledge of health-related aspects of tobacco use before and 3 months after the intervention in the students of control and intervention groups

Group	Time, Indicator				Significance level of R.M. ANOVA test
	Before intervention		3-months after intervention		
	Mean	Standard deviation	Mean	Standard deviation	
Intervention (n = 116)	3.28	1.5	5.73	1.8	<0.001
Control (n = 120)	3.24	1.2	3.23	1.3	0.877
Significance level of independent t-test	----- 0.807 -----		----- < 0.001 -----		-

Table 3: Comparing the mean of knowledge of health-related aspects of tobacco use 3 months after the intervention between control and intervention groups based on gender

Health area	Group	Intervention group (N = 116, male 56 and female 60)			Control group (N = 120, male 60 and female 60)		
		Mean (95%CI)	F-statistic	P-value	Mean (95%CI)	F-statistic	P-value
Tobacco use	Male	4.54 (4.16, 4.93)	0.008	0.930	3.48 (3.18, 3.79)	3.10	0.081
	Female	4.52 (4.14, 4.90)	0.008	0.930	3.09 (2.78, 3.40)	3.10	0.081

students, 120 were assigned to the control group, 120 to the intervention program, which become 116 after exclusion of four students due to not completing the questionnaire. There were 60 females and 60 males in the control group, while the intervention group had 60 females and 56 males. Stream of education track distribution of participants by school were 44 (37.9%) scientific and 72 (62.1%) non-scientific in the intervention school; control school, 45 (37.5%) scientific and 75 (62.5%) non-scientific. The mean age of the students was 16.9 years (range 16-18 years), with both gender and stream of education track almost equally distributed.

**Knowledge of health-related aspects of smoking:**

Table 2 shows the pre- and post-intervention respondents' knowledge of health-related aspects of smoking. The comparison of their knowledge about health-related aspects of smoking in the pre-test step indicated absence of any significant differences in the beginning of the study between the two groups.

Independent t-test confirmed this issue that before the intervention, there was no significant difference between the means of knowledge scores between the intervention and control groups ( $p = 0.807$ ) (Table 2). However, 3-months after the educational intervention, the mean of knowledge score in the intervention group significantly increased while that level was not significant in the control group. Repeated measures ANOVA confirmed this issue that after the intervention, there was significant difference between the means of knowledge scores between the intervention and control groups ( $p < 0.001$ ). The results indicated a significant difference ( $p < 0.001$ ) between the mean knowledge scores in the intervention group from pre-test to post-test; whereas, this results did not revealed significant differences ( $p = 0.177$ ) in the follow-up intervals in the control group (from pre-test to post-test) (Table 3). Further comparison showed that, there were no significant differences between male and female students in both the intervention and control groups.

Table 4: Comparing the mean of knowledge of health-related aspects of tobacco use 3 months after the intervention between the control and intervention groups based on education track

Health area	Group	Intervention group (N = 116, scientific 44 and non-scientific 72)			Control group (N = 120, scientific 45 and non-scientific 75)		
		Mean (95%CI)	F-statistic	P-value	Mean (95%CI)	F-statistic	P-value
Tobacco use	Scientific	4.68 (4.26, 5.12)	1.24	0.268	3.49 (3.15, 3.84)	3.51	0.064
	Non-scientific	4.38 (4.05, 4.71)	3.08 (2.81, 3.35)				

Table 5: Sources of Knowledge regarding knowledge of health-related aspects of tobacco use for the respondents (N = 236; males = 116, females 120)

Source of Health knowledge	Health area, Substance use		
	Strongly agree (n and %)	Agree (n and %)	Total (n and %)
Father	41 (17.4)	37 (15.7)	78 (33.1)
Mother	68 (28.8)	50 (21.2)	118 (50.0)
Brother	61 (25.8)	49 (20.8)	110 (46.6)
Sister	58 (24.6)	42 (17.8)	100 (42.4)
Peer	75 (31.8)	55 (23.3)	130 (55.1)
Relatives	65 (27.5)	50 (21.2)	115 (48.7)
School	46 (19.5)	23 (9.7)	69 (29.2)
Personal reading	63 (26.7)	61 (25.8)	124 (52.6)
Media	68 (28.8)	44 (18.6)	112 (47.6)
internet	125 (53.0)	38 (16.1)	163 (69.1)

Also, no significant difference was seen between both the intervention and control groups as related to their education track (scientific or non-scientific) at post-test (Table 4).

**Source of health knowledge:** Regarding source of health-related aspects of smoking knowledge, the results showed that, the most common sources of smoking knowledge in rank order were internet 163 (69.1) and peer 130 (55.1), while the least common sources were school 69 (29.2) and father 78 (33.1) (Table 5).

## DISCUSSION

This study investigated the impact of school-based smoking prevention programs on adolescents' smoking knowledge in Palestine. The aim of this study was to identify appropriate strategies for culturally tailored smoking prevention programs among Palestinian adolescents, specifically in Tarqumia.

One positive aspect of the Smoking Prevention Program was the increased knowledge about smoking among adolescents in the intervention group. It is known that knowledge is the key and first step towards the adoption of healthy behavior (Lloyd-Richardson *et al.*, 2002). Schools are a suitable setting to better inform and educate adolescents. Their exposure to an educational program can increase the potential of quitting smoking, or even prevent its intermittent or regular use. This could have an important effect on health, in terms of the future diseases, premature deaths and disabilities of these adolescents. In the long term, knowledge may have been enough to change behavior, whereas this cannot be achieved in the short term.

This study results showed that the school-based programs were effective in increasing students' knowledge about health-related aspects of tobacco smoking in Tarqumia. Knowledge about health-related aspects of tobacco smoking improved significantly among the intervention group post intervention program. Along with the results of the present study, the knowledge improvement of participants in the educational programs has been observed in many previous studies (Lee *et al.*, 2007; Sun *et al.*, 2007; Perry *et al.*, 2009; Hanewinkel and Abshauer, 2004). Knowledge improvement following school-based health education intervention has been reported in previous studies conducted in South Africa, (Hunter *et al.*, 1991a,b) Japan, (Lee and Wang, 2002) and Hong Kong (Betson *et al.*, 1995). These school-based studies had comparable results to the ones of this study and reported significant improvement in the knowledge score of the intervention group compared to control group at post-test.

**Conclusion:** The school-based health educational intervention has been elucidated to be effective in improving the knowledge of students of health-related aspects of smoking. This issue is confirmed by the statistically significant difference in the knowledge of respondents in the intervention group compared with the control group.

**Conflict of interest:** The authors declare that they have no conflicts of interest.

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