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Trauma exposure, mental health and tobacco use among vulnerable Syrian refugee youth in Jordan

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ABSTRACT

Background Little is known about tobacco use among youth exposed to armed conflicts, or the influence of trauma on tobacco use in this context. This study examined patterns of smoking by tobacco product and gender among Syrian refugee youth living in host communities in Jordan and assessed the associations of post-traumatic stress disorder (PTSD) and depression symptoms, trauma exposure and social support with current smoking status in boys and girls.

Methods Syrian refugee students (mean [standard deviation] age = 14.9 [1.33] years) were identified through the public school system. Data were collected using an online Arabic questionnaire that included questions about demographics, trauma exposure, current smoking (cigarette and waterpipe), PTSD, depression and perceived social support. Logistic regression was used to assess the adjusted effects of independent variables on current smoking status.

Results One in 7 boys and one in 14 girls were current smokers, with boys reporting greater tobacco use than girls. Among boys, current smokers reported significantly higher family member loss and lower perceived family social support than nonsmokers; among girls, current smokers also reported significantly higher family member loss as well as greater PTSD symptoms and lower perceived significant other/special person social support.

Conclusions Tobacco use is established among this vulnerable group. The findings highlight the potential role of psychosocial support for tobacco prevention and cessation strategies.

Keywords armed conflict, depression, Jordan, MSPSS, PTSD, refugee, smoking, social support, Syria, tobacco use, waterpipe, youth

Background

Tobacco use remains entrenched in most developing countries.[1] The Middle East has high smoking prevalence[2–5] and is affected by environmental stressors such as armed conflict and other types of trauma (e.g. political unrest, interpersonal victimization and natural disasters).[6–9] Current smoking estimates among youth in the Middle East region were estimated at 3.0, 6.1 and 3.8% for cigarette-only, waterpipe-only and dual use, respectively.[4] There is evidence that exposure to natural and man-made disasters is associated with heightened vulnerability to increased rates of tobacco smoking.[10–13] While some scholars have posed that the relationship between conflict exposure and tobacco use is potentially mediated by depressive and post-traumatic stress disorder (PTSD) symptoms,[14,15] evidence regarding the interplay of tobacco use, conflict-related trauma and psychosocial factors is mixed.[16] Available data are often specific to resettled refugees

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in their final hosting countries,[17–20] and no published work has examined the association of conflict-related traumatic experience with tobacco use, and the potential role of perceived social support on this association, among Syrian refugees who fled the armed conflict that began in 2011.

Approximately 1.5 million Syrian refugees currently live in Jordan, most of whom (78%) live in noncamp settings, referred to as host communities. Roughly half of these refugees are under 18 years old, and boys and girls (12–17 years) represent 7.0 and 6.7% of the population, respectively.[21] Syrian refugee families in Jordan face severe financial pressures as the majority have no source of income other than assistance from the United Nations High Commissioner for Refugees (UNHCR). A significant proportion of Syrian refugee youth may be particularly vulnerable to tobacco-related risks due to high rates of smoking in the Syrian population prior to the conflict.[22] Global Youth Tobacco Survey estimates reported a 20.7% current smoking prevalence among Syrian youth 13–15 years of age in 2010 (boys: 27.4%; girls 14.4%).[4]

As reports accumulate regarding noncommunicable disease risk and prevalence, including tobacco use among Syrian refugee adults[23,24] and the high rates of trauma and related mental health consequences among Syrian refugee youth,[25–31] the relationship between these factors remains to be explored. Given the heightened risk of developing nicotine addiction during adolescence[32] and the likely relationship between traumatic exposure, mental health disorders and smoking,[16,33,34] this evidence gap needs to be addressed in order to inform tobacco prevention and control initiatives for refugee populations.[35] This study aims to: (i) examine patterns of smoking by tobacco product (cigarette versus waterpipe) and gender, and (ii) assess the associations of PTSD and depression symptoms, trauma exposure and perceived social support with current smoking status in boys and girls.

Methods

Study sample

The study was conducted between February and April 2015. Participants included 418 Syrian refugee youth (55.0% female; mean [standard deviation (SD)] age = 14.89 [1.34]; range = 12–17 years) (Table 1) attending public middle and high schools in Ramtha city. The city was the first to welcome Syrian refugees in 2011 due to its proximity to the Syrian border. To accommodate the influx of Syrian pupils, the school system initially utilized a morning-afternoon shift schedule with refugee children attending in the afternoon. For this study, the largest four schools (one middle- and one high-school for each boys and girls) were approached to participate in the study. All Syrian students attending the afternoon shift at each school were asked to participate. Parental/legal guardian consent forms were distributed to the students and signed forms were collected the next day. The students were then asked to complete a 20-minute survey delivered via Google Forms on an iPad (made available by the research team) in the schools' computer labs.

Measures

The survey included demographics, trauma exposure, current smoking and psychosocial measures. Questions were translated from English into Arabic by an expert panel and were then back-translated for validation. The survey was piloted with 10 refugee students, and necessary modifications were made. Demographics included current age (years), age upon arrival to Jordan (years), gender (male, female) and current family household size (1–5 members, 6–10 members, 11 or more members). After initial analysis, household size was collapsed into five or less and more than five. Trauma exposure, defined as injury and/or loss of a family member due to the war, was measured using two questions: whether a family member was injured due to the war (yes/no) and whether a family member has died due to the war (yes/no). Current smoking questions (yes, no) included past 30-day cigarette smoking and waterpipe smoking that were adapted from the Global Youth Tobacco Survey.[36]

PTSD symptoms were measured using the PTSD Check-List—Civilian Version,[37] which has excellent reliability and validity.[38] The translated 4-point scale (1 = *no*, 2 = *rarely*, 3 = *mostly*, 4 = *always*) was modified from the original 5-point scale (1 = *not at all*, 2 = *a little bit*, 3 = *moderately*, 4 = *quite a bit*, and 5 = *extremely*). PTSD symptom scores were calculated by summing all items (Cronbach's $\alpha = 0.85$). Depressive symptoms were assessed using the depression anxiety stress scale-21 (DASS21).[39] Out of the seven items measuring depressive symptoms (Questions 3, 5, 10, 13, 16, 17, and 21), only six items were used in the current study. Question 3 was excluded because piloting showed that students were unable to distinguish it from Question 5 in Arabic. A 4-point Likert scale also was used for DASS21 items (0 = *does not apply*, 1 = *applies some of the time*, 2 = *applies most of the time,* 3 = *applies always*). Depressive symptom scores were calculated by summing all items (Cronbach's $\alpha = 0.79$). Perceived social support was assessed using the 12-item multidimensional scale of perceived social support (MSPSS).[40] The translated response options differed from the original version (7-point Likert Scale) and instead used a 4-point Likert scale (1 = *no*, 2 = *rarely*, 3 = *mostly*, 4 = *always*). MSPSS items were summed to create an MSPSS total score (Cronbach's $\alpha = 0.77$) as well

Table 1 Sample characteristics by gender and smoking status

Characteristic	*Total sample (N = 418)*	*Boys (n = 188)*			*Girls (n = 230)*		
		Nonsmoker (n = 160)	*Current smoker (n = 28)*	*P*	*Nonsmoker (n = 214)*	*Current smoker (n = 16)*	*P*
Age (years), M (SD)	14.9 (1.3)	14.8 (1.4)	15.6 (1.2)	0.003	14.8 (1.2)	15.9 (1.1)	0.001
Refugee duration (years), M (SD)	1.8 (0.8)	1.9 (0.8)	1.9 (0.8)	0.975	1.8 (0.8)	1.5 (0.9)	0.121
Family household number, *N* (%)				0.618			0.257
5 or less	74 (17.7%)	28 (82.4%)	6 (17.8%)		36 (90.0%)	4 (10.0%)	
More than 5	344 (82.3%)	132 (85.7%)	22 (14.3%)		178 (93.7%)	12 (6.3%)	
Family member injury, *N* (%)				0.360			0.317
No	278 (66.5%)	118 (86.8%)	18 (13.2%)		134 (94.4%)	8 (5.6%)	
Yes	140 (33.5%)	42 (80.8%)	10 (19.2%)		80 (90.9%)	8 (9.1%)	
Family member lost, (*N* %)				0.008			0.018
No	294 (70.3%)	110 (90.2%)	12 (9.8%)		164 (95.3%)	8 (4.7%)	
Yes	124 (29.7%)	50 (75.8%)	16 (24.2%)		50 (86.2%)	16 (13.8%)	
PTSD symptoms, M (SD)	42.0 (10.1)	43.4 (9.9)	45.1 (10.5)	0.410	40.2 (9.6)	47.3 (11.2)	0.005
Depressive symptoms, M (SD)	6.67 (4.2)	5.6 (4.1)	6.9 (5.0)	0.141	7.4 (4.1)	6.6 (3.3)	0.463
MSPSS total, M (SD)	34.8 (6.5)	35.5 (6.4)	34.5 (8.0)	0.453	34.6 (6.3)	30.9 (6.7)	0.023
MSPSS-friend, M (SD)	10.8 (3.1)	10.9 (2.9)	11.7 (3.3)	0.190	10.6 (3.1)	10.6 (2.8)	0.999
MSPSS-family, M (SD)	13.0 (2.6)	13.4 (2.2)	11.9 (3.3)	0.031	12.9 (2.5)	11.0 (3.9)	0.072
MSPSS-significant other, M (SD)	11.1 (3.1)	11.2 (3.3)	10.9 (3.4)	0.610	11.1 (2.9)	9.3 (3.6)	0.014

Note: Chi-square or *t*-tests were used for all bivariate analyses.

as three sub-scales regarding the source of social support: family (Cronbach's $\alpha = 0.64$), friends (Cronbach's $\alpha = 0.72$), and significant others/special persons (Cronbach's $\alpha = 0.65$). The collapsing of the rating scales is justified by the evidence showing that Arabs, similar to other non-European-American groups, are less likely to use middle response categories when presented a greater number of options.[41,42]

All study procedures were approved by the Institutional Review Board of Jordan University of Science and Technology.

Statistical analyses

Refugee duration was estimated using current age and age upon arrival to Jordan. Participants who reported past 30-day use of cigarettes and/or waterpipe were categorized as current smokers (coded as 1) and those who had smoked neither, nonsmokers, were coded as 0. Sample descriptive and bivariate comparisons first were performed for all measures. The sample was then split by gender to examine bivariate differences in demographics, trauma exposure and psychosocial measures by current smoking status. Items significantly associated at the bivariate level ($P < 0.10$) among each sub-sample were considered for subsequent regression models that included covariates specific to each gender. Logistic regression was used to assess the adjusted effects of independent variables on current smoking status. A significance level of 0.05 was used in these analyses.

Results

As seen in Table 2, just over one in 10 (10.5%) refugee youth were current smokers. The proportion of smoking differed significantly by gender ($P = 0.001$), with boys (14.9%) reporting higher use than girls (7.0%). Mean age of arrival to Jordan was 13.0 [1.5] years (range = 10–16 years) with an average refugee duration of 1.8 (0.8) years (Table 1). The majority (82.3%) of participants reported living with more than five family members. About one third of participants reported injury of a family member during the war in Syria and slightly fewer (29.7%) reported losing a family member during this time. Trauma exposure differed significantly by gender as 35.1% of boys and 25.2% of girls reported a death of a family member ($P = 0.014$), while 27.7% of boys and 38.3% of girls reported injury to a family member ($P = 0.018$).

Mean PTSD scores were relatively high (42.0 [10.1]; range = 17–68), with more than 40% of participants

Table 2 Prevalence of current smoking among Syrian refugee youth, by type and gender

Smoking status	*All (N = 418)*		*Boys (n = 188)*		*Girls (n = 230)*	
	N	*Percent*	*n*	*Percent*	*n*	*Percent*
Nonsmokers	374	89.5	160	85.1	214	93.0
Current smokers	44	10.5	28	14.9	16	7.0
Cigarette-only	14	3.3	8	4.3	6	2.6
Waterpipe-only	24	5.7	18	9.6	6	2.6
Dual	6	1.4	2	1.1	4	1.7

reporting specific experiences "mostly" or "always" in the past month. Boys had higher mean PTSD scores than girls (boys: 43.6 [9.9]; girls: 40.7 [9.0]; $P = 0.002$); whereas girls reported more depressive symptoms than boys (girls: 7.4 [4.1]; boys: 5.8 [4.3]; $P = 0.001$). There were no gender differences on the MSPSS total scores (boys: 35.4 [6.6]; girls: 34.4[6.8]; $P = 0.119$), or on any of the subscale scores.

Current smokers were older than nonsmokers (boys: 15.6 [1.2] versus 14.8 [1.4] years; girls: 15.9 [1.1] versus 14.8 [1.2] years; $P < 0.05$ for both). Boys and girls who experienced loss of a family member were more likely to be current smokers (boys: 24.2 versus 9.8%; girls: 13.8 versus 4.7%; $P < 0.05$ for both). Among girls, PTSD scores were significantly higher among current smokers compared to nonsmokers (47.3 versus 40.2, $P = 0.005$). Also among girls, MSPSS total score, as well as support from significant others/special persons subscale score, was significantly lower for current smokers compared to nonsmokers (MSPSS total: 30.9 versus 24.6; MSPSS significant other: 9.3 versus 11.1; $P < 0.05$ for both). Among boys, MSPSS total scores ($P = 0.45$) did not differ significantly by current smoking status; only the family support score was significantly lower among current smokers (11.9 versus 13.4, $P = 0.03$).

The variables measured in this study had different associations with tobacco use for boys and girls; therefore, logistic regressions were run separately by gender. As seen in Table 3, among boys, current smoking was positively associated with age (adjusted odds ratio [AOR], 95% confidence interval [CI] = 1.48, 1.06–2.06) and negatively associated with family support (AOR, 95% CI = 0.82, 0.70–0.96), adjusting for all variables including family member loss. Among girls, current smoking was positively associated with age (AOR, 95% CI = 2.29, 1.34–3.92) and loss of a family member (AOR, 95% CI = 3.34, 1.05–10.60) and negatively associated with support from significant others (AOR, 95% CI = 0.80, 0.65–0.98) adjusting for all variables including PTSD symptoms.

Discussion

Main findings

Among a sample ($N = 418$) of young Syrian refugees living in Jordan in 2015, one in seven boys and one in fourteen girls were current smokers. Loss of a family member during the conflict in Syria was significantly associated with current smoking among girls and boys, but this association remained only in girls after adjusting for potential confounders. Perceived social support from family, among boys, and from significant others/special persons, among girls, was protective against smoking. In the crude analyses, PTSD and depressive symptoms were associated with smoking but the associations disappeared after adjustment for confounding factors. The results suggest that tobacco use is established among this vulnerable group despite likely financial pressures. These financial pressures might partially explain why current smoking prevalence among study participants was almost half that observed among youth living in Syria during 2010[4] (no more recent estimates available per WHO[22]). Reported smoking estimates were also lower than those reported among Jordanian youth who resided in the same host communities (24% in 2014).[4,43] Despite these discrepant comparisons, gender differences in overall smoking prevalence were consistent in this sample with more boys reporting tobacco use relative to girls.[4,44–46]

Our results revealed high rates of traumatic experiences with about half of participants reporting family injury and/or loss, which may have long-lasting adverse effects on the mental health of refugee youth in Jordan. The high PTSD and depressive symptom scores in our sample indicated significant symptomology suggesting risk for possible mental health problems among Syrian refugee youth. These results are in line with the literature assessing the mental health of Syrian refugee youth,[28–31,47–49] which indicated that youth are one of the groups most negatively affected by violence, conflicts

Table 3 Adjusted associations of trauma exposure, PTSD symptoms, and perceived social support with current smoking status among Syrian refugee boys and girls

	Boys		Girls	
	AOR	95% CI	AOR	95% CI
Age (years)	**1.48**	1.06–2.06	**2.29**	1.34–3.92
Family member lost				
No (reference)	—	—	—	—
Yes	2.33	0.98–5.51	**3.34**	1.05–10.60
PTSD symptoms	—*	—	1.05	0.98–1.12
MSPSS-family	**0.82**	0.70–0.96	—*	—
MSPSS-significant other	—*	—	**0.80**	0.65–0.98

Notes: Bolded AOR indicates $P < 0.05$; —* refers to AOR not available as the variable was not selected in the final regression model.

and displacement-related adverse experiences and are vulnerable to the development of psychiatric disorders such as depression and PTSD.

Our results should be viewed within the cultural context of the Arab states. Families in northern Jordan share historical and cultural ties with families in southern Syria. Both families strictly adhere to traditional values that family and community are central to their lives[49] and utilize family-centered networks that provide a sense of cohesion and coexistence between refugee and host communities. Social context shapes patterns of tobacco consumption,[50,51] response to traumatic exposures, and vulnerability to PTSD and depression.[52] Greater levels of social support from various sources in our sample (family for boys; significant others for girls) protected against tobacco use. Increased levels of social support may provide additional means of coping to deal with trauma and stress that promote the reduced use of tobacco.[53] Youth's perception of social support also may protect against smoking by enhancing positive affect, perceived self-worth and improved well-being by mitigating stressful situations.[54] The buffering effect of social support on smoking among refugee youth raises the importance of the role of family members and community mentors in combating tobacco use.

What is already known on this topic

The prevalence of current smoking among youth exposed to armed conflict has ranged between 2.2 and 70%.[55,56] While conflict-affected populations in Lebanon had significantly higher smoking prevalence than nonconflict-affected populations,[57] Palestinian refugees had significantly lower overall smoking rates in camps compared to the host areas.[58] Within Palestinian refugee camps in Jordan, Lebanon and the West Bank, current smoking estimates were similar between Palestine refugee and nonrefugee youth groups. In Syria, however, Palestinian refugee youth had a higher current smoking prevalence when compared to nonrefugees.[20]

Previous research has emphasized the negative impact of armed conflict on the mental health of youth, in particular symptoms of PTSD and depression.[6,7,31,33,49,59–62] Evidence is strongest for direct exposure to violence posing the most significant threat to mental health.[61] In addition to the total number of traumatic events[63] and duration of exposure,[64] characteristics of such events[65,66] have been linked with psychological problems. Risky behaviors (including tobacco and other substance use) have been shown to increase following exposure to traumatic events.[14,33,67]

Results from the present study did not support a significant association between current smoking and either PTSD or depressive symptoms. These findings contradict other reports where smoking was associated with PTSD and depression in conflict-free[34,68] and armed conflict[17,18,33,69] populations. Studies among re-settled refugee youth[18] and adults[17] who relocated to Western countries showed an association between smoking and poor mental health. While the study of conflict-affected Israeli-Palestinian youth suggested a link between cigarette smoking and subjective threat of armed conflict,[33] the results may not be comparable to our findings as the Israeli-Palestinian conflict is long-standing and characterized by periods of acute events that do not necessarily cause displacement of residents or cause people to become refugees. Such events tend to take place within established health and educational infrastructure. Therefore, our results should be compared with others using caution. This potential discrepancy is especially true when considering findings from well-established refugee re-settlement programs in Western countries, long-lasting armed conflicts, such as the Palestinian and Israeli conflict, and the cultural barriers between refugees and host communities.

What this study adds

To our knowledge, this is the first investigation of tobacco use among Syrian refugee youth. Our findings are for Syrian refugee youth living within host communities in a developing country setting who are not engaged in Western country resettlement programs, unlike those reported in developed countries.[17,18] The duration of exposure to traumatic events in our sample was short (mean 1.8 years) and not as long-lasting as studies of Israeli-Palestinian youth.[33] The current study addressed an evident gap in the published literature as work in this field focused on smoking in conflict-free stable youth[2,4,44–46,70,71] but not refugee youth exposed to armed conflicts. The present study investigated the interplay of several important dimensions of health behavior that are rarely described among youth in the context of armed conflicts: PTSD, depression, social support and smoking. Available evidence regarding these factors is limited and based on studies conducted in developed countries,[16] with no evidence generated in conflict areas in developing countries. The shortage of literature addressing tobacco use among refugee youth shortly after displacement from their original country and the inclusion of waterpipe smoking data among refugee youth adds to the uniqueness of the current investigation.

Limitations

The lack of significant associations between PTSD and depressive symptoms and smoking observed in this study could have been due to the lack of power after stratification by gender, paired with low prevalence of smoking. In addition, the range of scores observed for the PTSD/depressive indices could have reduced our ability to detect these effects (e.g. potential ceiling effect).

The current investigation is cross-sectional in nature and lacks temporality in assessing the relationships studied. Follow-up design would have better estimated the effect of mental health status on smoking behavior because a cohort study design would have been more useful for examining the long-term impact of trauma on tobacco use. Schools were used as a sampling frame; however, enrolment rate of school-age Syrian children in Jordan is only around 68%,[31] so results may not be generalizable. Unenrolled youth may be working to support their families financially. This could explain the lower estimates of tobacco use in the study, as unenrolled students may have better economic means to buy/use tobacco products and may account for tobacco users who are missing from the study.[72] In addition, refugee families in Northern Jordan are not representative to the general Syrian refugee population in Jordan. Families who sought refuge in Ramtha city were of lower socio-economic status compared to those settled in major cities. Syrian refugees in major Jordanian cities may be more economically affluent, better educated and have more access to economic resources than those living within small, borderline cities. Generalizability is also limited to refugee youth living in host communities in Ramtha city and not within camp-settings.

Current smoking in this study refers to smoking cigarettes or waterpipe. Considering the sample size and frequency of smokers, it was not optimal to assess the separate effect of independent variables on cigarette smoking and on waterpipe smoking. Our results, therefore, should be considered with caution, as the two behaviors are distinct. For example, unlike cigarette smoking, which is considered a regular/daily behavior, waterpipe smoking is an intermittent behavior that is associated with social gathering with friends and family.[72] Both behaviors, however, were found to be associated with social setting such as parental and friends' smoking statuses.[70,73] The latter variables were not assessed in our study but are still of concern as they may have a potential confounding effect on the relationships investigated.

Out of the 500 consent forms initially distributed, only 418 students provided signed consents on the day of data collection. The remaining students (16.4%) did not show up for school on that day. Regardless, a nonresponse rate of less than 15% is usually considered trivial.[74]

Conclusion

Tobacco use seems to be well-established among Syrian refugee youth living in Jordan with evidence supporting a relationship between psychosocial measures and tobacco use. Follow-up of refugee youth to assess changes in mental health status and its effect on the uptake of tobacco products may be a critical research need at this stage. Additional research exploring the impact of trauma on tobacco use over time might help to better inform and target psychosocial support services for refugee youth. Addressing the research questions under investigation among adults and utilizing community, rather than school, settings could further our understanding of the relationship between psychosocial measures and tobacco use. Psychosocial support services targeting refugee youth should consider tobacco prevention programs and focus on social support as one dimension in controlling tobacco use. Tobacco use interventions targeting the psychodynamics of the family should be further considered among refugee youth.

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