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## PUBLIC HEALTH RESEARCH

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### Exposure to Second-Hand Smoke among Adolescent in Secondary School Students in Sana'a, Yemen

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#### ABSTRACT

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<b>Accepted</b>	4 December 2015
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<b>Introduction</b>	The aim of the study was to assess the knowledge and attitude of secondary school students in Sana'a Yemen related to exposure to second-hand smoking.
<b>Methods</b>	A cross-sectional study was conducted in Sana'a city. The total sample size was 336 students in which 63 were males and 273 were females. These students were stratified random sampling. Data were collected by using Questionnaire comprising of 3 parts: Part 1- consists of socio-demographic data. Part 2- consists of the knowledge regarding smoking and second-hand smoking and Part 3- consists of adolescents' attitude in relation to second-hand smoking.
<b>Results</b>	Out of 336 students, majority were between 14-18 years old (75.9%), males (81.2%) , (55.7%)of them was fathers' occupation private employee and low educated mother was (86.3%).The students who do not have smoking habit were (94.3%),and those who do not have friends with the habit of smoking was (57.4%). (57.10) having some one else at home who smokes beside them .The reaction of non printed mass media for SHS warning was (83.3%). The exposed to smoke out door was (60.1%). In this study, the majority of students had inadequate knowledge about the second-hand smoke was (52.7%). A higher percentage of students who had unfavorable attitudes toward secondhand smoke was (86.6%).
<b>Conclusions</b>	We concluded that The level of knowledge and attitude about the second-hand smoke is relatively low among the secondary school student in Sana'a Yemen. The finding of this study emphasized the need of effective awareness programs to increase level of consciousness and knowledge regarding SHS.
<b>Keywords</b>	Second-hand Smoking – Secondary School – Adolescent - Sana'a.

### INTRODUCTION

The non-smokers who exposed to tobacco smoke from the burning cigarette and the exhaled smoke from the smokers. In spite of decades of development of approaches to assess secondhand smoke exposure (SHSe), there are still unresolved methodological issues. This manuscript summarizes the scientific evidence on the use of SHSe reported measures and their methods, objectives, strengths and limitations; and discusses best practices for assessing behavior leading to (SHSe) for lifetime and immediate or current (SHSe).<sup>1</sup> Secondhand smoke (SHS) exposure is a potentially preventable environmental pollutant that remains a major global public health concern. A descriptive cross-sectional design was used to assess secondhand smoke exposure, knowledge, attitudes, and avoidance.<sup>2</sup> A previous survey found that only 6.3% respondents completely prohibited household smoking. Further analysis of the relationship between household smoking restriction and (SHS) exposure showed that the household (SHS) exposure rates in the case of 'smoking allowed in SOME indoor places' and 'smoking allowed in ALL indoor places' were higher than in the case of 'smoking not allowed in ANY indoor areas'.<sup>3</sup>

Good knowledge of the harmful effects of secondhand smoke was associated with significant reductions in the odds of being a current smoker and of being susceptible to smoking.<sup>4</sup> The prevalence rate of smokers among students was 37.1%. Their age range was 16–22 years, with a meanage of  $17.06 \pm 0.80$  years with no significant difference between ages of smokers ( $17.13 \pm 0.82$  years) and non smokers ( $17.01 \pm 0.79$  years).<sup>5</sup> Exposure to second-hand smoke (SHS) is a well-known risk factor for a range of diseases including lung cancer and coronary heart disease.<sup>6</sup> The knowledge of most students about the risks of water pipe is less than that of cigarette (cigarette: 90.5% and water pipe: 86.6%).<sup>7</sup> Nearly 2.5 million non smokers who died from heart disease or lung cancer were caused by exposure to secondhand smoke.<sup>8</sup>

More than 87% of lung cancer deaths, 61% of all pulmonary disease deaths, and 32% of all deaths from coronary heart disease were attributable to smoking and exposure to secondhand smoke.[8] In this study, we provides an overview of exposure to secondhand smoke and it's relationship with socio-demographic factors as well as knowledge and attitude about secondhand smoke exposure among adolescents from

Maeen Directorate in Sana'a Yemen. The main aim of this study was to assess the knowledge, and attitude of secondary school students related to exposure to second-hand smoking.

### METHODOLOGY

#### *Study Design*

The study carried out was a Cross-sectional study.

#### *Targeted Population*

Secondary school students in Maeen directorate, Sana'a city.

#### *Sampling Technique and Sample Size*

Stratified random sampling size technique was used to select the respondents. A total of 336 students were recruited for the study. Sana'a is the largest town and the capital of Yemen, which includes multicultural people of Yemen, and consists of ten directorates. One directorate was selected randomly. Selected directorate contains 12 schools, two schools were selected randomly consisting of one boys' school and the other one is girls' school. Each grade consists of many classes, secondary classes were selected randomly , which all of the students in were included in the study.

#### *Inclusion Criteria*

All students who agreed to participate in the study were recruited. The mobilization of the questionnaire was approved by the Office of Education Directorate - Maeen, and then subsequently Approved by the administration of targeted Schools, Al-Hussein School and Al-Salam School, The consent from The Students was done by writing the name or signature (Voluntary) in the questionnaire. The declare of ethical committee medical research has reverred the proposal titled MECA:(2014/11).

#### *Exclusion Criteria*

Students who refused written questionnaire and the students who answered incorrectly.

#### *Data collection*

Data were collected by questionnaire after we have taken the consent and agreement of the Al-Salam School and Al-Hussein School directors. The questionnaires were distributed in the classrooms among high school students. Data were collected in November 2014 and the questionnaires were distributed into three parts.

**Part I – Socio-demographic data.**

The questionnaire consists of 10 items consisting of age, sex, and educational status for fathers, mothers, father's occupation, smoking habit, friends have the habit of smoking, living at home with smoker, mass media used for warning second-hand smoking, and Locations of exposure to second-hand smoking.

**Part II - Knowledge regarding smoking, second-hand smoking and their effects.**

The questionnaire consists of 28 questions. A score of 1 was given for each correct response and score 0 was given for each incorrect response. Score of 50% and below is inadequate knowledge which is given 0 score, while above of 50 % is adequate knowledge and it is given 1 score.

**Part III – Attitude of adolescent regarding smoking, secondhand smoking and their effects.**

The questionnaire consists of 13 questions. A score of 1 was given for each of correct response favorable attitude and score 0 was given for each incorrect response of unfavorable attitude. A 50% and below was unfavorable attitude which is given 0 score

above 50 % - favorable attitude and it's given 1 score.

*Statistical analysis*

The data were coded and analyzed by using SPSS software version 20 (IBM Corp. Released 2011. Armonk, NY). Descriptive statistics by frequency and percentage were used in the analyzing socio-demographic data. The multiple logistic regression was used to determine the relationship of the dependent variable with the knowledge, attitude and socio-demographic factors. The statistical significance was assessed at  $P < 0.05$ .

**RESULTS**

Out of 336 students, majority were between 14-18 years old (75.9%), males (81.2%), (55.7%) of them was fathers' occupation private employee and low educated mother was (86.3%). The students who do not have smoking habit were (94.3%), and those who do not have friends with the habit of smoking was (57.4%). (57.10) having some one else at home who smokes beside them .The reaction of non printed mass media for SHS warning was (83.3%). The exposed to smoke out door was (60.1%). (Table1).

**Table 1** Socio-demographic characteristics of students (n=336)

Socio-demographic variable	No.	%
<i>Age group ( years)</i>		
14-18	255	75.9
>18	81	24.1
<i>Sex</i>		
Male	273	81.2
Female	63	18.8
<i>Father's education</i>		
Low	165	49.1
High	171	50.9
<i>Father's Occupation</i>		
Governmental Employee	149	44.3
Private Employee	187	55.7
<i>Mother's Education</i>		
Low	290	86.3
High	46	13.7
<i>Do you have smoke habit ?</i>		
Yes	19	5.7
No	317	94.3
<i>Whether your friends have the habit of smoking?</i>		
Yes	143	42.6
No	193	57.4
<i>Is there any one else living at home with you who smokes?</i>		
Yes	192	57.1
No	144	42.9
<i>The mass media used for warning Secondhand smokers is :</i>		
Printed	56	16.7
not printed	280	83.3

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### *Locations of exposure to smoke.*

Outdoor	202	60.1
Indoor	134	39.9

The adolescents defined the smoking as a habit (n= 157; 46.7%). The adolescents who know the smoking effects on the health were (n=316; 94.0%) with a good knowledge. A (n=214; 63.7%) of them said the toxic substance is a nicotine. A (n=273; 81.2%) said the peers group smoking leads to bad smoking habit in this age .The majority of them choose that the most common organ in the body effected by the smoking habit is the lung (n=259 ; 77.1%).

Almost of them thought (n=206; 61.3%) the addiction sign of smoking habit is the need to smoke everyday. The ones who don't prefer the way to stop or less this habit as a formal action by increasing tax were (n=189; 56.2%). The majority of these students said the nicotine replacement is not good treatment for stopping smoking (n= 301; 89.6%) (Table 2).

**Table 2** Items of knowledge of the secondary school student about exposure to second hand smoke (n=336)

Items of knowledge	Yes		No	
	No.	%	No.	%
1 Smoking is a habit.	157	46.7	179	53.3
2 Your point of view toward smoking is that it effects on your health.	316	94.0	20	6.0
3 The toxic substance present in smoking is nicotine .	214	63.7	122	36.3
4 One of the causes of smoking is lack family support .	136	40.5	200	59.5
5 The source that can lead to bad habit is peers group.	273	81.2	63	18.8
6 The reason for smoking habit is to improve personality .	51	15.2	285	84.8
7 Loosed family is a one reason to start smoking habit.	76	22.6	260	77.4
8 Desire to smoke becomes worst when living among active smokers.	141	42.0	195	58.0
9 Smoking habit in adolescent age is to show challenge and fashion .	281	83.6	55	16.4
10 Lung is an organ that is affected by smoking.	259	77.1	77	22.9
11 Cough is an initial sign of smoking .	308	91.7	28	8.3
12 Smoking affected directly on the health .	238	70.8	98	29.2
13 Lung cancer is the most common type of cancer caused by smoking .	321	95.5	15	4.5
14 one minute of exposure to a SHS is enough to affect the body health..	170	50.6	166	49.4
15 The chemical contents of cigarette are nicotine, tar, carbon monoxide.	180	53.6	156	46.4
16 The effect of smoking can lead to CVA.	188	56.0	148	44.0
17 Organs which are affected by smoking are heart, lung and kidney.	319	94.9	17	5.1
18 Wheezing is One of the ill-effect of smoking.	233	69.3	103	30.7
19 The healing process in smokers is low.	219	65.2	117	34.8
20 The young children are more prone to get pneumonia.	50	14.9	286	85.1
21 The total number of chemical substances in tobacco is 4,000	143	42.6	193	57.4
22 Cough is The physical ill-effect of smoking.	117	34.8	219	65.2
23 The sudden stop of smoking leads to headache.	109	32.4	227	67.6
24 The addiction sign of cigarette smoking is the need smoke every day.	206	61.3	130	38.7
25 One-year duration is necessary to cope with normal life after quitting smoking.	171	50.9	165	49.1
26 Keeping yourself busy and active all the time helps you to overcome the difficulty of quitting smoking.	241	71.7	95	28.3
27 Government can take step to stop smoking through increasing tax.	147	43.8	189	56.2

28	The treatment available for ill-effects of smoking is nicotinic replacement.	35	10.4	301	89.6
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Almost of the students stand against the staying away from the exposure to smoke was (n=311;92.6%). There number of those who don't remain with the smokers who start to smoke in the same group was (n=216; 64.3%). A (n=269; 80.1%) was the ones who don't ask the taxi drivers to stop smoking when they have trip .There was a great number of them who said they will not join

their friends if they are smoking in a designated smoking place (n=236; 70.2%).There was (n= 276; 82.1%) of them who don't avoid the exposure to SHS in the out door. A (n=187; 55.7 %) who don't wash their clothes from the smoke smell after they've exposed to smoke (n=149; 44.3%) (Table 3).

**Table 3** Items of attitude of the secondary school students about exposure to second and smoke (n=336)

Items of Attitude	Yes		No	
	No.	%	No.	%
When I encounter someone who is smoking, I distance myself to be not exposed to smoke.	25	7.4	311	92.6
If anyone begins to smoke in a group, I will remain with the group.	120	35.7	216	64.3
If I encounter a friend who is smoking, I will sit with him.	130	38.7	206	61.3
When I am in a public place, I will leave if I unable to sit in the nonsmoking section.	145	43.2	191	56.8
When I have a trip, I request a nonsmoking seat.	62	18.5	274	81.5
When I have a trip by taxi , I will ask the driver not to smoke.	67	19.9	269	80.1
If my friends are gathering in a designated smoking area to smoke, I will join them.	100	29.8	236	70.2
If I am with people who are smoking and I cannot leave, I will ask them to refrain from smoking.	90	26.8	246	73.2
I will sit in the smoking section if there are no seats available elsewhere.	187	55.7	149	44.3
When an outdoor functions where smoking is present, I will move away to avoid it.	60	17.9	276	82.1
When an outdoor functions where water pipe smoking is present, I will move a way to avoid it.	71	21.1	265	78.9
When exposed to SHS, I wash my clothes solely to remove the smell of smoke.	149	44.3	187	55.7
If I find it unpleasant to be around SHS, I routinely associate with people who smoke.	155	46.1	181	53.9

There was no significant association between socio-demographic smoking factors and knowledge on SHS among them. However, the pattern shows that adequate knowledge is highly educated fathers, and highly educated mothers. The inadequate

knowledge was in the students without smoking habit, and the students with friends without smoking habit, also the students exposed to non printed warning media about SHS, and who are exposed to smoking out door (Table 4).

**Table 4** Association between socio-demographic variable and knowledge of secondary school students about exposure to second-hand smoke

Socio-demographic variable	Knowledge				P-value
	Adequate		Inadequate		
	No.	%	No.	%	
<i>Age group (years)</i>					
14-18	120	47.1	135	52.9	0.659
>18	39	48.1	42	51.9	
<i>Sex</i>					

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Male	128	46.9	145	53.1	0.863
Female	31	49.2	32	50.8	
<i>Father's Education</i>					
Low	72	43.6	93	56.4	0.291
High	87	50.9	84	49.1	
<i>Father's Occupation</i>					
Governmental employee	71	47.7	78	52.3	0.554
Private employee	88	47.1	99	52.9	
<i>Mother's Education</i>					
Low	135	46.6	155	53.4	0.544
High	24	52.2	22	47.8	
<i>Do you have smoking habit ?</i>					
Yes	8	42.1	11	57.9	0.711
No	151	47.6	166	52.4	
<i>Whether your friends have the habit of smoking?</i>					
Yes	64	44.8	79	55.2	0.573
No	95	49.2	98	50.8	
<i>Is there anyone else living at home with you who smokes?</i>					
Yes	93	48.4	99	51.6	0.310
No	66	45.8	78	54.2	
<i>The mass media used for warning the reaction of Secondhand smoking is..</i>					
Printed	21	37.5	35	62.5	0.119
Not printed	138	49.3	142	50.7	
<i>The location of exposure to smoking.</i>					
Outdoor	99	49.0	103	51.0	0.442
Indoor	60	44.8	74	55.2	

There was no significant association between socio-demographic smoking factors and attitude on SHS except to father's occupation P value = 0.006 .However, the pattern shows that favorable attitude was with low father education, highly educated

mothers, students without smoking habit, the students with friends without smoking habit, students exposed to non printed warning media about SHS, and who are exposed to smoking out door (Table 5).

**Table 5** Association between socio-demographic variable and attitude of secondary school students about exposure to second-hand smoke

Socio-demographic variable	Attitude				P-value
	Favorable		Unfavorable		
	No.	%	No.	%	
<i>Age group years</i>					
14-18	32	12.5	223	87.5	0.794
>18	13	16.0	68	84.0	
<i>Sex</i>					
Male	36	13.2	237	86.8	0.229
Female	9	14.3	54	85.7	
<i>Fathers' Education</i>					
Low	21	12.7	144	87.3	0.383
High	24	14.0	147	86.0	
<i>Fathers' Occupation</i>					
Governmental employee	28	18.8	121	81.2	0.006
Private employee	17	9.1	170	90.9	
<i>Mothers' Education</i>					
Low	37	12.8	253	87.2	0.589
high	8	17.4	38	82.6	
<i>Do you have a smoking habit?</i>					
Yes	5	26.3	14	73.7	0.528
No	40	12.6	277	87.4	
<i>Whether your friends have the habit of smoking?</i>					

Yes	24	16.8	119	83.2	0.593
No	21	10.9	172	89.1	
<i>Is there anyone else living at home with you who smokes?</i>					
Yes	31	16.1	161	83.9	0.234
No	14	9.7	130	90.3	
<i>The mass media used for warning the reaction of Second-hand smoking is</i>					
Printed	9	16.1	47	83.9	0.193
Not printed	36	12.9	244	87.1	
<i>The location of exposure to smoking.</i>					
Outdoor	26	12.9	176	87.1	0.787
Indoor	19	14.2	115	85.8	

## DISCUSSION

Smoking and second hand smoking affect on human health and cause many diseases such as lung cancer, atherosclerosis and heart disease. This study is a descriptive cross-section among the secondary school students in Sana'a, Yemen. This reflects the role of the family, school and mass media to warn of the effects of smoking habit, the number of participants was 336 students, 273 male and 63 female students. It showed that in this study, the majority of students had inadequate knowledge about second-hand smoke (52.7%). A higher percentage of students had unfavorable attitude towards the second-hand smoke (86.6%). Another study was similar and showed that the knowledge about smoking was lower and attitude towards smoking were more negative when compared with the non-smokers.<sup>9</sup> Second-hand tobacco smoking exposure<sup>10</sup> A lower score indicated a more smoking friendly attitude and less knowledge and concern for passive smoking.<sup>11</sup>

Though, I find the second-hand smoking doesn't have a significant association with age, sex, parent education ( $p$  val.  $>0.05$ ). While the same study conducted in the Kingdom of Saudi Arabia showed that the parent's (both father's and mother's) education level was not significantly associated with the smoking status of study subjects, father's ( $OR = 1.8$ ) mother's ( $OR = 2.8$ ).<sup>12</sup> Another study revealed a significant relation of socio-demographic and secondhand smoke, whereas school poverty was significantly associated with secondhand smoke exposure  $OR=1.27$ ,  $95\% CI 1.04 - 1.58$ .<sup>13</sup> The present study indicates that the father's occupation has a significant effect in a second-hand smoking, while it didn't occur in the anther variables in present study, father's occupation has a significant association with adolescents' attitude, by using a multiple logistic regression  $p$ . value  $=0.006$ . There wasn't a significant association between father's education and adolescent's knowledge by using the statistic multi logistic regression  $p$  vale  $<0.05$ .

Another similar study showed the relationship between father's occupational group and statistically significant risk

categories of predictors of daily smoking. Also it revealed a significant oppose relationship with father's occupational group was observed for having a smoking father.<sup>14</sup> The number of students at this age who are smoking are very low and did not more than 5.7%, and this usually means that direct smoking among students is acceptable, and also the percentage of adolescent students friends who are smoking did not more than 42.6%. There are many ways that advertising is raising the knowledge about dangers of smoking and second-hand smoking, including printed and non printed, the present study found that the proportion of the means of non-print mass media was 83.3%. Though the most common used in the caution from the smoking in the modern technology are videos and audios, which have the most impact on this kind of smoking dangers, but the  $p$  vale here wasn't significant the  $P$  vale  $>0.05$ .

Another study mentioned that the educational mass media campaigns have the potential to increase support for smoke-free protections and may increase knowledge about the dangers of second-hand smoke among certain populations.<sup>15</sup> Local exposure to smoke in other study wasn't significant with knowledge  $P$  vale  $>0.05$ . Second-hand smoke (SHS) exposure is higher among children from lower socio-economic status (SES) households.<sup>16</sup> The SHS exposure rate in the current study is lower than the exposure rate in the workplace (63%) (43%;  $95\% CI: 37\% - 49\%$ ).<sup>17</sup> Despite small overall increases in adoption of smoke-free homes, the home remains a key source of SHS exposure for many children, with persistent inequalities in the prevalence of restrictions on smoking in homes. Hence, efforts to encourage smoke-free homes are crucial in attempting to reduce health inequalities.<sup>18</sup>

## CONCLUSIONS

The level of knowledge and attitude towards second-hand smoke is relatively low among the secondary school students in Sana'a Yemen. The findings of this study emphasized

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the need to the effective programs to increase the level of awareness, and knowledge between schools' students.

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