Original Article

Smoking and Pregnancy: Where are we now? An Update of the Situation in Greece

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Abstract

Background: Active and passive smoking during pregnancy cause a plethora of complications not only to pregnant women, but to the embryos as well. Pregnancy is a period where the prevalence of successful smoking cessation is high, yet certain aggravating factors and barriers which prevent women from quitting smoking during pregnancy have also been identified.
Aim: The aim was to study the psycho-social factors which affect women's smoking status during the period of pregnancy.
Methodology: The study was based on the completion of a specifically developed questionnaire. The sample consisted of 1100 pregnant women from three maternity hospitals in Greece.
Results: The main predictive factors for smoking cessation were found to be: the depressive attitude, the level of addiction to nicotine, the support received from the partner and family in the attempt to quit smoking, the smoking status before the pregnancy. Other factors included the premises where pregnant women smoked the most cigarettes, their intention or not to consult a smoking-cessation center, their working hours, the way they had been receiving information about smoking and finally its direct effects on pregnancy being present or not.
A 46.73% of pregnant women declared being smokers in the beginning of their pregnancy and 17.55% of them continued to smoke throughout their pregnancy. The change in the smoking status during pregnancy was found to have a statistically significant difference ($p=0.015$) among women of different age groups. The x^2 test showed that the more pregnancies the women had gone through, the less the percentage of smoking cessation ($p<0.001$). It was also shown that the marital status is also related to the smoking status of women during pregnancy ($p<0.001$). Women with mild depression had the highest success rate in smoking cessation (23.5%).
Conclusions: Smoking is a major health issue in Greece, thus the prevalence of smoking during pregnancy is considerably high. The results of this study therefore have a significant impact on detecting and predicting the smoking status of pregnant smokers throughout their pregnancies. With this data, healthcare professionals - especially midwives - can be aided towards implementing their smoking cessation programs in a more accurate way.

Key - words: Pregnancy, smoking, passive smoking, predictive factors

Background

According to the bibliography, the prevalence of smoking during pregnancy varies among different regions. On a global scale however, about 15-20% of pregnant women will continue to smoke throughout pregnancy (Colman and Joyce, 2003; Services, 2006). In Greece, the prevalence of smoking at the beginning of a pregnancy, according to a recent study, is 36% - out of which 17% - will continue to throughout pregnancy (Vivilaki *et al.*, 2016). The prevalence of smoking during pregnancy, despite getting lower and lower over the years, continues to be considerable regardless of the fact that pregnancy is actually the period of time in life with the highest successful smoking cessation rates. Nevertheless, Quitting smoking is difficult as results in unpleasant physical symptoms and mental or psychological symptoms including, difficulties in concentration, anxiety, anger, insomnia, irritability and aggression (Mc Even et al., 2006, Tzenatis & Sotiriadou, 2009). Moreover it is worth to stress that when a non-smoking partner encourages a smoker to quit smoking, then smoker's habit is affected regarding the hours of the day in which smoke more cigarettes(Georgiadou et al., 2015).

Several factors which affect the effort, as well as the success of smoking cessation have been detected. Some of these factors include women's parity (the number of liveborn children that have already been delivered), the level of education, the presence of a smoking partner or other close family member, the level of nicotine addiction, as well as certain sociodemographic characteristics, such as the marital status, the age, working with shifts and under stress, alcohol consumption, depression and general stress levels (Woodby *et al.*, 1999; DiClemente, Dolan-Mullen and Windsor, 2000; Ebert and Fahy, 2007, Tzenalis & Sotiriadou, 2009).

Expecting the same results on this study as well, certain demographic and psychosocial factors which affect the smoking status of pregnant women could be determined and certain supportive interventions performed by healthcare professionals specialized in smoking cessation can be put forward, in order to aid pregnant smokers quit and thus provide a smoke-free environment to the fetus and to the whole family.

Active and passive smoking during pregnancy are undeniably the leading preventable causes for a plethora of unfavorable pregnancy outcomes and continue to be a major public health concern (Coleman *et al.*, 2015; Holbrook, 2016). The effects of smoke to the fetus itself can even be revealed during childhood and will continue to have an impact on their health well into adult life (Holbrook, 2016). 15%-20% of all pregnant women will continue to smoke during pregnancy and 60%-80% from those who manage to quit during pregnancy will relapse within 6 months to one year after delivery (Colman and Joyce, 2003; Ripley-Moffitt *et al.*, 2008; Chamberlain *et al.*, 2013).

Quitting smoking will definitely yield a significant benefit, yet it might not be a total solution by itself as many pregnant women will continue to be exposed to tobacco smoke from other smokers around them in second-hand smoking environments (Salihu and Wilson, 2007; Vardavas *et al.*, 2010). Many mothers even prefer not to breastfeed their newborns in order to resume smoking. Smoking in pregnancy has decreased by 60-75% 7 in high-income countries but is still increasing in low to middle income countries, thus it is being strongly associated with poverty (Salihu and Wilson, 2007; Chamberlain *et al.*, 2013).

The reduction and the cessation of active and passive smoking during pregnancy are two of the most significant interventions that can be employed by healthcare professionals in order to lower the risk factors of adverse birth outcomes. Healthcare professionals should therefore be trained to use the various efficient methods of smoking cessation such as cognitive behavioral therapy, motivational interviewing and the 5 A's approach in order to achieve a higher percentage of smoking cessation among pregnant smokers (Trofor *et al.*, 2018).The factors that act as barriers to smoking cessation during pregnancy have not actually been studied so far in a sample of pregnant women in Greece. The aim of our study was to examine these factors.

Research questions and hypothesis

The particular study aims at responding to the following research questions:

1. Does the level of addiction to nicotine and alcohol consumption affect the smoking status of women during pregnancy? / Does the level of addiction to nicotine affect the success of smoking cessation during pregnancy
2. Does depression affect the smoking status of women during pregnancy?
3. Which other factors are related to the smoking status during pregnancy?
4. Which factors affect the knowledge and beliefs of pregnant women towards smoking?

The respective null hypotheses of this study:

1. The level of nicotine addiction does not affect the smoking status during pregnancy, nor does it affect the success of smoking cessation during this period.
2. Neither depression, nor alcohol consumption affects the smoking status of pregnant women.
3. The smoking status during pregnancy is not affected by psychosocial factors.
4. The knowledge and beliefs of the pregnant women about smoking do not affect their smoking status.

Methodology

Instruments and psychosocial scales: A self-administered questionnaire was developed to collect socio-demographic data from women on their employment status, ethnicity, age and level of education. The included questions were created based on international literature data. The women's reproductive history was also recorded, including the history of previous miscarriages, family planning and antenatal complications, attitudes toward smoking, perceived health risk, smoking history, smoking volume (before and during the index pregnancy) and exposure to passive smoking during the particular pregnancy. In addition to the regular questions, our questionnaire also included a set of three self-report scales, with the aim of assessing the addiction to nicotine, the alcohol consumption, as well as the depressive symptomatology during the pregnancy period. The respective 3 scales were the following:

The AUDIT-C assessment tool: The AUDIT-C assessment tool (Alcohol Use Disorders Identification Test), is a 3 item self-report alcohol screen which is used to identify alcohol consumption and alcohol abuse or dependence. It is a short version of the 10 item AUDIT instrument (Babor *et al.*, 2001; Health, 2010). This tool allows the healthcare professionals to assess alcohol consumption in an easy, non-critical way. The total score received from the tool provides an indication of the risks that the women and their embryos might face. Therefore the submission of an Audit-C's questionnaire can be the trigger for the start of a briefing and intervention by a healthcare professional towards the use of alcohol during pregnancy (Behnke and Smith, 2013; Smith *et al.*, 2014).The AUDIT-C tool has been validated for use on pregnant women (Dawson *et al.*, 2005) and is recommended for quickly identifying and assessing alcohol consumption during pregnancy - more specifically how often and much alcohol is consumed by a pregnant woman. Depending on the answers given and the score of the tool, the proper consultation and intervention to be taken is decided

The Fagerstrom Test for Nicotine Dependence (FTND): The FTND is a six item self-report test revised in 1991 from the original 8 questions scale (HEATHERTON *et al.*, 1991). The Fagerstrom test is available in many languages and is therefore used in many countries. It is considered a reliable tool for the assessment of nicotine addiction during pregnancy (Ma *et al.*, 2017). Nicotine addiction is the main reason smokers are having difficulty to quit and cannot resist continuing to smoke (Benowitz, 2017). Assessing the level of nicotine addiction is therefore important to healthcare professionals towards creating an intervention plan for the pregnant smoker and towards possibly referring her to a smoking cessation clinic. It is the first time that the FTDN is used in a sample of pregnant women in Greece.

The Greek version of the Fagerstrom instrument used in this study demonstrated a marginally acceptable consistency (Chronbach's alpha = 0.687). The analysis showed consistencies which ranged from 0.27 to 0.62 and are considered marginally acceptable to very acceptable.

Beck Depression Inventory (BDI I-A): The Beck Depression Inventory BDI I-A is a 21 item self-report scale, consisting of statements describing the depressive and anxiety symptoms experienced during the last 7 days. It is a revised version of the original 1961 inventory which is aimed at assessing depression (Beck, 1961). High BDI I-A scores could identify women with

a low mood or depression. It is the first time that the BD I-A is used in a sample of pregnant women in Greece. The final scoring is done by adding the individual scores from the 21 statements. Depending on the final score for each pregnant woman, her depressive symptomatology is evaluated.

The Greek version of the BDI I-A instrument used in this study was validated and it demonstrated high internal consistency (Chronbach's alpha = 0.83). The analysis showed consistencies which ranged from 0.11 to 0.58 and are considered marginally acceptable to very acceptable.

Setting, sampling and target population: Women were considered eligible to take part in the study if they met the following criteria: (1) aged more than 16 years old; (2) fluent in spoken and written Greek; (3) able and willing to provide informed consent; (4) illegal substance misuse; (5) not recorded depression.

Participants and data collection: A total of 1100 women were identified as eligible based on the inclusion criteria in the three maternity units (Fig. 1). The midwife-researcher (AD) ensured there was a balance in recruitment using a calendar to recruit participants across different shifts and days of the week. More specifically, the women were recruited on a one-day a week basis in all sites (i.e. first week on a Monday, the following week on a Tuesday, the week following that on a Wednesday, etc.). This technique was employed in order to avoid bias associated with possible seasonality of smoking habits. Each recruitment day was split into three shifts (8 a.m., 4 p.m., 12 a.m.). This ensured the reduction of possible bias related to the time of smoking.

The research ethics boards of hospitals approved the study. All participants provided written informed consent prior to enrolment. Included with the questionnaires was a cover letter explaining the purpose of the study, providing the researchers' details and contact information, and clearly stating that all answers would be confidential and no names would ever be used in any reports presenting the study findings. Women were also encouraged to discuss any concerns they had about their smoking status with the research midwives. In these cases women were informed about smoking adverse effects on pregnancy and they were also informed about the smoking cessation clinics that they can be referred if they wished to quit. All participants were informed verbally by the midwives researchers about smoking cessation services available in the hospital system to support them.

Data analysis: A statistical analysis was performed using IBM-SPSS 24 (Statistical Package for Social Sciences). The descriptive characteristics were calculated for the socio-demographic variables. The assumptions of normality, homogeneity and independent cases of the sample were checked by Kolmogorov-Smirnov test. We used chi-squared tests, student's t-test, Anova test, reliability coefficients, as measured by Cronbach's alpha, were calculated for the Fagerstrom and Beck questionnaires in order to assess reproducibility and consistency of the instrument; and the internal consistency of the questionnaire was also tested using Kaiser-Meyer-Olkin (KMO). Multiple regression analysis was also performed.

Results

Sample characteristics

Of the 1288 women initially approached, 1100 consented to take part in the study, a participation rate of 85.4 % (Fig. 1). The women had a mean age of 31 years, a mean height of 1.65 cm, a mean weight of 64 kilos and a mean gestation period of 32 weeks. For 73.7% of the pregnant women, it was their first pregnancy and for 56.7% of the women an expected pregnancy. Also 61.5% of the sample did not undergo IVF.

The Socio-demographic characteristics are shown in Table 1. 46.73% of the participants were smokers at pregnancy commencement. In total, 82.45% of the sample reported being smoke-free during pregnancy (Figure 2). Among tobacco users, 70.5% tried to quit. 29.18% of women had quit during pregnancy and 17.55% of the participants continued to smoke during pregnancy. Among women who did not stop smoking during pregnancy, 53.8% claimed that they could not stop smoking, another 5.4 % stated that they did not want to stop smoking and 10.8% of women claimed that they considered smoking cessation was not an important health issue for them. The smoking status of the partner was associated with an increased likelihood for

the woman to continue to smoke throughout her pregnancy ($p<0.001$).

Whether or not a pregnancy was desired and planned, was not a factor that seemed to affect the willingness of pregnant smokers to quit, as it was shown in our study (Table 1).

It was also shown that 20.7% of smokers who had suffered complications in a previous pregnancy continued to smoke during their current pregnancy, compared to 39.9% of smokers who had not had complications in previous pregnancies - a difference with a statistical significance of ($p=0.050$).

Depressive symptoms and smoking status

Women who did manage to quit smoking during pregnancy has a statistically significant lower BDI score, compare to those who continued to smoke throughout pregnancy ($p=0.041$). From the opposite perspective, the women with the higher BDI scores and the higher FTDN scores (nicotine addiction) were also the ones who continued to smoke throughout their pregnancies. The difference was statistically significant ($p=0.019$).

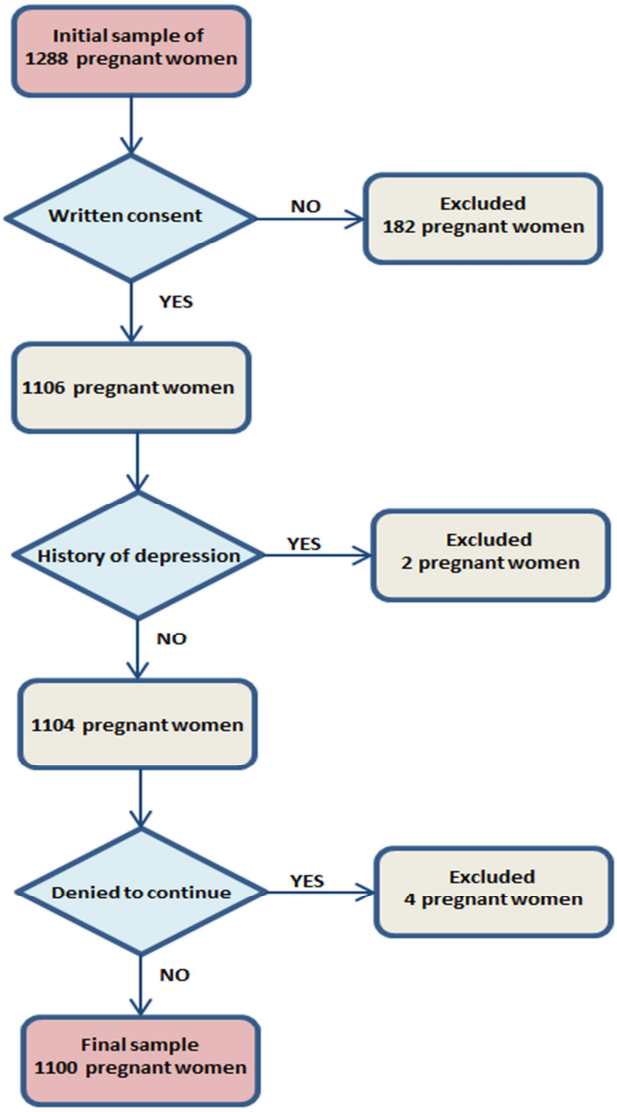

Figure 1: Study flow chart

Alcohol consumption and smoking Status

According to our study, 58.2% of the pregnant women consumed alcohol before pregnancy, while during pregnancy there was a radical decrease in this percentage down to 11%. It was therefore shown that during pregnancy only about 1 out of every 10 pregnant women consumed alcohol.

This radical decrease was also confirmed by the paired t-test as statistically significant ($p<0.001$). Furthermore, the x^2 test did not reveal any statistically significant difference in the percentages of the women who smoked or quit smoking during pregnancy, in relation to their alcohol consumption ($p=0.759$), meaning that there was no real correlation between the smoking status and the alcohol consumption during pregnancy.

Maternal health behavior and attitude regarding smoking

Fetal health was a critical reason for pregnant women to quit smoking, and most of the participants who quit chose to do this when they found out they were pregnant. 45.4% of women tried to reduce or quit smoking because of their pregnancy. A small proportion of women (2.6 %) reported that they did not understand that smoking was not recommended during pregnancy because of the high level of risk to fetal health.

As it was observed from our study, the smokers who had the highest level of knowledge around smoking in general, were also the ones who managed to quit. The women that were not smoking neither before, nor during their pregnancy had the highest mean knowledge on the effects of passive smoking - followed by the women who did smoke before their pregnancy but eventually managed to quit. Regarding their exposure to passive smoking, the women who were not smoking and those who managed to quit, refrained the most from getting exposed to passive smoking with a statistical significance of $p<0.001$, compared to those who continued smoking during pregnancy.

The women who smoked only outside the house had the highest percentage of smoking cessation (>60%) ($p<0.001$). On the other hand, 69% of those who smoked both outside and inside the house also continued to smoke during pregnancy. Furthermore, 66.6% of the smokers stated that they had not been adequately supported by their partners in their attempt to quit smoking and 28% stated having been exposed to passive smoking by their partners, in addition to not having received support - a percentage that is quite high.

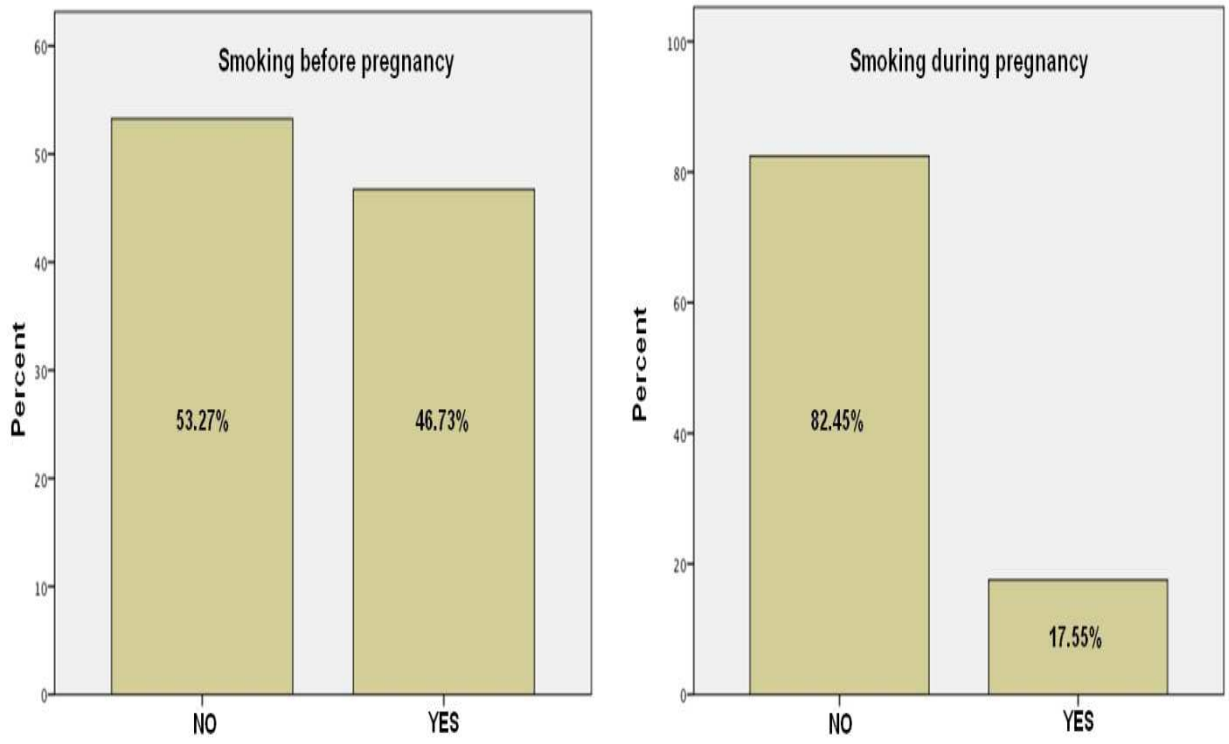

Figure 2: Smoking prevalence before and during pregnancy

Table 1: Characteristics of the sample

		Smoking status during pregnancy		P value
	All Women No (%)	**Smoking No (%)**	**Non smoking No (%)**	
Age				0.015
16-20	11(1.01)	5(45.5)	6(55.5)	
21-30	304(27.92)	67(22)	237(78)	
31-40	719(66.02)	105(14.6)	614(85.4)	
>40	55(5.05)	11(20.0)	44(80.0)	
Nationality				**0.186**
Greek	1012(92.0)			
Other	88(8.0)			
Education				<0.001
Primary school	11(1.0)	5(45.5)	6(55.5)	
Middle school	31(2.8)	15(48.4)	16(51.6)	
High School	290(26.7)	68(23.4)	222(76.6)	
University/ College	496(45.6)	79(15.9)	417(84.1)	
MSc	236(21.7)	19(8.1)	217(91.9)	
PhD	24(2.2)	3(12.5)	21(87.5)	
Work Status				0.007
Public Sector	155(14.2)	144(92.9)	11(7.1)	
Private Sector	532(48.7)	436(82)	96(18.0)	

Self-Employed	134(12.3)	112(83.6)	22(16.4)	
Housewife	93(8.5)	69(74.2)	24(25.8)	
Unemployed	161(14.7)	126(78.3)	35(21.7)	
Student	17(1.6)	16(94.1)	1(5.9)	
Gravida				<0.001
Primigravida	811(73.7)	118(14.5)	693(85.5)	
Multigravida	289(26.3)	67(23.2)	222(76.8)	
Marital Status				<0.001
Married	908(82.5)	124(13.7)	784(86.3)	
Single	165(15.0)	57(34.5)	108(65.5)	
Divorced	11(1.0)			
Widow	3(0.3)			
Pregnancy				0.079
Planned	624(56.7)	96(15.4)	528(84.6)	
Unplanned	442(53.3)	91(20.6)	351(79.4)	
In Vitro Fertilization (IVF)				0,309
Yes	32(4.5)	2(6.3)	30(93.7)	
No	677(95.5)	107(15.8)	570(84.2)	

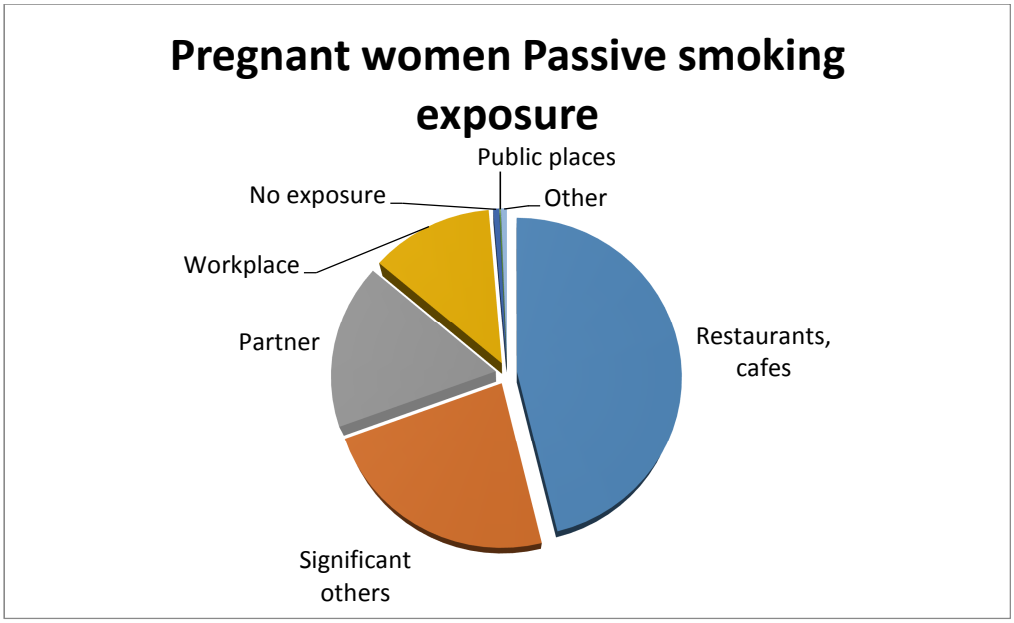

Figure 3: The exposure to passive smoking of pregnant women

Education and attitude regarding smoking

A statistically significant difference (p=0.027) was also observed among the smoking cessation success rates and the level of education the women had received. More specially the highest success rate was observed on BSc level graduates (48,7%), closely followed by MSc level (44.4%)

and High school graduates (44,3%), then followed by Primary school (25%) and ultimately middle school graduates (19%).

Passive smoking

Figure 3 shows the exposure of the participants to passive smoking. 28.8% of participants lived with a partner who smoked; 39.8% of the participants lived with relatives who smoked; 21,4% were exposed to smoke in their work environment; 79,5 % reported being regularly exposed to second hand smoke in restaurants and cafes.

Regression analysis

A linear regression on the data of our study was executed, with the smoking status being the dependent variable (no change, cessation, starting during pregnancy) and the independent ones being the following: Where do you smoke the most cigarettes, will the banning of smoking is public places cause you to smoke less cigarettes, would you intent visiting the smoking cessation clinics, what are your working hours, are you informed about the dangers of smoking in pregnancy, how did you obtain information about smoking in pregnancy, do you think the new cigarette packs will affect your smoking status, please describe who informed you, do you refrain from visiting places where you get exposed to passive smoking.

The model was statistically significant and the factors that predicted the smoking status were the following: (1) Where do you smoke the most cigarettes, (2) would you intent visiting the smoking cessation clinics, (3) What are your working hours, (4) How did you obtain information about smoking in pregnancy.

Discussion

Our study has identified that the prevalence of tobacco use among the pregnant women sampled was very high, being in line with the high rates of the general population of women in Greece in the same age range (52.9%) and that of women aged 18–36 smoke in Greece as reported in a recent study (Filippidis *et al.*, 2011). Another criterion that we took into account and on which there was also a statistically significant difference, was the smoking status of the partner (Leonardi-Bee, Britton and Venn, 2011; Lai *et al.*, 2013).

Table 2: Linear regression analysis

Model		Unstandardized Coefficients		Standardized Coefficients			95,0% Confidence Interval for B	
		B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
1	(Constant)	1.985	0.953		2.082	0.059	-0.092	4.062
	Where do you smoke the most cigarettes	-0.417	0.190	-0.408	-2.190	0.049	-0.831	-0.002
	will the banning of smoking is public places cause you to smoke less cigarettes	0.300	0.313	0.150	0.961	0.356	-0.381	0.982
	would you intent visiting the smoking cessation clinics	0.924	0.382	0.357	2.417	0.032	0.091	1.758
	what are your working hours	0.230	0.059	0.521	3.887	0.002	0.101	0.358
	are you informed about the dangers of smoking in pregnancy	-0.664	0.375	-0.228	-1.770	0.102	-1.481	0.153

how did you obtain information about smoking in pregnancy	1.917	0.000	0.501	3.316	0.006	0.000	0.000
do you think the new cigarette packs will affect your smoking status	-0.292	0.285	-0.143	-1.023	0.326	-0.913	0.329
please describe who informed you	0.399	0.247	0.279	1.612	0.133	-0.140	0.937
do you refrain from visiting places where you get exposed to passive smoking	-0.284	0.303	-0.142	-0.939	0.366	-0.944	0.375

Previous studies which have investigated smoking in pregnancy have also reported that women who did not quit smoking during their pregnancy typically had family members, who were smokers, had partners who smoked, or lived with relatives who smoked (Haslam and Draper, 2001; Lai *et al.*, 2013). Partners play an important role in influencing women's smoking behavior in the perinatal period, and their support can be an important facilitator to quitting (El-Mohandes *et al.*, 2010; Leonardi-Bee, Britton and Venn, 2011; Lai *et al.*, 2013). A partner who continues using tobacco throughout a woman's pregnancy is a significant predictor of the current smoking status of the pregnant woman (El-Mohandes *et al.*, 2010; Leonardi-Bee, Britton and Venn, 2011; Lai *et al.*, 2013).

Moreover, passive smoke exposure during pregnancy has also been shown to have adverse effects on fetal health (Leonardi-Bee, Britton and Venn, 2011). (Mantziou *et al.*, 2009; El-Mohandes *et al.*, 2010; Leonardi-Bee, Britton and Venn, 2011; Wagijo *et al.*, 2017). In our study, despite the high level of awareness that pregnant smokers generally demonstrated about risks to the health of their infants as a consequence of their reluctance to quit smoking, only one third of participants were successful in quitting (Lai *et al.*, 2013). Based on our findings, even in cases where women managed to quit smoking or reduce smoking in pregnancy, they continued to be exposed to second-hand smoke (Mantziou *et al.*, 2009; El-Mohandes *et al.*, 2010; Leonardi-Bee, Britton and Venn, 2011; Lai *et al.*, 2013; Wagijo *et al.*, 2017). In line with previous study findings, our study also found that the two most prominent factors influencing the exposure of women to passive smoking were dining at restaurants (79.5%), having friends who smoked (38.9%) and having a partner who smoked (28.8%). Having a partner who does not smoke or who quits when the woman becomes pregnant is clearly of benefit to support a pregnant women's attempts to avoiding passive smoking (Mantziou *et al.*, 2009; El-Mohandes *et al.*, 2010; Leonardi-Bee, Britton and Venn, 2011; Lai *et al.*, 2013; Wagijo *et al.*, 2017).

In our study, the benefits to infant health was the second most critical reason for pregnant women to quit (45.4%). Specifically, most of the quitters in our study stopped smoking as soon as their pregnancy was confirmed. It has previously been found that specific psychosocial interventions targeting smoking cessation can increase the number of women who stop smoking in pregnancy (Chamberlain *et al.*, 2013). It is therefore essential that pregnant women, their partners and close relatives are educated on the health risks of active and passive smoking (Mantziou *et al.*, 2009; El-Mohandes *et al.*, 2010; Gharaibeh *et al.*, 2011; Leonardi-Bee, Britton and Venn, 2011; Lai *et al.*, 2013; Wagijo *et al.*, 2017). Moreover, the parents' social support network, including close family members should be involved in supporting smoke-free environments in spaces shared by the newborn. Strategies for successfully engaging families during the perinatal period should be adopted by midwives.

Almost all women in our study believed both that smoking is harmful during pregnancy (97.4%), and that smoking affects the embryo (95%). The

vast majority (87%) also knew that their smoking will affect the embryo's later life as a child and as an adult. Finally, 86.6% of the women considered passive smoking to also be affecting the embryo. The fact is however that nicotine addiction is so strong that knowledge by itself ends up not being a good enough motivating factor to quit – contrary to what happens with alcohol consumption (Ystrom, Vollrath and Nordeng, 2012).

Recent studies have reported a number of psychosocial differences between smokers and non-smokers during pregnancy and the postnatal period (Ebert and Fahy, 2007; Hauge, Torgersen and Vollrath, 2012; Maxson *et al.*, 2012). In our study, women who smoked had significantly higher levels of depressive symptoms than nonsmokers as assessed using the Beck Inventory I-A scale. Maternal anxiety and stress may inhibit smoking cessation during pregnancy and promote a relapse after pregnancy in women who have achieved abstinence (Hauge, Torgersen and Vollrath, 2012). Smoking cessation is correlated with depressive symptomatology and should be supported under medical guidance among those smokers who are identified as having mental health symptoms.

This study had some limitations which should be considered. First, maternal smoking status was assessed based on self-report and without any further clinical assessment. Secondly, we did not follow women up beyond the postnatal period to assess if pregnant quitters returned to active smoking. Moreover, only women who had access to the particular three maternity hospitals where the study was conducted were able to take part and were counselled about smoking cessation support services offered. As this was a study relevant to perinatal smoking cessation services in Attica Greece, findings may not be not applicable to countries where perinatal smoking cessation services have already been implemented. Finally, as only sociodemographic and perinatal variables were assessed as potential confounding factors it is possible that there are other biological and environmental confounding variables which were not detected in this study.

Conclusion

Considerably high rates of tobacco use were reported during pregnancy. The majority of the subjects chose to quit smoking, yet they were still getting exposed to high levels of passive smoking. The marital status, the places where the pregnant women were used to smoke and the support that they had received from their partners and their significant others to quit smoking during pregnancy were the three critical prognostic factors for the anti-smoking behaviors of pregnant women in the study sample. Our data supports the importance of ensuring that pregnant women, their partners and close relatives are educated on the health risks of active and passive smoking and how these could have an adverse effect on birth and other unfavorable outcomes on infants. Only smoke-free environments sufficiently promote perinatal health for the mother and the newborn(s). There is finally, an emerging need to highlight the international aspects of this critical public health issue.

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