

**NURSES' KNOWLEDGE, ATTITUDE AND PRACTICE
REGARDING SECONDHAND SMOKE,
AN INTERVENTION STUDY**

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ABSTRACT

Background: Smoking is a growing public health problem in Egypt. In 1997, it was estimated that 43.6% of adult males and 4.8% of adult females smoked. Second-hand smoke, known as environmental tobacco smoke (ETS), is a mixture of the side-stream smoke given off by the burning end of a cigarette, pipe or cigar and the smoke exhaled from the lungs of smokers. Non-smokers exposed to secondhand smoke (SHS) at work are at increased risk for adverse health effects.

Objectives: To assess nurses' knowledge, attitude and practice regarding second-hand smoke and to reassess them once more after an intervention health education setting.

Participants and Methods: This study was conducted at Menoufiya university hospitals. Two hundred and seventeen nurses were selected as a study group. A pre-designed self-administered questionnaire regarding KAP of nurses about SHS was filled by each participant. Urine samples were collected and analyzed for quantitative detection of cotinine level.

Results: Nurses had general knowledge about SHS specially its related diseases; however, they had deficient attitude and poor practice towards it. The intervention health education setting, significantly, raised nurses' KAP about SHS and, also, significantly decreased the urinary cotinine level.

Conclusion: Nurses had some knowledge about the health effect of SHS however, their attitude and practice towards it, are still in need for more efforts to include smoking as a major problem in the nursing education curriculum.

Key words: KAP, secondhand smoke, urinary cotinine.

Introduction

Smoking is a growing public health problem in Egypt. In 1997, it was estimated that 43.6% of adult males and 4.8% of adult females smoked (HNP; Health, Nutrition and Population, 2002).

A current smoker is defined as someone who has smoked a minimum of 100 cigarettes or more in a lifetime and has smoked within the past month (CDC, 2003). Secondhand smoke, known as environmental tobacco smoke (ETS), is a mixture of the side-stream smoke given off by the burning end of a cigarette, pipe or cigar and the smoke exhaled from the lungs of smokers. It is involuntarily inhaled by non-smokers (called passive smoking), lingers in the air, on carpet, floors, counters and other surfaces for hours after cigarettes have been extinguished and can cause or exacerbate a wide range of adverse health effects, including cancer, respiratory infections and asthma (California Envi-

ronmental Protection Agency, 2005).

Secondhand smoke has been classified by the Environmental Protection Agency (EPA) as a known cause of cancer in humans (Group A carcinogen). SHS exposure causes diseases and premature death in children and adults who did not smoke. SHS, also, contains hundreds of chemicals known to be toxic or carcinogenic, including formaldehyde, benzene, benzo [a] pyrene, 4-(methylnitrosamine)-1-(3-pyridyl)-1-butanone, vinyl chloride, arsenic, ammonia and hydrogen cyanide (The International Agency for Research on Cancer, 2002) (The Health Consequences of Involuntary Exposure to Tobacco Smoke, 2006).

The adverse health effects of exposure to SHS are now well-documented and established in various independent research studies and numerous international reports (Ontario Campaign for Action on Tobacco, 2007).

In a population survey, the prevalence of second-hand smoke exposures at work was 47.5% among non-smoking full-time workers compared with only 26% at homes. People exposed at work were 37% more likely to consult a doctor for respiratory illness (McGhee et al., 2000)

SHS causes approximately 3400 lung cancer deaths and 22,700 - 69,600 heart disease deaths in adult non-smokers in the developed countries every year (California Environmental Protection Agency, 2005).

Secondhand smoke can also aggravate allergies, trigger asthma attacks and migraine, and increase vulnerability to colds and other respiratory infection (American Lung Association, 2006).

A study found that non-smokers exposed to environmental smoke were 25 % more likely to have coronary heart disease compared to non-smokers not exposed to smoke (He et al., 1999) Moreover, non-smokers exposed to SHS at work are at increased risk for adverse health effects. Levels of ETS in public places, bars and restaurants were found to be 2-5 times higher than in residences with smokers and 2-6 times higher than in office workplaces (U.S. Department of Health and Human Service, 2002).

SHS is especially harmful to young children. It is responsible for between 150,000 and 300,000 lower respiratory tract infections in infants and children under 18 months of age, resulting in between 7500 and 15,000 hospitalizations each year, and causes 1,900-2,700 sudden infant death syndrome (SIDS) deaths in the United States, annually (California Environmental Protection Agency, 2005).

SHS exposure is also causally associated with stroke, low birth weight, spontaneous abortion, negative effects on the development of cognition and behavior, increasing menstrual pain, exacerbation of cystic fibrosis and cervical cancer (Ontario Campaign for Action on Tobacco, 2007).

Meconium analysis indicates that nicotine metabolite concentrations in infants of passive smokers are not significantly different from those in infants of active light smokers. Fetal exposure to tobacco smoke may therefore be substantial even as a result of maternal passive smoking (Ostrea et al., 1994).

SHS exposure may cause build up of fluid in the middle ear resulting in 700,000 - 1.6 million physician office visits/year (California Environmental Protection

Agency, 1997). It can also aggravate symptoms in 400.000 - 1 million children with asthma (California Environmental Protection Agency, 2005).

The Current Surgeon General's Report concluded that scientific evidence indicates that there is no risk-free level of exposure to secondhand smoke. Furthermore, short exposures to SHS can cause blood platelets to become stickier, damage the lining of blood vessels, decrease coronary flow velocity reserves, and reduce heart rate variability, potentially increasing the risk of heart attacks (The Health Consequences of Involuntary Exposure to Tobacco Smoke, 2006).

Cotinine is a metabolic by-product of nicotine which can be measured in serum, saliva and urine. Most cotinine is excreted by the kidneys into the urine, where it is concentrated about 10 times higher than it is in the serum. People who do not smoke or who are not exposed to other peoples' smoke should not have measurable cotinine. In urine, values between 11- 30 ng/mL may be associated with light smoking or passive exposure, while levels in active smokers typically reach 500 ng/mL (Foundation for Blood Research, 2007).

Aim of the work

This study aimed at: assessment of the knowledge, attitude and practices (KAP) of nurses about passive smoking as well as to compare nurses' KAP before and after health education setting.

Subjects and Methods

This intervention study was carried out during the period from the beginning of January 2006 to the end of June 2006, on nurses working in Menoufiya University hospitals (in-patient and out-patient clinics). Two hundred and seventeen nurses (mean duration of employment was 10.54 ± 3.48 years) with mean age of 37.9 ± 9.94 were chosen as a study group from all nurses in the hospitals (801 nurse). After exclusion of those who live with a smoker at home (husband, father or brother), the number of nurses was 236; however, the number of nurses who agreed to participate in this study was 217 nurse (response rate was 91.95%). The purpose of the study was explained to the manager of the hospital, and participation in the study was voluntary. A consent form was signed before sharing and all personal information collected was treated confidentially. The study was approved by the Ethics Review

Committee of Menoufiya University. All nurses were subjected to the following:

History taking through a pre-designed self-administered questionnaire including data about personal history (age, marital status and income), and detailed occupational history (duration of employment, name of the department, number of days worked/ month including night and day shifts and past occupations and their hazards). The questionnaire included questions about knowledge, attitude and practice towards secondhand smoking and its related health effects. Questions gave two choices (taking score of 1 and 2) providing that the correct answer takes 2 score and the wrong one takes 0 score. The scores of each of the questions for knowledge, attitude and practice were added together; scores above 75% mean satisfactory knowledge, positive attitude and correct practice where as scores below 75% mean unsatisfactory knowledge, negative attitude and incorrect practice.

A urine sample (10 ml) without preservatives, was collected from each nurse at the end of Thursday working shift for quantitative determination of urinary cotinine, which was assayed using the Cozart EIA cotinine urine kit M155 u1 (in ng/mL) (Buckley, 1979).

Health education setting, including information about SHS, its related health effects and how to protect oneself and improve others' health status by initiating smoking prohibition, supported by posters and hand-outs about SHS was applied to the nurses. The questionnaire and health education setting were applied at the work place, in a quiet room during the morning shift where the HE setting took about 10 minutes. After six months, the questionnaire about SHS was re-filled by each nurse and another urine sample was collected to determine the level of urinary cotinine (the same nurses were re-assessed with no failure rate).

Results

Most of the studied group were married (61.3%), the majority were nurses (83.4%), where as the rest were supervisors, working in the different hospital wards (71.1%).

Although 68.7% of the studied nurses reported that smoking is the single most preventable cause of death, many underestimated the risk of secondhand smoke when compared to other risks. Most of the studied nurses (88.5%) wrongly believed that health hazard of SHS are less than any other air pollution (table 2 and 3).

More than 90% have good knowledge that the heavy smoker is not the only one at serious health risk. Eighty six per cent of the studied group were greatly concerned if regularly exposed to SHS. Most respondent (95.9%) recognized that SHS could cause lung cancer, aggravate asthma (88.0%) and coronary heart disease (83.9%). Over half knew that SHS causes or contributes to stroke (65.9%), low birth weight (68.2%), neonatal deaths (61.8%) and increases menstrual pain (60.8%)(table, 2).

A high percentage (72.8%) were positive about their role and responsibility in delivering health education program. However, about 48.8% thought that HE about SHS should be limited to patient with smoking-related disease only. About half (47.9%) believed that only non-smoker health team could effectively deliver HE programs on SHS. More than half (65.8%)

think that smoking must be prohibited in offices, clinics and markets (table, 3).

Most of the studied group was exposed to SHS in the work place (88.0%). Only one fourth of the studied nurses said that they ask any smoker in their work place to stop smoking or to smoke outside (25.9%) (table, 4).

The intervention health education program, significantly, raised nurses' KAP about SHS ($P < 0.001$)(table, 5).

The mean value of urinary cotinine was significantly higher among those with negative attitude than those with positive one and among those with incorrect practice than those with correct one ($P < 0.05$) (table, 6).

Also, HE setting, significantly, reflected its effect by decreasing mean value of urinary cotinine level ($P < 0.05$)(table, 7).

Table (1): Socio-demographic characteristics of the studied group.

Socio-demographic characteristics	Studied Group (n = 217)	
	%	No
Marital status:		
Single	084	38.7
Married	133	61.3
Residence:		
Rural	106	48.8
Urban	111	51.2
Age in years:		
Mean±SD	37.9±9.94	
Duration of employment:		
Mean±SD	10.54±3.48	
Position:		
Nurse	181	83.4
Supervisor	036	16.6
Clinical practice area:		
ward	154	71.1
Outpatient clinic	041	18.8
Accident and emergency unit	022	10.1

Table (2): Knowledge of studied group about secondhand smoke before intervention.

Knowledge	Studied Group (n = 217)	
	No	%
Is smoking the most prevalent cause of death?		
Yes	149	68.7
No	068	31.3
Is heavy smoker the only one at serious health risk?		
Yes	020	09.2
No	197	90.8
Does regular exposure to SHS concern you?		
Yes	188	86.6
No	029	13.4
Health hazards of SHS:		
Lung cancer	208	95.9
Coronary heart diseases	182	83.9
Stroke	143	65.9
Aggravate asthma	191	88.0
Increase menstrual pain	132	60.8
Neonatal deaths	134	61.8
Low birth weigh	148	68.2

Table (3): Attitude of studied group about secondhand smoke before intervention.

Attitude	Studied Group (n = 217)	
	No	%
To which extent you believe that SHS is hazardous?		
Less than any other air pollutant	192	88.5
Similar or more than any other air pollutant	025	11.5
Do you think that you have any responsibility towards SHS control?		
Yes	158	72.8
No	059	27.2
Do you think that health education program should be limited to:		
Patients with smoking-related illness	106	48.8
All smokers	022	10.1
All community members	089	41.0
In your belief, who could effectively deliver health education programs?		
Non-smoker health team	104	47.9
Smoker health team	067	30.9
Both	046	21.2
Do you think that smoking must be prohibited in:		
Offices	024	11.1
Clinics	037	17.1
Markets	013	06.0
All	143	65.8

Table (4): Practice of studied group about secondhand smoke before intervention.

Practice	Studied Group (n = 217)	
	No	%
Were you ever exposed to SHS in your work place?		
Yes	191	88.0
No	026	12.0
Did you ask the smoker to stop smoking or to smoke outside?		
Yes	056	25.9
No	161	74.1

NB: None of the nurses was a smoker or received any health education programs about SHS.

Table (5): Comparison of knowledge, attitude and practice of studied group about secondhand smoke before and after health education setting.

Item	Pre-intervention (n= 217)		Post-intervention (n= 217)		X2	P-value
	No	%	No	%		
Knowledge:						
Satisfactory	164	75.6	204	94	28.59	<0.001
Unsatisfactory	053	24.4	013	06		
Attitude:						
Positive	118	54.4	187	86.2	52.52	<0.001
Negative	099	45.6	030	13.8		
Practice:						
Correct	056	25.8	198	91.2	191.41	<0.001
Un-correct	161	74.2	19	08.8		

Table (6): Relation between mean value of urinary cotinine and knowledge, attitude and practice of the studied group before intervention.

Item	Urinary cotinine (ng/mL) Mean± SD	t -test	P-value
Knowledge:			
Satisfactory (n= 164)	16.61 ±2.31	1.84	>0.05
Unsatisfactory (n = 53)	17.24 ±1.62		
Attitude:			
Positive (n = 118)	17.51±1.98	2.59	<0.05
Negative (n = 99)	18.22±2.05		
Practice:			
Correct (n = 56)	17.25±2.41	2.27	<0.05
In-correct (n = 161)	18.04±2.18		

Table (7): Mean value of urinary cotinine among studied group.

Item	Pre-intervention (n= 217) Mean±SD	Post-intervention (n= 217) Mean±SD	Paired t test	P-value
Urinary cotinine (ng/mL)	18.14±2.08	13.30±1.42	28.65	<0.001

Discussion

To our knowledge, this is the first study on KAP related to SHS among nurses in Menoufiya hospitals. It was not surprising that most of the studied group had never smoked and had general knowledge about SHS, but did not recognize the great risk of SHS when compared to other types of air pollution.

The level of knowledge of the studied nurses about secondhand smoke and its health hazards was good specially for lung cancer, coronary heart diseases and aggravating asthma. This finding was in agreement with Chan et al. (2007) who reported that Chinese nurses had some general knowledge about smoking and health as well as smoking-related diseases.

Regarding attitude, about 73% of the studied nurses were positive about their role and responsibility in delivering smoking health education interventions. This was similar to the finding observed among Chinese nurses by Chan et al. (2007) that about 71.5- 96.9% of the studied nurses had the same positive attitude. As all of the studied group were non-smokers, this supported the finding reported by Sarna et al., (2000) that being a smoker, negatively affected your tobacco attitude. Despite this

positive attitude, and although 68.7% of the studied nurses reported that smoking is the single most preventable cause of death, many (88.5%) underestimated the risk of secondhand smoke when compared to other risks. Chan et al. (2007) found that 79.6% of the studied nurses, wrongly, thought that staying in a room with asbestos had the same health risk as staying in a room where many people smoked and 48.2% agreed that health hazards of smoking were similar to those of alcohol drinking.

Also, 48.8% of the studied nurses believed that intervention health education programs should be limited to patients with smoking-related diseases. A lower percentage of about 40% was observed between Chinese nurses by Chan et al. (2007). This may be attributed to partial awareness of the nurses' responsibility to provide appropriate intervention to all smokers in healthcare settings regardless of whether they have or have not contracted the obvious smoking-related diseases (Fiore et al., 2000).

As regards nurses' practice towards SHS, 88% reported that they were exposed to SHS in their workplace; however, only 26% asked the smoker to stop smoking or to smoke outside and 0% had received any

HE programs about SHS. In the United States, nurses asked about the smoking status of the patients more frequently, but few engaged in interventions (Sarna et al., 2000 and Borrelli et al., 2001). This was opposite to the finding in Hong Kong by Fiore et al. (2000) and Tsung (2002) and in China by Chan et al. (2007) who found that nurses tended more to perform interventions related to advising patients or visitors to quit smoking. This may be attributed to inadequate content and time spent on active and passive smoking health effects in the curricula of the schools of nursing in Egypt as they are in the USA (Hornberger C.A., and Edwards, 2004 and Wewers et al., 2004). Also, insufficient preparation in providing smoking health education interventions during their nursing education could be one of the main barriers preventing nurses from such practice as well as lack of education about SHS among nurses (Lancaster et al., 2000).

As the attitude of the studied nurses was not so good it was accepted to show this poor practice according to the previous research in western countries which has shown that nurses' attitude was significantly related to smoking HE practice (Borrelli et al., 2001 and Johnston et al., 2005).

Intervention health education setting significantly raised the KAP of the studied nurses regarding SHS. This finding agrees with Chan et al. (2007) who reported that the nurses with smoking intervention programs, showed significantly higher KAP than those without. Also, it was reported that, as tobacco companies are actively targeting developing countries with advertisement to increase tobacco consumption, nurses who have good knowledge and positive attitude about passive and active smoking have tremendous power to support a comprehensive approach to prevent and reduce tobacco use and SHS exposure as well (Sarna et al., 2000). It was found that the mean value of urinary cotinine was significantly higher among those with negative attitude than those with positive one and among those with incorrect practice than those with correct one ($P < 0.05$). This is concordant with Thaqi et al. (2005) who found that passive smoking significantly raised the urinary cotinine level. Also, urinary cotinine level post-intervention was significantly lower than before intervention which may be due to improving the nurses' practice towards SHS after the HE setting by asking smokers in the workplace to smoke outside and therefore, decreasing passive smoking exposure .

Conclusion

The studied nurses at Menoufiya university hospital had general knowledge about smoking and secondhand smoke, however their attitude was not so good with poor practice towards SHS. An intervention health education setting, significantly, raised the nurses' KAP and decreased the mean urinary cotinine level.

Recommendations

Nurses, the large group of health professionals, who are all predominantly non-smoker, can act as catalysts to curb the tobacco epidemic by providing excellent KAP about SHS. Improving nursing education curricula with inclusion of SHS will necessary increase the number of nurses prepared to deliver effective smoking HE interventions. Strict enforcement of the legislations and policies that restrict and forbid smoking in public places will ensure a smoking free environment. Further studies are needed to highlight the effect of improving nurses' KAP about SHS on improving community health status.

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