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Original article

Determinants of tobacco use among youths in Isfahan, Iran

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Summary

Objective: To determine potential factors that may result in motivating the youths to adopt smoking behaviour
Method: This cross-sectional study was conducted on 210 smoking and 217 non-smoking youths, aged 12–20 years.
Results: The average age of starting cigarette and water pipe smoking was 14.5 ± 2.4 and 11.2 ± 1.5 years, respectively. The first experience with water pipe occurred mostly in the traditional teahouses for girls (54.8 %), and in family parties (48.2 %) for boys. In both genders, the first place of cigarette smoking was at friends' parties (56.8 % for boys, and 52.1 % for girls) and then followed by traditional teahouses (43.2 % for boys, and 47.9 % for girls). The most common reasons youths have picked up cigarette smoking were mainly to attract attention from friends, family inattention and poverty. Meanwhile, nearly all water pipe smokers reported using it for fun. The strongest predictors of smoking among boys were respectively father's occupation, having a smoking mother, and the number of smoking peers, whereas among girls, these factors were respectively having a smoking mother, frequenting traditional teahouses, and the number of smoking peers. Lower education of fathers and divorce among parents increased the probability of smoking in both genders, especially girls. School/work failure, as well as troubled relationship with parents and siblings were the other significant predictors of smoking in both genders, notably in girls.
Conclusion: Public health control measures should be adopted not only to curtail cigarette use, but also to address water-pipe use. Preventive measures should be regarded as a high priority for socio-economically disadvantaged families.

Keywords: Smoking – Determinants – Youths - Water pipe – Gender.

Smoking is considered a major preventable cause of morbidity and mortality, causing over four million deaths a year (Murray & Lopez 1997). This figure is forecast to increase to 10 million deaths per annum by 2030; 70 % of which will be in developing countries (Centers for Disease Control and Prevention 1999). If the present smoking pattern observed in the world continues, lifetime tobacco use will result in the deaths of 250 million children and young people alive today, mostly in developing countries (Peto et al. 1994). Numerous studies have indicated that both in developed and developing countries the prevalence of smoking is increasing in youths, while the age of smoking initiation is decreasing (Weiss et al. 2006). However, developing countries have reported a more rapid rise in the prevalence of tobacco consumption among the youth than developed countries (Peto et al. 1994; Mackay &Crofton 1996).

It seems that in many countries, including Iran, a substantial percentage of smokers begin this behaviour before the age of 18 (Sarraf-Zadegan et al. 2004); this is associated with engaging in multiple health-risk behaviours (Durant et al. 1999). Nevertheless, in many nations, especially in developing countries, little information exists on the extent of this behaviour among youths, as well as on factors which encourage them to start smoking for the first time (The Global Youth Tobacco Survey Collaborative Group 2002).

Researchers have investigated this multi-factorial phenomenon revealing various individual and environmental correlates of youth tobacco use onset. These variables have included age, gender, ethnicity, race, family structure, attachment to family and friends, personal and parental socio-economic status, school factors, lifestyle, stress, self-esteem and other personality characteristics, knowledge and attitudes, and parental and peer smoking (Piko 2001; Ma 2003).However, there exist some discrepancies in the literature regarding to what extent each influential variable contributes to the first experimentation of smoking by youths. These disparities are more prominent

when demographical and cultural diversities in different countries are taken into account (The Global Youth Tobacco Survey Collaborative Group 2002; Ma 2003; Steptoe et al. 2002).

Iran has adopted many tobacco control measures. Since the 1990s, smoking is prohibited in all roofed public places, public transportation vehicles and workplaces. Tobacco advertising by the broadcasting media is not permitted; cigarette packets must carry health warnings. Iran signed the Framework Convention on Tobacco Control (FCTC) in 2003 and ratified the treaty in 2005. However, similar to many other developing countries, in our previous national survey, we documented an alarming rise in adolescents smoking trends especially among girls (Kelishadi et al. 2006), which warrants strict public health control measures and reinforcement of the existing legislations.

The water-pipe is one of the most traditional instruments of relaxation and indulgence in the Middle East, and has been used for more than 400 years in Iran and neighbouring countries. Similar to the Arab countries (Maziak et al. 2004; Baddoura et al. 2001), there is less of a stigma associated with water pipe than with cigarette smoking in the Iranian community. Usually the elderly, notably women used it, however with a revival in recent years; water pipe smoking is being casually practiced by youths for fun in traditional teahouses. Although the general belief is that its smoke is not hazardous or at least not as dangerous as cigarette smoke is, different studies have documented that the concentrations of nicotine, carbon monoxide, and heavy metals in its smoke are as high as or even higher than cigarette smoke (Shihadeh 2003). Girls have more limitations in cigarette smoking; however, as smoking water pipe is an accepted traditional entertainment for many families, girls can experience it easily at home and outdoors. Water pipe smoking has reportedly turned into a leisure time social activity of conversation and passing time among youth, and a "new" health risk behavior even in Western countries (Knishkowy & Amitai 2005).

Given the scarcity of relevant published data in developing countries (The Global Youth Tobacco Survey Collaborative Group 2002), particularly in Iran, this study was intended to determine potential risk factors, which may play some part in motivating youths to adopt this life-threatening behaviour. This can provide baseline data for policy makers so that they can design prevention and control programmes targeting all influential parameters.

Methods

This cross-sectional study was carried out on a population of youths aged 12–20 years in Isfahan, the second largest city of Iran, in 2004. Assuming the similarity of determinants in each group, and estimating environmental factors to have 55 % contribution to cigarette tendency, and considering these factors to be present in at least 30 % of non smoking youths, the sample size was calculated at 200 individuals in each group with confidence interval of 95 %, test power of 90 %, error of 0.2, and predicted response rate of 60 %. Sampling was performed on a non-randomised simple basis. Given that parks are a common place for spending the leisure time for many Iranians, the participants were selected from youngsters who were smoking in parks within different parts of the city.

The criterion for considering an individual as a smoker was smoking at least one cigarette per day for at least one month prior to the time of study. Those who had lower frequency of smoking were considered as occasional smokers, and were not included in the study. The controls were selected from among youths who reported not having smoked in the last 30 days and who were walking in the same parks. The case and control groups included almost equal number of participants with equal proportions of males and females. Overall, 9 smoking and 5 non-smoking individuals refused to answer our questions, and 210 smokers and 217 non-smokers were included in the study.

Upon the feedback of focus group discussions conducted among 30 youths, and by using the questionnaire of the Global Youth Tobacco Survey project (The Global Youth Tobacco Survey Collaborative Group 2002), a 48-item self-administered questionnaire was designed in three main sections of demographic characteristics, family factors, and social factors, according to hypothesised data on the probable risk factors in the population, with an emphasis on local and cultural specifications validated in a pilot study and used in the main survey. The content validity was verified by a panel of experts, and the reliability was confirmed with a Cronbach alpha reliability coefficient of 0.72 obtained in a pilot study on 30 cases other than the two main study groups. A team of expert nurses, especially trained for this study distributed the anonymous questionnaires among the participants, while giving adequate explanation and reassurance. The participants filled out the questionnaires confidentially.

The obtained data were analysed by SPSS software package version 13.0 (SPSS, Inc. Chicago, IL) using t-test for comparison of mean values and Chi square test for comparing the frequencies between smokers and non-smokers. Odds ratios (95 % CIs) from logistic regression models were employed to evaluate the gender-specific associations of starting to smoke with possible associated factors such as socioeconomic factors, smoking of relatives and friends, parents' marital status, the self-reported quality of school/work performance, and the quality of relationships with family members and friends. The significance level was set at $p < 0.05$.

Results

In the smoking group, 76.5 % were male and 23.5 % female, while in the non-smoking group, 74.5 % were male, and

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Table 1 Characteristics of the subjects studied in the smoking and non-smoking groups

	Smokers *(n = 210)* *(%)*	***Non-smokers*** *(n = 217)* *(%)*	***OR (95 % CI)*** [¶]
Gender			
Male	76.5	74.5	†
Female	23.5	25.5	†
Education level			
Primary school	18.5	17.5	1.01(0.8–1.2)
Middle school	43.5	38.5	1.2(1.1–1.4)*
High school	26.5	32.5	1.2(1.1–1.7)*
College	11.5	11.5	NS
Job			
Student	43.5	73	1.7(1.2–2.1)**
Employee	1	0.2	5.1(4.2–5.9)**
Worker	7	12.5	1.4(1.1–1.8)*
Unemployed	42	12.3	3.7(3.2–4.1)**
Soldier	6.5	5	1.01(0.8–1.1)
Father's job			
Unemployed	18.5	13.5	1.3(1.09–1.7)*
Teacher	15	13.5	1.02(0.9–1.2)
Employee	17	27	1.4(1.1–1.6)*
Worker	13.5	12.3	1.01(0.8–1.1)
Driver	9.5	8.5	1.02(0.9–1.2)
Other	26.5	25.2	1.01(0.8–1.1)
Mother's job			
Housewife	87.5	79	1.3(1.1–1.4)*
Employee	7	16.5	1.9(1.5–2.1)*
Worker	5.5	4.5	1.01(0.9–1.1)
Occasional use of tobacco products other than cigarette			
Water pipe	47.5	11.5	4.8(4.1–5.4)**
Pipe	4.5	2.0	2.1(1.9–2.3)*
Cigar	0.5	0.1	1.01(0.9–1.1)
Having a smoker friend	88	25	4.7(4.1–5.4)**
Having a smoker relative	84	55	1.6(1.4–1.7)*
Cigarette purchase for smoker relatives	59.5	27	2.4(2.1–2.9)*
Divorced parents	2	0.5	2.1(1.7–2.4)*
Parents living separately	4	1.5	2.4(2.1–2.9)*
Poor quality of relationship			
With fathers	10.5	4.5	2.1(1.7–2.4)*
With mothers	4.5	0.5	4.1(3.7–4.5)*
With siblings	7.5	0.2	2.8(2.1–3.2)*
With friends	3.5	0.5	3.2(2.8–3.6)*
Quitting school	65	21.5	2.8(2.1–3.1)*
School failure	63	24.5	2.7(2.1–2.9)*
Frequenting traditional teahouses	57.8	13.4	4.7(4.1–5.4)**

*: $p < 0.05$; **: $p < 0.0001$; †: not different according to the study design; [¶]: OR of higher to lower values

25.5 % female. The mean age of participants in smoker and non-smoker groups was not significantly different (17.5 ± 2 vs. 16.8 ± 2.6 years, respectively, $p > 0.05$). Other characteristics of the subjects studied are presented in Table 1.

The average age of starting cigarette and water pipe smoking was 14.5 + 2.4 and 11.2 + 1.5 years, respectively ($p<0.05$). The average number of the daily cigarettes smoked was 4.9 + 0.5. Modelling parents was reported in 22.5 % of smokers while imitating siblings was reported in 29 % of them. Of smokers, 21 % smoked water pipe and 9.5 % smoked cigarettes occasionally in the presence of parents, and 37.5 % smoked water pipe and 25.5 % smoked cigarettes occasionally in the presence of other family members. In addition, parents' awareness about adolescents' smoking behaviour was observed in 23.5 % of smokers, whereas it was 36 % and 92 %, respectively for siblings and friends ($p = 0.02$).Of smoking youths, 92 % smoked in the presence of their friends.

The reasons for which smokers are believed to have started cigarette smoking are illustrated in Figure 1. It shows that the three most common causes were attracting the friends' at-

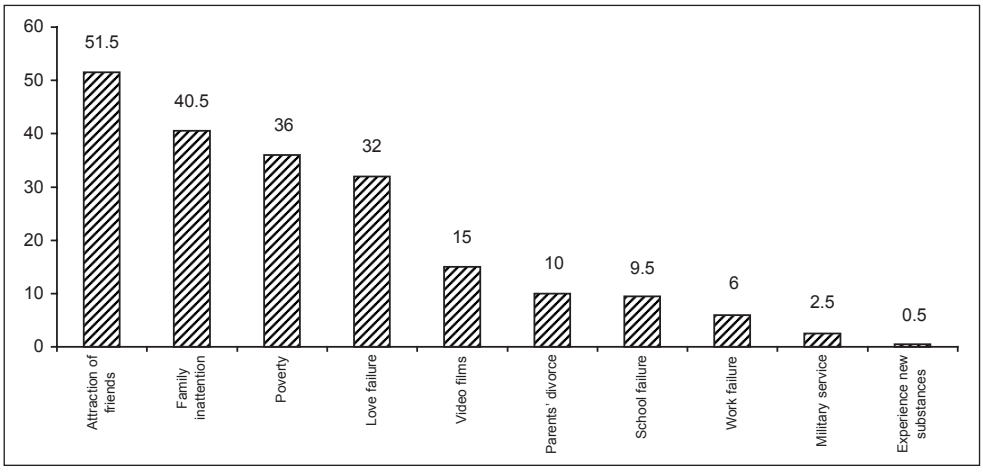

Figure Self-reported reasons of starting to smoke among smokers

tention, family inattention and poverty. Meanwhile 97 % of smoking girls, and 92 % of smoking boys revealed that they used water pipe as a means of entertainment , hospitability, and as a symbol of fashion/fad.

The place where smoking girls experienced their first attempt to smoke a water pipe was mostly (54.8 %) in traditional teahouses followed by family parties (41.3 %) and friends' parties (3.9 %). The corresponding figures for boys were in family parties (48.2 %), teahouses (39.7 %), and friend parties (12.1 %), respectively. In both genders, the first place of smoking cigarette was in friends' parties (56.8 % for boys, and 52.1 % for girls) followed by traditional teahouses (43.2 % for boys, and 47.9 % for girls).

Multivariate analysis of factors predicting tobacco use in smoking girls and boys is presented in Table 2, and shows that the strongest predictors of smoking were the father's job, having a smoking mother and the number of smoking peers respectively for boys; and having a smoking mother, frequenting traditional tea houses and the number of smoking peers respectively for girls. Lower education of fathers and divorce among parents increased the probability of smoking in both genders, with higher OR among girls. School/work failure, as well as having a bad relationship with parents and siblings were other significant predictors of smoking in both genders notably in girls, whereas the quality of relationships with friends did not increase the probability of smoking.

Discussion

To the best of our knowledge, this research was one of the few studies conducted of its kind in the Middle East region. A number of studies have investigated some aspects of smoking behaviour among Iranian adolescents and adults focusing mostly on prevalence rates as well as prevention and control programmes (Sarraf-Zadegan et al. 1999; Mohammad et al. 2001; Kelishadi et al. 2004; Sarraf-Zadegan et al. 2004; Mosavi-jarrahi et al. 2004; Roohafza et al. 2005; Kelishadi et al. 2006).

We previously assessed some general circumstances under which Iranian adolescents began to experiment with smoking and some of the environmental influential factors such as age, gender, family members' smoking habits, age and place of smoking initiation, as well as knowledge and attitudes (Kelishadi et al. 2004; Kelishadi et al. 2006). The present study was a complement to previous attempts to probe the problem by concentrating on individual, familial, social, and vocational parameters.

A notable concern was the age of onset of smoking; although the average age of smokers participating in the study was 17.5 years, they began to smoke at lower ages. This is in contrast to findings of our previous study and most other national studies revealing a direct association between age and smoking behaviour (Sarraf-Zadegan et al. 1999; Kelishadi et al. 2004; Sarraf-Zadegan et al. 2004; Mosavi-jarrahi et al. 2004; Roohafza et al. 2005; Kelishadi et al. 2006). However, the age of smoking initiation is firmly proved to have a descending inclination in many countries, particularly developing nations (Sarraf-Zadegan et al. 2004; Kelishadi et al. 2006; Surgeon General 1989). This trend undoubtedly leads to higher prevalence of smoking in lower ages in a country like Iran with a predominantly young generation. The age of smoking initiation in this study was similar to figures from earlier national and international studies. This threatening tendency towards lowering age of smoking initiation is convincing enough to necessitate urgent national measures to control smoking from early childhood through anti-smoking education in primary schools.

Of additional concern is gender, which is gradually shifting towards increased prevalence of smoking among females, notably among youths in Iran and many other countries (Kelishadi et al. 2006; Piko 2001; Seguire & Chalmers 2000). Our

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Table 2 Multivariate analysis of factors predicting smoking among smokers by gender

Independent variables*		Boys	Girls
		OR (CI 95 %)	OR (CI 95 %)
Father's education level	≥ 12 years	1	1
	6–11 years	1.4 (1.2–2.7)	1.1 (0.2–2.7)
	≤6 years	2.1 (1.8–2.4)	1.4 (1.1–2.6)
	Illiterate	2.7 (1.9–3.4)	1.4 (1.2–2.5)
Father's job	Teacher	1	1
	Employee	1.1 (0.9–2.7)	1.1 (0.9–2.7)
	Worker	1.8 (1.1–2.4)	1.8 (1.1–2.4)
	Driver	12.3 (7.1–15.2)	12.3 (7.1–15.2)
	Other	1.4 (0.8–1.7)	1.2 (0.7–2.1)
	Unemployed	4.6v (2.7–6.1)	1.6 (1.1–3.2)
Smoking in first relatives	No	1	1
	Father	1.7 (1.2–2.8)	1.9 (1.3–3.5)
	Mother	8.5 (5.3–10.1)	9.2 (6.8–10.6)
	Brother	1.4 (0.8–1.8)	1.2 (0.6–2.4)
	Sister	4.2 (3.7–5.8)	6.1 (3.4–7.9)
Number of peer smokers	No	1	1
	1	1.4 (1.1–2.5)	4.4 (4.1–7.5)
	2	2.1 (1.7–3.2)	4.1 (3.7–5.4)
	≥3	5.4 (3.4–7.1)	7.1 (5.4–9.1)
Frequenting traditional tea houses	Never	1	1
	<4 times/month	1.8 (1.2–2.7)	8.7 (6.3–10.1)
	≥ 4 times/month	4.8 (2.7–6.3)	9.1 (7.2–11.4)
Parental marital status	Living together	1	1
	Divorced	1.8 (1.2–2.2)	2.4v(1.7–2.9)
Quality of relationship with father	Good	1	1
	Bad	1.9 (1.2–2.4)	2.1 (1.4–2.7)
Quality of relationship with mother	Good	1	1
	Bad	1.7 (1.2–2.2)	2.4 (1.7–2.9)
Quality of relationship with siblings	Good	1	1
	Bad	1.5 (1.1–1.7)	1.9 (1.2–2.3)
Self report on school / work performance	Successful	1	1
	Acceptable	1.2 (0.8–1.4)	1.1 (0.9–1.5)
	Failure	2.1 (1.7–2.8)	2.7 (1.8–3.4)

*: Mothers' job and educational level, quality of relationship with friends, and participants' job were also included in the model but had no significant effect.

national study (Kelishadi et al. 2006) confirmed the increasing pattern of smoking by Iranian girls in comparison with earlier studies (Sarraf-Zadegan et al. 1999; Mosavi-jarrahi 2004; Sarraf-Zadegan et al. 2004). Reports on gender differences in adolescents' smoking behaviour in other countries are controversial, ranging from higher prevalence either in boys (Steptoe et al. 2002; Youssef et al. 2002) or in girls (Pinilla et al. 2002; Abroms et al. 2005) to no significant difference (Meijer et al. 1996; Soteriades et al. 2003). Many factors could cause such differences, e. g. attitude has been said to be more positive towards smoking in girls (Piko 2001), or equal in both genders (Brook et al. 1999). Moreover, family can be a more protective factor in girls than in boys (Sasco & Kleihues 1999). A worrisome fact is the recently induced relation between the values of masculinity such as competitiveness, initiative, and power; and the consumption of tobacco which seems to be more attractive for girls (Pinilla et al. 2002).

In the current study, the youths' smoking behaviour was strongly influenced by their social circle. Smoking was associated with perceived dimensions of socio-economic disadvantage. These findings confirm that lower-income and less-educated populations are particularly burdened by tobacco use, and suggest that public health preventive measures against tobacco use should be considered as a high priority for the children of socio-economically disadvantaged families.

In the present study, history of quitting school and unemployment were observed more frequently in smoking youths than in non-smoking youths. Educational and employment status have been strongly proved to have negative association with smoking in many studies (Pinilla et al. 2002; Conwell et al. 2003). Previous studies documented that the household socioeconomic status as well as parents' education are negatively related with youths' smoking behaviour (Piko 2001; Conwell et al. 2003).

Family members' behaviours and attitudes concerning this problem have been frequently investigated and considered as one of the strongest determinants of smoking initiation by youths (Ma et al. 2003; Pinilla et al. 2002; Sasco & Kleihues 1999; Bauman et al. 2001; Viatro et al. 2004; Sargent & Dalton 2001). In the current study, we found that parents and siblings of smoking youths, particularly their fathers and brothers, smoked more than those of non-smokers. Additionally, smoking of family members in the presence of youths was reported more frequently in the smoking group than in the non-smoking group. Similar difference between the groups was seen regarding buying cigarettes for family members. These data affirm the crucial role of household on smoking initiation by youths. Other studies have pointed out that inadequate parental monitoring and perceived parental permissiveness have been consistently associated with higher rates of adolescents' substance use (Sargent & Dalton 2001; Kodl & Mermelstein 2004). However, there have been some discrepancies concerning these relationships. Parental smoking may legitimise smoking to their children, or alternatively, it may be a convincing example for the children as to the harmful and addictive nature of smoking (Meijer et al. 1996).

Parent-child interactions have also been independently related to adolescent smoking behaviour in other studies (Piko 2001; Pinilla et al. 2002; Conwell et al. 2003; Kodl & Mermelstein 2004). A strong protective association was reported between family connectedness (feelings of warmth, love, and caring from parents) and lower propensity to engage in risky behaviours, including tobacco use (Sargent & Dalton 2001). We observed similar circumstances in this study with higher divorce among parents and separation rates, as well as higher percentage of adolescents with poor family relationships in the smoking group than in the non-smoking group; poor relationship with friends was not a significant predictor of starting smoking.

Peers have been frequently cited as major factors involved in smoking initiation (Pinilla et al. 2002; Sasco & Kleihues 1999; Bauman et al. 2001; Viatro et al. 2004; Sargent & Dalton 2001). This has been emphasised in other studies as the most important risk factor for smoking in early ages (Meijer et al. 1996). Usually teenagers report an internal self-pressure to smoke if others around them do in order to avoid potential exclusion by peers, to gain social approval, and to achieve a sense of autonomy and independence (Sasco & Kleihues 1999). In the present study, compared to the non-smoking group, a larger number of smokers' friends were smoker themselves.

Nearly all smoking youths stated that they used water pipe as a mean of entertainment, hospitability, and as a symbol of fashion/fad. However, when asked about their own opinion concerning the main reason for starting cigarette smoking, drawing friends' attention and family inattention were ranked as most frequently reported reasons in more than 90% of smoking adolescents. This is consistent with their generally worse family conditions which in turn lead to greater closeness to friends, and further corroborates the critical role of family and friends in adopting smoking as a habit.

In the current study, one of the strongest predictors of smoking, notably in girls, was frequenting traditional teahouses, where water pipes are usually served. As found in this study, less of a stigma is associated with water pipe than with cigarette smoking in Iranian society; the general belief being that water pipe is not hazardous; hence this type of tobacco use is an accepted traditional and safe entertainment for many families. Consequently, youths, especially girls who have much more limitation for cigarette smoking, can experience it easily at home and outdoors. Water pipe smoking has revived in recent years, and has turned into a leisure-time social activity for youths even in Western countries; hence this "new" health risk behaviour (Knishkowy & Amitai 2005), and should be tackled through appropriate public health measures.

Certain factors might have influenced the findings of the present study, we wish to acknowledge that the study design and methods used resulted in a sample that may not be generalised to all youths in Iran The most important limitation of this study was using self-reported questionnaires, which increases the possibility of underreporting by smokers. However, since the questionnaires were filled out anonymously and confidentially, the magnitude of this factor is estimated not to be high and not acting systematically.

Conclusion

Social and family factors, notably peer pressure, family inattention, having a smoking mother and tobacco use by water pipe, as a renewed tradition, are strongly associated with smoking among Iranian youth. Given that most smoking youths reported beginning water pipe use as a symbol of fashion, and cigarette smoking as a means of attracting friends, tobacco prevention policies should be aimed more specifically at the negative image of smoking. Preventive measures against tobacco use should be considered as a high priority for the children of socio-economically disadvantaged families. Public health control measures should be developed not only to address cigarette smoking, but also water-pipe smoking in youths, particularly girls.

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