RESEARCH ARTICLE

Intention to Quit Smoking among Intermediate and Secondary School Students in Saudi Arabia

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Abstract

Background: Smoking is one of the most preventable causes of disease and death, including cancer, and quitting at an early age can reduce smoking-related morbidity and mortality. This study aimed to estimate the prevalence and to identify factors affecting the "intention to quit" among intermediate and secondary school current cigarette smoker students in Al Madinah city, Saudi Arabia. Materials and Methods: This study cohort included 307 current smoker students in a school-based survey. The intention to quit and its related determinants were assessed using a self-administered questionnaire. Results: More than half of the participants were ≥17 years, and of male gender (54.7%, 77.9% respectively). An intention to quit smoking was reported in 71.7% of participants, and was been significantly associated with: male gender (OR=3.25, 95% CI=1.65-6.41): age at 1st trial of smoking. 10-15 years (OR=2.11, 95% CI=1.03-4.32) along with age of ≥15 years (OR=3.10, 95% CI=1.20-7.88); days of smoking in the past 30 days (days <10 (OR=2.31, 95% CI=1.23-4.35) along with days ranging from 10-19 days (OR= 3.42, 95% CI=1.18-9.91); knowing that smoking is hazardous to health (OR=3.04, 95% CI=1.42-6.47); and finally, supporting smoking bans in public places (OR=1.89, 95% CI=1.11-3.25). Conclusions: A substantial number of participants were willing to quit smoking. Effective interventions focusing on providing information about the hazards of smoking and prohibiting smoking in public places could help initiate the intention to quit among youth smokers.

Keywords: Intention to quit - smoking cessation - students - youth - Saudi Arabia

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Introduction

It has been estimated that 150 million adolescents worldwide use tobacco. Nearly half of them are suspected to die prematurely of tobacco-related diseases later in life (WHO, 2014).

Tobacco smoking is a public health problem worldwide that leads to a variety of respiratory and non-respiratory illnesses. Chronic obstructive pulmonary disease (COPD), cardiovascular disease, and various cancers (e.g., cancers of the lungs, esophagus, larynx, stomach, uterine cervix, kidney, and bladder and certain forms of leukemia) are the most common tobacco-related diseases (CDC, 2012).

The Kingdom of Saudi Arabia (KSA) has a population of approximately 30 million; however, it ranks fourth in the world in terms of tobacco sales (Al Moamary, 2011; Al-Mobeireek, 2011). Tobacco import was banned in Saudi Arabia from 1926 to 1960. From 1961 to 1984, tobacco import increased by 40-fold (Al-Mobeireek, 2011). Yet, Saudi Arabia became one of the top 10 cigarette-importing countries, with an import of 20 billion cigarettes by 2000 (Mackay and Eriksen, 2002).

In 2007, the Global Youth Tobacco Survey (GYTS) was conducted in Saudi Arabia among school students aged 13-15 years, with an overall response rate of 82.1%. The results showed a prevalence of 6.7% of students currently smoking cigarettes and 11.9% smoking tobacco products other than cigarettes, which is mainly shisha (water pipe). Boys were more likely to be current smokers than girls for both cigarettes (10.2% *vs*. 2.6%) and shisha (13.3% *vs*. 9.4%) (Al-Mulla et al., 2008; Warren et al., 2008).

Smoking prevention programs directed at adolescents and aiming to prevent the initiation of smoking in this age group have shown limited effectiveness (Thomas, 2002). Moreover, once teenagers start smoking, convincing them to quit is a tough issue for both parents and authorities (Pecmann and Reibling, 2006).

Intention to quit is considered an important predictor of smoking cessation. Past attempts to quit have been found to be a predictor/independent variable of the intention of youth to quit smoking (Woodruff et al., 2006).

Research has revealed a number of factors that affect the intention to quit among youth and young adult smokers. It has been reported that those with fewer smoking friends and lower cigarette consumption/day were more likely

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to make an attempt to quit in the near future (Fagan et al., 2007; Leatherdale, 2008). Psychological factors such as readiness to change and self-efficacy also influence smoking cessation in youth (Leatherdale, 2008).

When smoking cessation has been analyzed theoretically, it seemed to be a process rather than a single event (Vidal et al., 2011). According to stage of change theory, smokers shift from being content to smoke, to contemplating quitting, to planning to quit, to trying to quit, to maintaining quitting or relapsing to smoking. Smokers may rotate though some or all of these stages several times before achieving long-term smoking cessation (Mohammed, 2004). Quitting smoking is associated with reduced total mortality among past-smokers relative to current smokers (Kyoungwoo et al., 2014).

To date, few studies exist concerning intention to quit among Saudi adolescent smokers. Hence, this study has been conducted to determine the prevalence and to identify factors affecting the "*intention to quit*" among intermediate and secondary school current cigarette smoker students in Al Madinah city, Saudi Arabia. Such information can contribute to improving tobacco cessation activities at individual and population levels (Stockings et al., 2012).

Materials and Methods

This study is part of a larger cross-sectional school-based survey with a standard three-stage cluster sampling methodology based on schools, grades, and classes to randomly select (using Probability Proportional to Size (PPS) techniques) a representative sample of intermediate and secondary school students from public and private schools in Al Madinah city in Saudi Arabia in order to identify the prevalence and determinants of smoking among the selected population. The sampling frame consisted of all 354 public and private intermediate and secondary schools (excluding international and special needs' schools) in Al Madinah city. Included schools adopt the curriculum endorsed by the Saudi Ministry of Education. A total of 3322 students were surveyed in 36 schools (19 intermediate, and 17 secondary schools) from the beginning of April 2013 to the end of May 2013.

The participants completed an anonymous, voluntary, self-report questionnaire modified from the Global Youth Tobacco Survey (GYTS) questionnaire (WHO, 1998). Socio-demographic characteristics, tobacco use and intention to quit, nicotine dependence, and exposure to tobacco advertisements through the media were surveyed. The questionnaire was pre-tested in a pilot study of over approximatly 100 students who were randomly selected from all study years in intermediate and secondary schools.

This study was conducted among students who reported to be current cigarette smokers from the school-based survey. Current smoking state has been defined by the World Health Organization (WHO) as having smoked on one or more days in the 30 days preceding the survey (Warren et al., 2008). A total of 499 students were current cigarette smokers based on the question "*During the past 30 days (one month), on how many days did you smoke cigarettes?*" Those who reported one or more days of smoking were considered to be current cigarette smokers and were used as the population for this study. However, in data analysis we have included only 307 student smokers and excluded 192 students who either provided inconsistent responses throughout the questionnaire and/or had an important variable(s) missing. Nearly two-thirds of the excluded students were of male gender and Saudi nationality.

Dependent variable

Intention to quit smoking now was the primary outcome and was determined based on the question "*Do you want to stop smoking now?*" Responses were categorized into A. I had smoked every day or occasionally in the past but I do not smoke anymore; B. I smoke every day or occasionally and I would like to stop smoking within a few months or up to one year at a maximum; C. I smoke every day or occasionally and I would like to stop smoking within the coming 5 years; or D. I smoke every day or occasionally and I do not want to stop smoking. A dichotomous variable was created so that those who responded "*A*" or "*B*" were considered to have an intention to quit smoking, while those who responded "*C*" or "*D*" were considered to have no intention to quit smoking.

Independent variables

The questionnaire includes questions covering the following items: socio-demographic data (gender, age, school grade, nationality, and living with parents or not), patterns of smoking and exposure to second-hand smoke (SHS), previous attempts to quit, environmental and familial factors that could influence participants' own smoking behavior (smoking status of parents and/or friends, exposure to anti-smoking messages through media, the information discussed in homes and schools regarding the harmful effects of tobacco use), and knowledge and attitudes regarding smoking.

Ethical considerations

The study proposal and questionnaire were approved by Taibah University's review board. A list of schools, grades, classes, and their access have been authorized by the Directorate of Education Sectors in Al Madinah city. Students were informed during the distribution of the questionnaires that participation was voluntary and that the collected information would be kept anonymous.

Statistical analysis

Data have been collected and entered into the computer using the SPSS (Statistical Package for Social Science) program for statistical analysis (version 17; Inc., Chicago. IL). Two types of statistics were performed: 1) descriptive statistics, where qualitative data have been expressed as frequencies and percents, and 2) analytical statistics, where univariate analysis in the form of the Chi- square test was used to assess associations between the qualitative sample characteristics with the binary outcome "*intention to quit; yes/no*". A multivariate logistic regression model was used to provide the adjusted ORs and 95%CIs of the effect of different studied factors over the intention to quit

among participants. Significant variables (p-value <0.05) in the univariate analyses were included in the model in addition to the demographic variables "*age*" and "*gender*". P-values were considered statistically significant when less than 0.05.

Results

Among the 307 surveyed students with current smoking status, 239 (77.9%) were of male gender, more than half were more than 17 years old and were attending secondary schools (54.7%, and 61.6%, respectively), the majority (94.1%) were living with one or both parents, and more than three-quarters (83.7%) were of Saudi nationality (Table 1). Although 220 of 307 participants (71.7%) demonstrated intention to quit smoking within one year, male current smokers were more likely to be intending to quit than female current smokers (75.7% *vs*. 57.4%, respectively) (Figures 1, 2).

In contrast to those having no intention to quit smoking, a higher percentage of participants who reported an intention to quit smoking were more than 15 years

Table 1. Socio-Demographic Characteristics and Patterns of Smoking among Participants in Relation to The Participants' Intention to Quit Smoking

Category	Intention to quit among participants		Total (n=307) n (%)	P-value
	Present (n=220) n (%)	Absent (n=87) n (%)		
Socio-demographic factors				
Age group:				
≤12	7(3.2)	5(5.7)	12(3.9)	0.4
13-16	95(43.2)	32(36.8)	127(41.4)	
≥ 17	118(53.6)	50(57.5)	168(54.7)	
Gender:				
-Male	181(82.3)	58(66.7)	239(77.9)	0.003*
-Female	39(17.7)	29(33.3)	68(22.1)	
School grade:				
-Intermediate; 1-3	82(37.3)	36(41.4)	118(38.4)	0.505
-Secondary; 1-3	138(62.7)	51(58.6)	189(61.6)	
Nationality:				
-Saudi	183(83.2)	74(85.1)	257(83.7)	0.688
-Non Saudi	37(16.8)	13(14.9)	50(16.3)	
Living with:				
-One or both parents	212(96.4)	77(88.5)	289(94.1)	0.008*
-Others	8(3.6)	10(11.5)	18(5.9)	
Patterns of Smoking				
Age at 1st trial of smoking (in years):				
< 10	26(11.8)	21(24.1)	47(15.3)	0.016*
10 to 15	150(68.2)	55(63.2)	205(66.8)	
> 15	44(20.0)	11(12.7)	55(17.9)	
Days of smoking in the past 30 days:				
< 10 days	107(48.6)	38(43.7)	145(47.2)	0.035*
10-19 days	31(14.1)	5(5.7)	36(11.8)	
20-30 days	82(37.3)	44(50.6)	126(41.0)	
Average daily cigarette consumption in the past 30 days:				
≤ 5	140(63.6)	43(49.4)	183(59.6)	0.041*
6 to 10	44(20.0)	18(20.8)	62(20.2)	
11 to 20	21(9.6)	13(14.9)	34(11.1)	
> 20	15(6.8)	13(14.9)	28(9.1)	
Days of exposure to 2nd-hand smoke last week at home:				
≤ 4	156(70.9)	55(63.2)	211(68.7)	0.19
> 4	64(29.1)	32(36.8)	96(31.3)	

* P-value <0.05

old at the time of their 1st smoking trial (20.0% *vs*. 12.7%, respectively), had been practicing smoking less than 10 days in the previous 30 days (48.6% *vs*. 43.7%, respectively), consumed 5 or fewer cigarettes per day (63.6% *vs*. 49.4%, respectively), and were exposed to second-hand smoke 4 days or less per week (70.9% *vs*. 63.2%, respectively) (Table 1). Nearly two-thirds (70.5%) of student smokers with an intention to quit made at least one quit attempt in the last year; the most commonly cited reason for such attempts was for preserving health and saving money (50.5%) (Table 2).

Participants who were willing to quit smoking were more likely to have non-smoking parents and friends and to have received home and school messages regarding the harmful effects of smoking than those who were unwilling to quit (63.6% *vs*. 56.3%), (11.4% *vs*. 6.9%), (79.1% *vs*. 63.2%), and (56.8% *vs*. 46.0%), respectively. Although 87.9% of participants believed that smoking is hazardous to health, only 59.6% supported its ban in public areas (Table 2).

Table 2. Previous Attempts to Quit, Environmental and Familial Influences, Knowledge and Attitudes Of Participants in Relation to Their Intention to Quit Smoking

Category	Intention to quit among participants:		Total (n=307) n (%)	P-value
	Present (n=220) n (%)	Absent (n=87) n (%)		
Quit attempts				
History of any attempts to quit last year:				
-Yes	155(70.5)	48(55.2)	203(66.1)	0.011*
-No	65(29.5)	39(44.8)	104(33.9)	
Reason for attempting to quit last year:				
-Didn't quit last year	41(18.6)	31(35.6)	72(23.5)	0.001*
- Preserve health& save money	111(50.5)	24(27.6)	135(43.9)	
-Family and friends' request	36(16.4)	18(20.7)	54(17.6)	
-Religious reasons	32(14.5)	14(16.1)	46(15.0)	
Environmental and familial influences				
Parental smoking:				
-Non	140(63.6)	49(56.3)	189(61.6)	0.391
-One or both parents	69(31.4)	31(35.6)	100(32.6)	
-Don't know	11(5.0)	7(8.1)	18(5.8)	
Smoker friends:				
-Non	25(11.4)	6(6.9)	31(10.1)	0.009*
-Some	178(80.9)	64(73.6)	242(78.8)	
-All	17(7.7)	17(19.5)	34(11.1)	
Taught harmful effects of smoking at home:				
-Yes	174(79.1)	55(63.2)	229(74.6)	0.004*
-No	46(20.9)	32(36.8)	78(25.4)	
Taught harmful effects of smoking at school:				
-Yes	125(56.8)	40(46.0)	165(53.7)	0.219
-No	55(25.0)	26(29.9)	81(26.4)	
-Not sure	40(18.2)	21(24.1)	61(19.9)	
Saw anti-smoking media messages in the last 30 days:				
-Yes	110(50.0)	38(43.7)	148(48.2)	0.318
-No	110(50.0)	49(56.3)	159(51.8)	
Knowledge about and attitude towards smoking				
Is smoking hazardous to health?				
-Yes	203(92.3)	67(77.0)	270(87.9)	<0.001*
-No	17(7.7)	20(23.0)	37(12.1)	
Support smoking ban in public areas:				
-Yes	142(64.5)	41(47.1)	183(59.6)	0.005*
-No	78(35.5)	46(52.9)	124(40.4)	

* P-value <0.05

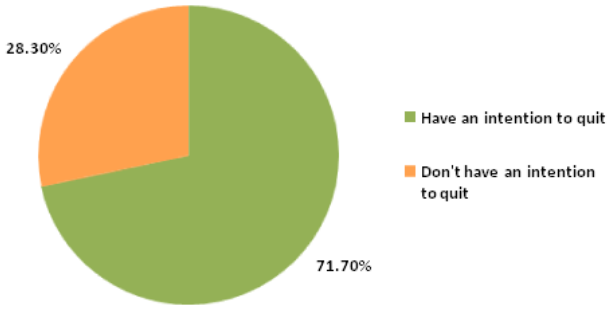

Figure 1. Intention To Quit among Participants

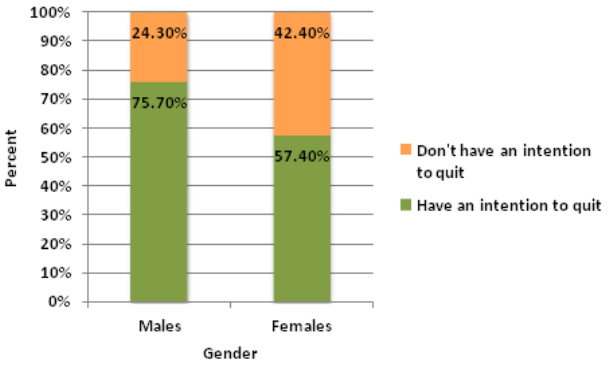

Figure 2. Intention To Quit Smoking among Both Genders of Participants

Table 3. Factors Associated with Intention to Quit Smoking among Participants

Main factors	Adjusted OR** (95% CI)	P-value
Gender:		
-Male	3.25 (1.65-6.41)	0.001*
-Female	1[a]	
Age at 1st trial of smoking (in years):		
< 10	1[a]	0.042*
Oct-15	2.11 (1.03-4.32)	0.019*
> 15	3.10 (1.20-7.88)	
Days of smoking in the past 30 days:		
< 10 days	2.31 (1.23-4.35)	0.009*
10-19 days	3.42 (1.18-9.91)	0.023*
20-30 days	1[a]	
Is smoking hazardous to health?		
-Yes	3.04 (1.42-6.48)	0.004*
-No	1[a]	
Support smoking ban in public areas:		
-Yes	1.89 (1.11-3.25)	0.019*
-No	1[a]	

[a] Reference category, * P-value <0.05; **Odds ratio has been adjusted for age, living type, average daily cigarette consumption in the past 30 days, history of any attempts to quit in the last year, the reason for attempting to quit in the last year, friends' smoking statuses, and home messages about the harmful effects of smoking

Multiple demographic, smoking-related habitual, knowledgeable, attitudinal, environmental and familial factors have been found to be significantly ($p<0.05$) associated with the intention to quit smoking among student smokers in univariate analyses; however, when included in multivariate regression analysis, only five of the factors showed significant associations with the intention to quit among participants; these factors were male gender (adjusted OR=3.25, 95%CI=1.65-6.41), age at 1st trial of smoking (an age of 10-15 years was associated with an adjusted OR=2.11 (95%CI=1.03-4.32), and an age of more than 15 years was associated with an adjusted OR=3.10 (95%CI=1.20-7.88)), days of smoking in the past 30 days (less than 10 days was associated with an adjusted OR=2.31 (95%CI=1.23-4.35), and days ranging from 10-19 was associated with an adjusted OR=3.42 (95%CI=1.18-9.91)), knowing that smoking is hazardous to health (adjusted OR=3.04, 95%CI=1.42-6.47), and finally, supporting smoking bans in public places (adjusted OR=1.89, 95%CI=1.11-3.25) (Table 3).

Discussion

There are few data regarding intention to quit among Saudi adolescent smokers. This study thus provides important information regarding the prevalence and factors that affect quitting intention among intermediate and secondary school students who are current smokers in Al Madinah city, KSA.

In the current study, it has been reported that 71.7 % of the current student smokers have an intention to quit within one year; this finding is lower than that of a Nigerian study, which concluded that 82.8% of Nigerian adolescent smokers have an intention to quit within 12 months (Agaku et al., 2012). However, this value is considerably higher than that reported in two studies in Hong Kong and Cyprus among adolescents (51%, and 46.1%, respectively) (David et al., 2010; Savvides et al., 2014).

Among our students who have an intention to quit, it has been found that male students were more likely to have a quitting intention than female students (75.7% *vs*. 57.4%, respectively). This finding is in agreement with previous studies in the literature (David et al., 2010; Agaku et al., 2012). In contrast, two studies showed no association between sex and quitting intention (Lai et al., 2004; Haddad and Petro-Nusras, 2006), and one study reported that youth males were less likely to have an intention to quit (Leatherdale, 2008).

In this study, students who were more than 15 years old at the time of their 1st smoking trial were found to have more motivation to quit than younger students. A Canadian study reported similar findings; smokers aged 10-14 made fewer cessation attempts than smokers older than 14 years old (Brown and Pederson, 1996).

Quitting smoking is a very dynamic process, not a single event. This explains the presence of multiple and repeated trials to quit in most smokers before they succeed in quitting (Vidal et al., 2011). One of the important findings of our study was the strong association of previous quit attempts with the intention to quit, in which nearly two-thirds (70.5%) of student smokers with an intention to quit made at least one quit attempt in the last year. This finding is consistent with the results of two studies conducted among adolescents in Hong Kong and

the Netherlands (Engels et al., 1998; David et al., 2010).

Because previous quitting trials are positively related to quitting intention, it is important that smoking cessation programs should stress increasing smokers' self-esteem towards quitting trials to avoid the frustration, anger and loss of self-esteem that could affect smokers when they fail to sustain smoking cessation (Reichert et al., 2008).

Almost all revised studies showed that health concerns and a fear of the health hazards of smoking are the most important motives for quitting smoking (Hyland et al., 2006; Chan et al., 2009). Similar findings have been reported among our participants; they considered preserving health and saving money as the top two motives for quitting smoking. This enhances the importance of health education among smokers and non-smokers to increase the population awareness about smoking and its related health problems.

In this study, participants who were willing to quit smoking were more likely to have non-smoking parents and friends, and their exposure to passive smoking at home was less than 4 days per week. In addition, participants who previously smoked fewer than 10 days in the previous 30 days and those who previously smoked fewer than five cigarettes per day were more likely to quit smoking. Similar findings were reported among students in Hong Kong (David et al., 2010). This suggests the explanation of nicotine withdrawal symptoms, which are more likely to occur with a higher consumption of cigarettes per day and among daily smokers and thus affect quitting intention and, in turn, quitting trials (David et al., 2010).

Messages from family members, friends, and school teachers against smoking are considered very important motives for current smokers' intentions to quit (Aung et al., 2003), which is consistent with our study results that demonstrated that students with quitting intention have received home and school messages regarding harmful effects of smoking more than those who were unwilling to quit (79.1% *vs*. 63.2%), and (56.8% *vs*. 46.0%), respectively. This demonstrates the importance of peer pressure from aware nonsmokers in the circle of the young smoker to motivate him/her to quit.

Smoking and tobacco use have become normal sights in society, and unfortunately, the prevalence of these practices has been extended in some cultures to the level that offering a cigarette to a person is a way of interacting and showing friendship. Some measures can be used to de-normalize the social image of smoking and to help smokers to initiate and maintain quitting; social anti-smoking advertisements, such as smoking hazard posters, TV and radio programs and internet massages can help in educating the public about smoking harms (David et al., 2010). However, in current study, we were unable to find significant association between watching anti-smoking media messages last 30 days and the intention to quit smoking among participants.

Similar finding was reported by an Indian study that concluded that laws, advisements on health risks of smoking and warnings on cigarette packages were not significant factors in determining the quitting attempt among tobacco-users of different age groups visiting public health facilities (Rajmohan et al., 2014).

More than half (59.6%) of our study participants support smoking ban protocol in public places, more over supporting such ban was independently associated with intention to quit among participants, this ban makes smoking not allowed at work, hospitals, restaurants, malls and other public places. Laws to increase tags cigarettes and laws against selling tobacco to children are other ways. Preventing smoking in the public places evokes the problem of increased household smoking prevalence. This implies that many smokers have not ceased to smoke, but they in turn smoke at their homes rather than at public places, which raises the importance of household smoking bans by family members (David et al., 2010).

Currently, nicotine replacement therapies approved by FDA and counseling are the most effective methods for smoking cessation (Nisha et al., 2015). Providing health risk appraisal (HRA) in terms of 'health age' during smoking cessation program has effectively helped smokers quit smoking (Yu-Jin et al., 2014).

Identified determinants of quitting intention among participants will provide valuable information for policy-makers to prepare appropriate effective programs toward smoking cessation and determine required interventions at individual, family and community level.

Limitations, this was a cross sectional study, the causal relationships between identified determinants and intention to quit couldn't be addressed by this type of study design; a prospective follow up study can address such point. Although all students accepted to participate in the study, nearly one third were uninterested in completing the questionnaire. Self-reported responses of participants made the study liable for recall bias. The study was limited to intermediate and secondary school students in Al Madinah city, so results are not generalizable over all students in the Kingdome of Saudi Arabia.

In conclusion, this study reported that two thirds of current smoker students in Al-Madinah, KSA, have an intention quit. Male gender, age at 1st trial of smoking, days of smoking in the past 30 days, knowing that smoking hazardous to health, and supporting smoking ban in public places are independently associated with intention to quit among participants. Strengthening the prohibition of smoking in public areas and providing information over hazards of smoking may help initiating the intention to quit among youth smokers. Smoking cessation programs should approach youth at an early age and stress over increasing smokers' self-esteem towards quitting trials.

Similar studies in different regions of Saudi Arabia are recommended to determine adolescents' smoking and quitting statuses. Further studies are suggested to look for any possible causes or associations that make quitting smoking more difficult among females than males.

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