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Article in *International journal of adolescent medicine and health* · June 2017

DOI: 10.1515/ijamh-2017-0017

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# Parent educators for teenage smoking behavior

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## Abstract:

**Background:** Several studies have shown that there is a significant relationship between teenagers and parental smoking behavior. This study was to empower parent (smokers and non-smokers) to raise parents' concern, to describe teenagers' knowledge about smoking and its dangers, to reduce the status of teenage smoking behavior, and to decrease the number of cigarettes smoked/day.

**Methods:** This was a quasi-experimental study, with a pretest-posttest group design. The respondents were 649 students from the 8th grade in junior high schools from three provinces in Indonesia divided into two intervention groups and one control group. The dependent variable was the implementation of parent educators (smokers and non-smokers) who were trained about smoking and its dangers. Data were analyzed by analysis of variance (ANOVA) and the Kruskal-Wallis test, with a significant level of 0.05.

**Results:** The results showed that the smoking parent educator model increased the frequency of parent concern significantly and improved knowledge about the dangers of smoking insignificantly; whereas the non-smoker parent educator model decreased the number of respondents' frequent smoking status insignificantly and reduced the number of cigarettes smoked /day by the frequent smoker respondents significantly.

**Conclusion:** The parent educator model can be used for preventing teenage smoking behavior.

**Keywords:** parent educators model, smoker and non-smoker, teenage smoking behavior

**DOI:** 10.1515/ijamh-2017-0017

**Received:** January 30, 2017; **Accepted:** March 22, 2017

## Introduction

"Smoking or being healthy" is a decision that must be chosen by individuals who already have enough information about smoking in conjunction with its dangers and responsible to be aware of the risk of their choices. This is not applicable for teenagers (aged 13–15 years old) because they have not received sufficient information about smoking and its dangers. They still require parental involvement to obtain cigarettes. They will "share", consciously or unconsciously, the negative impact on the environment and their family. The short-term effects to health due to smoking behavior are coughing, fatigue, shortness of breath and a reduction in smell and taste sensation, while the long-term effects that may occur are lip, tongue, throat and lung cancer, respiratory disorders, tuberculosis, heart disease, hypertension, osteoporosis, kidney disorders, fertility disorders, skin wrinkles and others [1]. Smoking has a significant impact on mortality [2].

The National Data Basic Health Research organized by Indonesian Ministry of Health in 2013 showed an increased proportion of people aged older than 15 years who consume snuff and chewing tobacco in all provinces throughout Indonesia. From 2007 to 2013 data showed an increase from 34.2% to 34.7% to 36.3% [3]. Research on the students in the 7th and 8th grades in high schools in Bantul, Yogyakarta showed that 50% of teenage smokers including trial smokers [2]. The national mean number of cigarettes smoked/day (for the population older than 10 years old) was 12.3 cigarettes. The category was not classified as low [4]. However, only 39% parents knew their teenager's smoking behavior [5]. The amount of teenage smoking behavior relates to family life [6]. Parental smoking behavior was one of the factors that influences significantly teenage smoking behavior [7], [8].

Without ignoring the multiple factors, significantly proven by some previous investigators, this research wanted to intervene in teenage smoking behavior by empowering parents (smokers and non-smokers). This research also considered the parents (fathers) as role models whose behavior was observed and imitated by teenagers as in the Social Learning Theory proposed by Bandura [6]. Moreover, the attitude of the father was as a supporter to his teenage son's behavior [9]. It was expected that by empowering parents (fathers), both

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smokers and non-smokers, would increase the parents' awareness to their teenagers smoking behavior, would reduce the number of cigarettes smoked per day (for teenagers who already smoked) or at least discourage their teenagers to become smokers.

## Methods

This is quasi-experimental research, with a pretest-posttest group design was divided into three groups (two treatment groups and one control group). The respondents were 649 male students in the 8th grade from 16 junior high schools, randomly selected, from a number of the junior high schools in three provinces in Indonesia. The province was chosen based on the lowest proportion of smokers so that prevention for teenagers was needed. The intervention included updating knowledge about smoking and its dangers. Once done the parents' enforcement they are called parent educators. The parent educators were given the chance to take care of their teenager's behavior for 2 months (June–July 2016). Parent educators who smoked were coded X1 and parent educators who did not smoke as X2, while the parents who were not given enforcement was considered as the control group. The 649 respondents (male students of the 8th grade) were divided into three groups (220 students belonged to group X1, 214 students belonged to group X2 and 215 students were in the control group).

There are four variables assessed: 1) parent's concern towards teenage smoking behavior, considering that the parental knowledge on teenage smoking behavior related to communication between teenagers with parents combined with the parenting pattern. Parents' concern was assessed using a self-reported questionnaire from respondents; 2) knowledge about smoking and its dangers, assessed using the test, consisting of 12 items, which was calibrated on students who were not respondents, with a 0.653 Cronbach's alpha reliability; 3) respondents' smoking behavior status was assessed from the recognition of respondents using self-reported questionnaires; 4) the number of cigarettes smoked/day especially for smoker respondents. The behavior of respondents' status was categorized into three groups, the non-smokers group (if never smoked), the trial smoker group (if ever tried smoking, or one to three cigarettes in the last 30 days, but did not smoke for the last 7 days or the last 24 h), and frequent smoker group (if they smoked four cigarettes or more in the last 30 days or smoked at least one cigarette within the last 7 days or the last 24 h). Data were analyzed by analysis of variance (ANOVA) and the Kruskal-Wallis test with a 95% level of confidence, using the SPSS version 13.0 for Windows (IBM Corporation). Students and parents participated voluntarily in this study and gave their informed consent.

## Results

### Respondents characteristics

On average, the respondents were 14 years old (the youngest 12 years old, the oldest 17 years old) and the parents were 46 years (the youngest 34 years old, the oldest 65 years old), mostly worked as self-employed or private employees.

### Parents' concern about their teenager's behavior

Overall, the parents' concern toward teenage smoking behavior increased from the initial measurements of 75.30% to 79.78% or increased by 4.48%. The increase occurred after the parents were given the opportunity to communicate with the respondent for 2 months. At the beginning of the measurement, the highest percentage with concerns was parents of the group control (82.79%), followed by the non-smoker parent educator group, X2, (76.42%) and the last was the smoker parent educator group, X1, (66.70%). Two months later, the post-test data collection was done. The results of measurements showed a sequence of changes, the highest percentage were parents in X2 group (89.53%), followed by X1 (84.77%) and lastly by the control group (65.08%). The difference percentage changes (between pre-test and post-test) in the X1 group showed the highest percentage increase (18.07%), followed by the X2 group (13.11%) however, the control group showed contrarily a decrease of 16.62% (Table 1).

**Table 1:** Parents' concern on respondents smoking behavior.

Group	Location	Parents' concern (%)
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		Pretest	Posttest	Difference
X1	Province 1 (n = 54)	68.52	77.77	9.25
	Province 2 (n = 50)	54.00	80.00	26.00
	Province 3 (n = 116)	77.58	96.55	18.97
	Total X1 (n = 220)	66.70	84.77	18.07
X2	Province 1 (n = 51)	72.55	78.43	5.88
	Province 2 (n = 47)	80.85	93.61	12.76
	Province 3 (n = 116)	75.86	96.55	20.69
	Total X2 (n = 214)	76.42	89.53	13.11
Control	Province 1 (n = 48)	64.58	56.25	-8.33
	Province 2 (n = 51)	96.07	80.39	-15.68
	Province 3 (n = 116)	84.48	58.62	-25.86
	Total control (n = 215)	82.79	65.08	-16.62
Total (n = 649)		75.30	79.78	4.48

Source: Research data

The frequency of parents' concern (i.e. explaining the dangers of smoking, warning not to smoke and reducing cigarettes smoked) to the respondent for 2 months is shown in Table 2. In general, the average frequency of parents' concern before the intervention was 1.18 times per 2 months and the number increased after intervention to 2.48 times, an increase of 37.01%. The highest increase was in the intervention parents group X1 (smoker parent educators), i.e. 40.40%, while the control group decreased by 0.11%. After the ANOVA analyses, it was known that there was a significant difference in the average increase in the frequency of parent's concern among respondents ( $p$ -value 0.0001) and the post hoc results showed that the intervention group of parent smoker educators is the best educator model.

**Table 2:** Parents' concern on smoking behavior respondents.

Group	Location	Prevalence of parents' concern (pre-test n = 495)	Location	Prevalence of parents' concern (post-test n = 526)	Mean difference (%)	p-Value <sup>a</sup>
X1	Province 1 (n = 37)	1.84	Province 1 (n = 42)	2.6	1.16 (40.40)	0.0001 <sup>b</sup>
	Province 2 (n = 27)	1.67	Province 2 (n = 40)	2.65		
	Province 3 (n = 90)	2.76	Province 3 (n = 112)	4.16		
	Sub-total (n = 154)	361.57/154 = 2.348	Sub-total (n = 194)	681.12/194 = 3.51		
X2	Province 1 (n = 37)	2.22	Province 1 (n = 40)	2.73	0.82 (32.67)	
	Province 2 (n = 38)	2.58	Province 2 (n = 44)	2.32		
	Province 3 (n = 88)	2.60	Province 3 (n = 112)	3.94		
	Sub-total (n = 163)	408.98/163 = 2.51	Sub-total (n = 196)	652.56/196 = 3.33		
Control	Province 1 (n = 31)	2.77	Province 1 (n = 27)	2.44	-0.27 (-0.11)	
	Province 2 (n = 49)	2.31	Province 2 (n = 41)	3.20		
	Province 3 (n = 98)	2.15	Province 3 (n = 68)	1.16		
	Sub-total (n = 178)	409.76/178 = 2.30	Sub-total (n = 136)	275.96/136 = 2.03		
Total		1180.31/649 = 1.81		1609.64/649 = 2.48		

<sup>a</sup>ANOVA test; <sup>b</sup>0.05 level of significant.

## Respondents' knowledge about smoking and its danger

There is an increase in the average knowledge score in all groups. The average score of the respondents' knowledge was 72.8 before the intervention and it became equal to 78.03 (maximum score of 100) after the intervention. The highest increase in the knowledge score was in the smoker parent educator group (X1), 9.19%. However, after analysis by ANOVA with the significant level difference of 0.05, it showed that there is no significant difference with the p-value of 0.400 (Table 3).

**Table 3:** Respondents' knowledge on smoking and its danger before and after intervention.

Group	Location	Average knowledge score				p-Value <sup>a</sup>
		Pre test	Post test	Gain score	%	
X1	Province 1 (n = 54)	70.34	81.32	10.98		0.400 <sup>b</sup>
	Province 2 (n = 50)	71.36	74.02	2.66		
	Province 3 (n = 116)	71.05	77.15	6.10		
	Sub-total average knowledge score X1 n = 220	70.94	77.46	6.52	9.19	
X2	Province 1 (n = 51)	71.12	80.61	9.49		
	Province 2 (n = 47)	73.89	75.70	1.80		
	Province 3 (n = 116)	75.29	78.95	3.66		
	Sub-total average knowledge score (X2) n = 214	73.99	78.63	4.64	6.27	
Control	Province 1 (n = 48)	69.93	82.93	13.00		
	Province 2 (n = 51)	79.14	80.06	0.92		
	Province 3 (n = 116)	72.91	75.14	2.23		
	Sub-total average knowledge score (C) n = 215	73.72	78.04	4.32	5.86	
	Total	72.89	78.03	5.14		

<sup>a</sup>ANOVA test; <sup>b</sup>0.05 level of significant.

## Smoking behavior

Teenage smoking behavior was grouped into non-smokers, trial smokers and frequent smokers (Table 4). Respondent smoking behavior status (including trial smokers) before the intervention was 55.71%, and it became 53.41% after intervention. Smoking status in all three groups was dominated by the trial smoker. After the parent educator intervention, there was an increase in non-smokers' status and a decrease in smokers' status. The most reduced number was in the group X1 intervention (smoker parent educator model). However, from the Kruskal-Wallis statistical test result, there was no significant difference in all three groups of respondents decreasing smoking behavior status, p-value 0.1

**Table 4:** Smoking behavior students before and after intervention (n = 649).

		Pre test Smoking behavior status			Post test Smoking behavior status			Difference smoking behavior status			p-Value <sup>a</sup>
		A	B	C	A	B	C	A	B	C	
X1 n = 220	Prevalence %	82 37.27	116 52.72	22 10	92 41.81	107 48.63	21 9.54	+10 +4.54	-9 -4.09	-1 -0.55	0.153 <sup>b</sup>
X2 n = 214	Prevalence %	96 44.86	103 48.13	15 7.0	100 46.73	103 48.13	11 5.14	+4 +1.87	0 0	-4 -1.86	
C n = 215	Prevalence %	109 50.69	94 43.72	12 5.58	110 51.16	90 41.86	15 6.97	+1 +0.47	-4 -1.86	+3 +1.39	
Total	Prevalence %	287 44.27	313 48.19	49 7.52	302 46.56	300 46.20	47 7.21	+15	-13	-2	
Total %			A B+C		A B+C						
		44.27	55.71		46.56	53.41					

A, non-smoker; B, trial smokers; C, frequent smokers. <sup>a</sup>Kruskal-Wallis test, <sup>b</sup>0.05 level of significant.

### The number of cigarettes smoked by respondents

The number of cigarettes smoked by respondents before and after the intervention can be seen in Table 5. There was a decline in the average number of cigarettes smoked/day by the frequent smokers' respondent in all groups. The decline was mostly in the non-smokers parent educator group (X2). At post-test, there were still 46 frequent smoker respondents. Using ANOVA analysis, with a 0.05 significant level, there was a significant difference in the number of cigarettes smoked/day by respondents in the three groups (p-value 0.020) and the post hoc results indicated that non-smokers parent educator (X2) was the best. A correlation test was used to determine the relationship between the frequent smokers' knowledge and the number of cigarettes smoked/day. The results showed the higher the respondents' knowledge, the less cigarettes that were smoked (-0.385 coefficient correlation, 0.008 significant 2-tailed).

**Table 5:** Number of cigarettes smoked/day by respondents.

	Before Intervention (pre-test)		After intervention (post-test)		Difference	p-Value <sup>a</sup>
		Cigarettes smoked/day		Cigarettes smoked/day		
X1	Sub total (3 location) n = 22	11.78	Sub total n = 20	9.55	-2.33	0.020 <sup>b</sup>
X2	Sub total (3 location) n = 15	15.45	Sub total n = 11	5.21	-10.24	
Control	Sub total (3 location) n = 12	10.82	Sub total n = 15	7.32	-3.5	
	Total n = 49	620.75/49 = 12.67	Total n = 46	358,11/46 = 7.78		

<sup>a</sup>ANOVA test; <sup>b</sup>95% level of significant.



## Discussion

Smoking by teenagers will generally also potentially be a predictor of a number of other social problems, namely unhealthy sexual behavior, school dropout and juvenile delinquency. With the parent educator model, parents can help by warning and maintaining the attitudes and skills of their teenager to avoid smoking. Numerous studies have been made by previous researchers on the smoking behavior in teenagers by interventions through peers and mentors, this study wanted to complement the efforts through the empowerment of parents both smokers or non-smokers [10], [11], [12]. The parent (father) should be responsible for his teenagers behavior especially in families who still hold onto the “patriarchal social system”. The father is a role model figure in that his behavior is observed and imitated by the teenager, as is shown in the social learning theory of Bandura [6] and as a supporting factor along with peer, mentors and teachers as reflected in the concept of the determinants of behavior [9]. It is expected with the empowerment of parents (fathers), both smokers or non-smokers, that this will complement the numerous attempts that have been made to reduce the number of cigarette smoked per day (for adolescents who already smoke) or it can prevent the intention of older children from becoming smokers. Besides, teenagers still need parental money support to buy the cigarettes.

Parents’ concern towards respondents smoking behavior was 40.40%. This figure is greater than William’s research in 2003 [5]. There was an increasing parent concern on teenage smoking behavior significantly after smoker parent educators model intervention. This was likely due to smoking parents’ wishes for their teenage children not to follow their behavior, by increasing concern (explaining the dangers of smoking/warning not to smoke/reducing the number of cigarettes smoked per day) from an average of 2.3 to 3.5 times frequency in 2 months.

There was an increased in respondents’ knowledge of all groups and the highest increase was in in the smoker parent educators model intervention. This is likely due to parents as the smoker parent educators model had felt the effects of smoking behavior which raised concern by giving the explanation the dangers of smoking. On the other hand, the respondents would willingly accept and obey parental authority if their warning was about cigarettes and alcohol because the issue was more acceptable than the conventional issues of education and worship, and choosing friends, music and how to dress [13]. Increasing respondents’ knowledge, especially in the smoker parent educators model intervention was not statistically significant. The lack of significance was likely due to variations in implementing the refreshing/debriefing to parents at each location (in the group at school or individually/home visit) and limited spare time for parent educators to meet respondents because of the various type of parents’ work. One of the determined successes of teaching was the group size [14]. In addition, the parent educators’ limited time to communicate with respondents could also influence the depth of smoking and knowledge of its dangers. Most of the respondents’ parents (70.87%) were working as private employees or were self-employed, so that most of their time was outside the house (e.g. in Denpasar, Bali, where parents were artists or art product sellers throughout the day). In addition to those two reasons mentioned above, the short intervention time likely influenced the significance of teenagers’ knowledge changing. Intervention implementation (parent educators) was carried out for 2 months. Thomson et al. selected research articles mainly on the intervention of children and adolescence smoking status measured about a minimum of a 6-month period from the beginning of the intervention [15]. Considering that, this intervention study was very short, but an increase of the respondent’s knowledge could be found.

There are several forms of parental concern on teenager’s smoking behavior. In this study, the concerns are giving information about smoking and its dangers, reminding teenagers to avoid friends who smoke, reminding them not to smoke, reminding them to reduce the number of cigarettes that they smoke, reminding them to stop smoking, listening to their problems and helping solving issues they are facing. Each parent can apply some form of intervention. The form of intervention mostly chosen is “giving information about smoking and its dangers”, selected by 308 parents (70.96%), whereas the least selected by the parent was “help solving the issues they are facing”, selected by only 38 parents (8.75%).

Teenage smoking behavior status (respondents in the three groups) at the beginning of the intervention (pretest) was 55.71% and at the end of the study was 53.41%. The smoking behavior included trial smokers. This smoking behavior status was higher compared to some previous research, such as 20.3% of teenage smokers and 54.3% smoking prevalence in five states (Florida, North California, New Jersey, Wisconsin and West Virginia) in 1998 to 2006 [16]; 51% of teenage boy smokers from non-Hispanic White, non-Hispanic Black and Mexican American in 1988–1994 in a self-reported questionnaire [17]; 50% of smokers (including trial smokers) at junior high schools (aged 13–15 years) in Bantul, Yogyakarta Indonesia [2] and 29.3% in junior high target class students (aged 13–14 years) in Jayapura Indonesia 2015 [18].

There were changes in smoking behavior status from all three groups. The highest smoking behavior changes were in the non-smoker parent educator group (X2) compared to the other two groups. Such changes can be seen by decreasing the number of teenage frequent smokers. The largest decrease in the non-smokers parent educators group can be explained through Bandura’s Social Learning Theory, [6] that one can learn

new behavior by observing others. Teenage smokers observed their parents' behavior so that they would imitate their parent's behavior (who do not smoke) and stop their smoking behavior, from frequent smokers to non-smokers. However, this finding was not statistically significant. Nevertheless, this study showed that social learning theory could be carried out on the prevention of teenage smoking behavior by empowering parents (fathers) as parent educators. Other studies proved social learning theory in relation to the alcohol behavior with peer educators [6]. The lack of statistical significance in reducing smoking behavior status was likely because of their early smoking. Based on these results, it was found that respondents who had ever smoked, smoked for 3 years ago or since they were in the 5th grade in elementary school (aged 10 years). It can be assumed that they were introduced to cigarette since the 5th grade of elementary school.

A decline in the average number of cigarettes smoked/day by teenage smokers was found in all intervention groups. Although every school implements a policy of "No-Smoking at School". The national scale for the average number of cigarettes smoked a day ( $\geq 10$  years) is 12.3 cigarettes [3].

The decline is mostly in the non-smokers parent educator group, from 15.45 cigarettes/day to 5.21 cigarettes/day. The declining rate was statistically significant (p-value 0.020). The decline in the number of cigarettes smoked/day by teenage smokers was in accordance with the reduction of smoking behavior status. In the non-smokers parent educators group, there was a significant decrease number of frequent smokers and a significant reduce the number of cigarettes smoked/day compared to the other two groups. The decline in the number of cigarettes smoked/day related to their knowledge after the intervention. The higher their knowledge about smoking and its dangers, the greater reduction in the number of cigarettes smoked/day was found. This is in line with the concept of Green that knowledge was the components on the predisposing factors that influence a person's behavior, in addition to two other factors, enabling and reinforcing factors [19]. In this case, teenagers who knew the dangers of smoking would reduce the number of cigarettes smoked/day.

## Research limitations

The instrument was a questionnaire on smoking behavior (self-reported) and parental concern instruments collected through respondents' explanations (self-reported questionnaire), not asking questions directly to the parent. In addition, there was the various ways for training the parent to become parent educators.

## Conclusion

Parents could be empowered as parent educators in influencing teenage smoking behavior. Parent educators who were smokers were able to increase the parent's concern and also increase their teenagers' knowledge in terms of the dangers of smoking, while nonsmoker parent educators were able to decrease the smoking behavior status and the number of cigarettes smoked/day.

## Compliance with ethical standards

This study received ethics approval from the Ethics Committee faculty of medicine and health, the University of Muhammadiyah Yogyakarta in 2016. All respondents had signed informed consent before participating in this study. The authors declare that they have no conflict of interest. All or part of this study has not been published in any journal.



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