



Factors Associated with Tobacco Smoking among College Students in the Kingdom of Saudi Arabia: A Systematic Review



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BACKGROUND

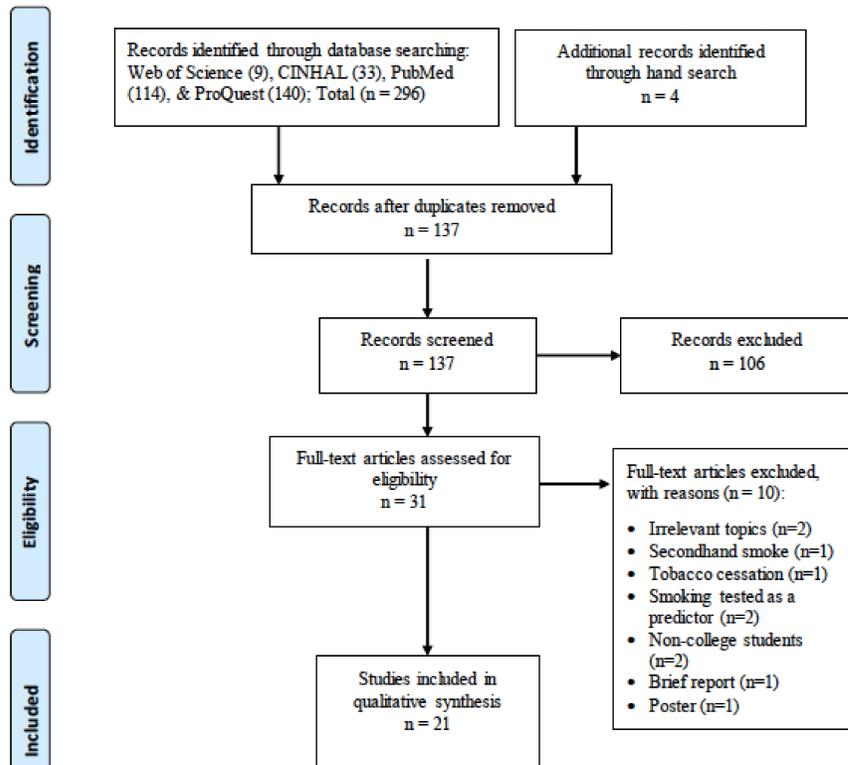
- The Kingdom of Saudi Arabia (KSA), were found to have a statistically significant increase in tobacco smoking between 1980 and 2012.
- The KSA has lost 280,000 lives and 20.5 billion US dollars due to tobacco smoking between 2001 and 2010.
- A 2019 meta-analysis study found that the prevalence of tobacco smoking among Saudi college students is higher than the general Saudi population.

PURPOSE

- The purpose of this systematic review is to synthesize and to assimilate the vast amount of information available on the determinants of smoking by Saudi college students.

METHODS

- PubMed, ProQuest, Web of Science, and CINAHL were utilized to retrieve studies addressing risk factors associated with tobacco smoking among college students between 2010 and 2019. After confirming their eligibility criteria, studies were imported to the Nvivo software for data collection and synthesis. All included Articles were critically appraised, based on a modified STROBE.



RESULTS

- 21 out of 300 studies met the eligibility requirements for inclusion.
- 43% of studies investigated only male smoking behavior, while 38% and 19% of the included articles addressed risk factors of smoking among both genders and females, respectively.
- Almost half of the included studies were conducted among health-related students, either in the city of Riyadh or in the city of Jeddah.

Table 1. Characteristics of included studies (n = 21)

First author (year) ^{Ref.}	Gender of population (college)	Location	Sample size	Sample technique	Type of tobacco smoking	Survey type	# of factors found significant
Mandil (2011) ⁹	All (All)	Riyadh	6,793	Multi-stage	Cigarette & Waterpipe	GYTS	7
Abdulghani (2013) ¹⁵	Female (All)	Riyadh	907	Convenient	Cigarette & Waterpipe	Self-developed	0
Alghaneem (2016) ¹⁶	Male (Edu., Scien, & BA)	Majmaah	301	Multi-stage	Cigarette, Waterpipe & cigar	Not available	1
AlHaqwi (2010) ¹⁷	All (Health: Medical)	Riyadh	215	Convenient	Cigarette & Waterpipe	GATS	2
AlKaabba (2011) ¹⁸	All (Health: Medical)	Riyadh	153	Convenient	Cigarette	WHO	2
Almogbel (2013) ¹⁹	Male (Three campuses)	Hassa & Buraidah	467	Convenient	Cigarette	Self-developed	5
Almohaithef (2018) ²⁰	Male (All)	Abha (KKU)	337	Multi-stage*	Not available	Not available	1
Al-Mohamed (2010) ²¹	Male (All)	Hassa	1,382	Multi-stage	Cigarette & Waterpipe	GYTS	6
Alshehri (2019) ²²	All (Health: medical)	Tabuk	287	Random	Cigarette & Waterpipe	Self-developed	4
Almutairi (2016) ²³	Male (Edu. & Scien)	Riyadh	715	Convenient	Cigarette & Waterpipe	Self-developed	4
Alswailem (2014) ²⁴	All (Health)	Riyadh	400	Convenient	Cigarette & Waterpipe	GATS	4
Ansari (2017) ²⁵	Female (Health: medical)	Dammam	332	Not available	Cigarette & Waterpipe	GYTS	2
Ansari (2016) ²⁶	Male (Health & BA)	Majmaah	340	Multi-stage	Cigarette & Waterpipe	WHO	1
Awan (2016) ²⁷	Male (Health)	Riyadh	535	Random Cluster	Waterpipe	Self-developed	3
Azhar (2012) ²⁸	Female (All)	Jeddah	310	Not available	Cigarette & Waterpipe	GATS	1
Jiang (2018) ²⁹	Male (All)	Riyadh	340	Random Cluster	Not available	Self-developed	3
Koura (2011) ³⁰	Female (L&S)	Dammam	1,020	Multi-stage	Cigarette & Waterpipe	GYTS	2
Mansour (2017) ³¹	All (Health: dental)	Jeddah	336	Convenient	Cigarette & Waterpipe	Self-developed	3
Mahfouz (2014) ³²	All (All)	Jazan	3,764	Multi-stage	Cigarette & Waterpipe	GYTS	3
Venkatesh (2017) ³³	Male (All)	Buraidah	199	Convenient	Cigarette & Waterpipe	Self-developed	0
Wali (2011) ³⁴	All (Health: medical)	Jeddah	643	Convenient	Cigarette & Waterpipe	GATS	2

- Twenty studies examined the determinants of tobacco smoking among Saudi college students, using a retrospective cross-sectional and based on no particular theoretical framework.
- Only one study did utilize a longitudinal observational design using two theoretical framework (social learning theory and social control theory).

RESULTS cont.

- Four individual and two social factors were established to have a significant relationship with tobacco smoking behavior among college students in four or more studies. Environmental factors were found to be associated with a change in smoking behavior among Saudi college students based on two studies.

Table 2. Determinants or risk factors examined by included studies.

Theme	Factors	N Studies	n of studies found statistically significant association*		Direction
			χ^2 (Reference)	Logistic Regression	
Individual	Age	9	2** (21, 25)	2 (21, 29)	Older students had an association with smoking.
	Belief	1	1 (29)	1 (29)	Nonsmoking beliefs predict a change in the smoking status.
	College affiliation	9	5 (9, 16, 21, 28, 30)	0	Non-health related students are associated with smoking.
	Employment	1	1 (29)	-	Unemployment is associated with smoking.
	Gender	8	8 (9, 17, 18, 22, 24, 31, 32, 34)	1 (31)	Being male is associated with smoking behavior.
	Income	6	2 (19, 23)	0	High income is associated with smoking.
	Knowledge	5	4 (22, 23, 31, 34)	2 (23, 31)	Low knowledge is linked to the smoking status.
	Material status	6	1 (9)	1 (9)	Being single is associated with smoking.
	Religion	2	1 (23)	1 (23)	Low Islamic practice is associated with smoking behavior.
	Residence	4	1** (21)	1 (21)	Urban residence was a risk factor of smoking.
	School performance	5	1** (19)	1 (19)	Low GPA is associated with smoking.
	School year	10	4** (9, 17, 22, 34)	0	Senior students had an association with smoking.
	Psychological issues	1	1 (29)	1 (29)	Stress is associated with tobacco smoking.
	Social	Friends' substance use	1	1 (25)	1 (25)
Teachers' smoking status		1	0	-	-
Parents education		5	1 (24)	-	Students whose parents' education is college or higher are associated with tobacco smoking.
Environmental	Family smoking status	8	6 (6, 19, 21, 24, 30, 31)	4 (6, 19, 21, 31)	Any smoker in the family was a strong risk factor for smoking.
	Friends	7	7 (6, 18, 19, 21, 23, 24, 32)	5 (6, 19, 21, 23, 32)	Friends' smoking status was a strong risk factor for smoking.
	Family occupation	2	1 (18)	-	Students whose mothers are working or retired are associated with tobacco smoking.
Environmental	Media	1	1 (21)	1 (21)	Students who were exposed to antimoking media messages were less likely to smoke.
	Policy	1	1 (29)	1 (29)	Government's efforts to control smoking was associated with a decrease in smoking.

* (P < .05)
** Three articles (21, 25, 27) tested one or all these factors but did not write them in the results section. Thus, factors were not included.

- We found a lack of qualitative and other observational designs (e.g., experimental, case-control, or cohort), which could assist in better understanding some of the risk factors of tobacco smoking among Saudi college students.
- All of the included studies relied heavily on a retrospective method (e.g. surveys) of measuring tobacco smoking.

CONCLUSION

- There is a dearth of research in utilizing theoretical frameworks to guide the research in order to propose an intervention program among Saudi college students. Future research should aim to recruit participants from different institutions in the KSA, apply other methodological approaches, test other measurements of tobacco smoking, and utilize a theoretical framework.

