Smokeless Tobacco and Smoking Relative Harm: Beliefs and the Association between Risk Perception and Tobacco Use Transitions



Introduction

Despite epidemiological evidence suggesting that using smokeless tobacco (ST) is far less harmful than smoking cigarettes ³, many adult smokers (AS) perceive ST as equally or more harmful than cigarettes⁴⁻⁶. Risk perception can impact future tobacco product use choices^{5,7}. We examined changes in risk perception of ST relative to cigarettes among AS using the first three waves of the US nationally representative longitudinal PATH data⁸. Next, we analyzed the association between risk perception and transition from cigarettes to ST from Wave 1 to Wave 2 and, to detect continuing patterns, from Wave 1 to Wave 3.

Research Design & Analysis

A trio of analyses were performed among AS (≥18 years of age, including 43.8% tobacco poly users, n=6916):

A Percent Misperception

We estimated the percent of AS with misperception of ST relative to smoking cigarettes across Waves 1, 2, and 3 based on the question:

Is using smokeless tobacco less harmful, about the same, or more harmful than smoking cigarettes?

AS indicating that ST use is "about the same" or "more harmful" than smoking cigarettes were considered to have a risk misperception and those indicating "less harmful" were considered as without misperception.

2. Misperception and Behavior

We estimated the percent of AS, stratified by risk misperception, who transitioned from cigarettes at Wave 1 to:

- ST use (no combustibles and irrespective of any other poly use) at Wave 2 and Wave 3,
- poly use of ST and combustibles (irrespective of any other poly use) at Wave 2 and Wave 3 and,
- tobacco non-use at Wave 2 and Wave 3.

. Odds of Transitioning

We estimated the odds of transitioning from cigarettes to use of ST without any combustibles by Wave 2 and Wave 3 between those with and without risk misperception while adjusting for age, education, and cigarette use. The data were adjusted with population weights and variance estimates computed using Fay's balanced repeated replication (rho=0.3) using SAS 9.4.

Conclusions

- Our findings confirm that a significant percent (>90%) of AS continue to have misperception that ST use is about the same or more harmful than smoking, a belief inconsistent with the epidemiological evidence.
- AS without misperception were \sim 4x more likely to stop combustibles and switch to ST.
- Our analyses highlight the importance of providing AS with truthful and accurate information about relative risks of ST compared to cigarettes to advance tobacco harm reduction.

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Percent Misperception

The vast majority of AS exhibited risk misperception of ST at Wave 1 (91.2%), a rate which increased modestly at Wave 2 (92.5%, p=0.002) and non-significantly at Wave 3 (93.2%, p=0.002)o=0.099), Figure 1.

FIGURE 1. Percent AS reporting ST misperception



3. Odds of Transitioning

Adjusted odds of transitioning from cigarettes to exclusive ST use by Wave 2 was 4.3 times greater for AS without the misperception relative to those with misperception, p=0.001. AS more likely to switch to exclusive ST use were <35 years of age and smoked fewer cigarettes, data not shown

Adjusted odds of transitioning from cigarettes to exclusive ST use by Wave 3 was 3.8 times greater for AS without the misperception relative to those with misperception, p=0.001. AS more likely to switch to exclusive ST use were <45 years of age and smoked fewer cigarettes, Table 1.

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Results

2. Misperception and Behavior

- Switching to ST use (no combustibles and irrespective of any other poly use): A significantly higher percentage of AS without misperception (2.1%) transitioned from cigarettes to ST use by Wave 2 relative to those with misperception (0.4%), p=0.0001. Similar results were seen in those who transitioned to ST use by wave 3 (2.6%) vs. 0.8%, p=0.0002), Figure 2a.
- Switching to poly use of ST and combustibles (irrespective of any other poly use): Risk perception was not associated with an AS (who did not use ST) becoming a poly user of ST and combustibles by Wave 2 (p=0.1), however, a significantly higher percent of AS (who did not use ST) without misperception (4.3%) transitioned from cigarettes to ST and combustible poly use by Wave 3 relative to those with misperception (1.6%, p=0.001), Figure 2b.
- Switching to tobacco non-use: Risk perception was not associated with becoming a non-tobacco user by Wave 2 (p=0.2) or Wave 3 (p=0.5), Figure 2c.



Outcome		aOR (95% CI)	p-va
AS or AS/ST poly user switched to ST (no combustibles and irrespective of any other poly use) *Note: based on <50 respondents	Believed ST is less harmful than smoking vs misperception	3.83 (1.76-8.34)	0.00
	Age 18 to 24 years old vs 45+ years old	14.14 (1.9-105.35)	0.01
	Age 25 to 34 years old vs 45+ years old	15.78 (2.19-113.97)	0.00
	Age 35 to 44 years old vs 45+ years old	8.48 (1.05-68.3)	0.04
	GED/HS graduate vs < High school	2.25 (0.59-8.63)	0.23
	Some college+ vs < High school	2.06 (0.57-7.48)	0.26
	Cigarettes per day	0.93 (0.89-0.98)	0.00
AS switched to poly use of ST and combustibles (irrespective of any other poly use)	Believed ST is less harmful than smoking vs misperception	2.44 (1.24-4.79)	0.01
	Age 18 to 24 years old vs 45+ years old	4.26 (2.09-8.65)	0.00
	Age 25 to 34 years old vs 45+ years old	2.16 (1.13-4.1)	0.02
	Age 35 to 44 years old vs 45+ years old	1.74 (0.87-3.5)	0.11
	GED/HS graduate vs < High school	0.68 (0.42-1.09)	0.10
	Some college+ vs < High school	0.64 (0.38-1.07)	0.08
	Cigarettes per day	1 (1-1)	0.45
Tobacco non-use	Believed ST is less harmful than smoking vs misperception	1.12 (0.82-1.52)	0.47
	Age 18 to 24 years old vs 45+ years old	1.08 (0.84-1.38)	0.56
	Age 25 to 34 years old vs 45+ years old	0.9 (0.68-1.19)	0.46
	Age 35 to 44 years old vs 45+ years old	0.9 (0.68-1.19)	0.45
	GED/HS graduate vs < High school	1.08 (0.82-1.44)	0.57
	Some college+ vs < High school	1.55 (1.14-2.1)	0.00
	Cigarettes per day	0.92 (0.9-0.94)	<0.0

TABLE 1. Wave 3 multinomial logistic regression

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Submitted Abstract

Despite epidemiological evidence suggesting that using smokeless tobacco (ST) is less harmful than smoking cigarettes, many adult smokers (AS) perceive ST as equally or more harmful than cigarettes. We analyzed longitudinal PATH data to determine the changes in risk perception of ST relative to cigarettes among AS and the association between risk perception and transition from cigarettes to ST from Wave 1 (W1) to Wave 2 (W2).

We estimated the risk perception in AS (> 18 years of age, tobacco poly use possible, n=7918) across W1 and W2 using an item assessing the relative risk of ST use compared to smoking cigarettes. AS indicating that ST use is "about the same" or "more harmful" than smoking cigarettes were considered to have a risk misperception and those indicating "less harmful" were considered as without misperception. We also estimated the percent of AS who transitioned from cigarettes (W1) to exclusive use of ST (W2) stratified by risk misperception. Last, we calculated the odds of transitioning from cigarettes (W1) to exclusive ST use (W2) between those with and without risk misperception of ST adjusting for age, education, and cigarette use.

The vast majority of AS exhibited risk misperception of ST at W1 (91.5%), a rate which increased modestly at W2 (92.5%), p=.002. Significantly higher proportion of AS without misperception (2.1%) transitioned from cigarettes (W1) to ST use (W2) relative to those with misperception (0.4%), p<.001. Odds of transitioning from cigarettes (W1) to exclusive ST use (W2) was 4.5 times greater for those without the misperception relative to those with misperception of ST, p<.001. AS more likely to switch to exclusive ST use were <35 years of age and smoked fewer cigarettes.

Our findings confirm that a significant proportion of AS continue to have misperception that ST use is about the same or more harmful than smoking, a belief inconsistent with the epidemiological evidence. AS without such misperception were more likely to switch to exclusive ST. Our analyses highlight the importance of providing AS with truthful and accurate information about relative risks of ST compared to cigarettes to advance tobacco harm reduction.

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