

Association of Nicotine Harm Perceptions and Subsequent Smoking Abstinence Among Past 30-Day Smokers who Purchased JL Electronic Nicotine Delivery System

Nicholas I. Goldenson, PhD; Joshua G. Vose, MD, MBA; Shivaani Prakash, MSc, PhD; Mark L. Rubinstein, MD; Erik M. Augustson, PhD, MPH
JUUL Labs, Inc. (San Francisco, CA)

Introduction

- Research has not found an independent association between nicotine and tobacco-related diseases, including cancer. “Nicotine, though not benign, is not directly responsible for the tobacco-caused cancer, lung disease, and heart disease that kill hundreds of thousands of Americans each year.”¹
- Recent evidence suggests that misperceptions regarding the harmfulness of nicotine are widespread,^{2,3} and that relative harm perceptions of electronic nicotine delivery systems (ENDS; i.e., perceived harmfulness of ENDS compared to combustible cigarettes) among smokers who use ENDS are associated with future smoking behavior.⁴
- However, there is little longitudinal data on nicotine harm perceptions among smokers who use ENDS, and it is unknown if nicotine harm perceptions are prospectively associated with future abstinence from cigarette smoking.

Methods

- Adult past 30-day smokers (N=26,187) who recently purchased a JL ENDS Starter Kit (JUUL Labs, Inc.) participated in a longitudinal prospective cohort study and completed baseline, 1-month, 2-month, 3-month, 6-month, 9-month and 12-month follow-up assessments.
- At baseline, participants completed two measures assessing nicotine harm perceptions:
 1. “How large a part of the health risks caused by cigarette smoking comes from the nicotine itself?”
 2. “How large a part of the cancer caused by cigarette smoking comes from the nicotine itself?”
- Both measures had four response options:
 1. “A very large part or all of the health/cancer risks”
 2. “A relatively large part”
 3. “A relatively small part”
 4. “None or a very small part”
- At each follow-up assessment, participants reported if they had smoked combustible cigarettes in the past 30-days (yes/no).
- Repeated-measure logistic regressions adjusted for sociodemographic and smoking characteristics assessed associations of nicotine harm perceptions and subsequent cigarette smoking across all follow-up assessments.

Results

Table 1. Baseline Sociodemographic and Smoking Characteristics of Analytic Sample

Variable	N (%) or Mean (SD)	Available No. ^a
In your opinion, how large a part of the health risks caused by cigarette smoking comes from the nicotine itself?		
None or a very small part	3370 (12.6%)	—
A relatively small part	12697 (47.4%)	—
A relatively large part	7487 (27.9%)	—
A very large part or all of the health risks	3259 (12.2%)	—
In your opinion, how large a part of the cancer caused by cigarette smoking comes from the nicotine itself?		
None or a very small part	4698 (17.5%)	—
A relatively small part	12059 (45.0%)	—
A relatively large part	6469 (24.2%)	—
A very large part or all of the cancer risks	3554 (13.3%)	—
Sociodemographic Characteristics		
Age, yr, Mean (SD)	31.37 (10.72)	27386
Sex		27182
Male	15418 (56.7%)	
Female	11615 (42.7%)	
Transgender	149 (0.5%)	
Race/Ethnicity		25489
Non-Hispanic White	19527 (76.6%)	
Non-Hispanic African-American	837 (3.3%)	
Non-Hispanic Asian	1467 (5.8%)	
Non-Hispanic Other Race	1199 (4.7%)	
Hispanic Ethnicity	2459 (9.6%)	
Marital Status		26899
Married	6838 (25.4%)	
Divorced, Separated or Widowed	3524 (13.1%)	
Never Married	16537 (61.5%)	
Highest Level of Education Completed		25391
High school graduate or less education	7425 (29.2%)	
Some college or associate degree	10849 (42.7%)	
Bachelor's degree or more education	7117 (28.0%)	
Smoking Characteristics		
Combustible cigarette dependence at baseline	2.94 (1.11)	20843
Age started smoking regularly	18.22 (3.74)	23267
Duration regular smoker, years	12.52 (10.65)	19381
No. days smoked cigarettes in past 30 days at baseline	22.12 (10.22)	20638

Note. N=27,386.

- At baseline, 12.6% of participants responded that “None or a very small part” of the health risks caused by smoking comes from nicotine, 47.4% “A relatively small part,” 27.9% “A relatively large part” and 12.2% “A very large part or all of the health risks” (**Table 1**).
- Similarly, 17.5% responded that “None or a very small part” of the cancer risks caused by smoking comes from nicotine, 45.0% “A relatively small part,” 24.2% “A relatively large part” and 13.3% “A very large part or all of the health risks” of the cancer risks (**Table 1**).
- Unadjusted associations of nicotine harm and cancer perceptions and subsequent cigarette smoking across follow-up are presented in **Table 2**.
- After adjustment for sociodemographic and smoking

Table 2. Unadjusted Association of Nicotine Harm and Cancer Perceptions and Subsequent Cigarette Smoking Across Follow-Up

Nicotine Perception	Response Option	Cigarette Smoking Across Follow-Up Unadjusted OR (95%CI)
Reference		
In your opinion, how large a part of the health risks caused by cigarette smoking comes from the nicotine itself?	A relatively small part	0.90 (0.84, 0.96)
	A relatively large part	0.83 (0.78, 0.88)
	A very large part or all of the health risks	0.99 (0.92, 1.06)
In your opinion, how large a part of the cancer caused by cigarette smoking comes from the nicotine itself?	A relatively small part	0.87 (0.82, 0.93)
	A relatively large part	0.85 (0.80, 0.91)
	A very large part or all of the health risks	1.07 (0.98, 1.15)

Note. N=112,635 observations; N=26,607 participants. Follow-up = 1-, 2-, 3-, 6-, 9-, 12-month follow-up assessments

Table 3. Association of Nicotine Harm Perceptions and Covariates with Subsequent Cigarette Smoking Across Follow-Up

Regressor	Past 30 - Day Abstinence From Smoking OR (95% CI)
Nicotine Harm Perceptions	
None or a very small part	Ref
A relatively small part	0.85 (0.77, 0.94)
A relatively large part	0.83 (0.76, 0.91)
A very large part or all of the health risks	1.03 (0.92, 1.15)
Time Effects	
Time	1.24 (1.23, 1.25)
Sociodemographic Covariates	
Age	1.00 (0.99, 1.00)
Sex	
Male	Ref
Female	0.95 (0.90, 1.01)
Transgender	0.91 (0.64, 1.31)
Race/Ethnicity	
Non-Hispanic White	Ref
Non-Hispanic African-American	1.09 (0.93, 1.28)
Non-Hispanic Asian	0.88 (0.78, 0.99)
Non-Hispanic Other Race	0.96 (0.84, 1.09)
Hispanic Ethnicity	1.01 (0.91, 1.11)
Marital Status	
Married	Ref
Divorced, Separated or Widowed	0.87 (0.79, 0.95)
Never Married	0.75 (0.70, 0.80)
Highest Level of Education Completed	
High school graduate or less education	Ref
Some college or associate degree	0.88 (0.82, 0.94)
Bachelor's degree or more education	0.85 (0.79, 0.92)
Smoking Covariates	
Combustible cigarette dependence at baseline	0.95 (0.92, 0.98)
Age started smoking regularly	1.00 (0.99, 1.01)
Duration regular smoker	0.98 (0.97, 0.98)
No. days smoked cigarettes in past 30 days at baseline	0.97 (0.97, 0.97)
No. cigarettes smoked per day at baseline	0.99 (0.99, 0.99)

Note. N=62,982 observations; N=14,846 participants. Follow-up = 1-, 2-, 3-, 6-, 9-, 12-month follow-up assessments

characteristics (**Table 1**), compared to participants who stated “None or a very small part” of the health risks caused by smoking comes from nicotine, those who stated a “A relatively small part” (adjusted odds ratio: aOR [95% CI] = 0.85 [0.77, 0.94]) and “A relatively large part” (aOR [95% CI] = 0.83 [0.76, 0.91]) had significantly lower odds of reporting past 30-day

Table 4. Association of Nicotine Cancer Perceptions and Covariates with Subsequent Cigarette Smoking Across Follow-Up

Regressor	Past 30 - Day Abstinence From Smoking OR (95% CI)
Nicotine Cancer Perceptions	
None or a very small part	Ref
A relatively small part	0.84 (0.76, 0.92)
A relatively large part	0.82 (0.75, 0.89)
A very large part or all of the cancer risks	0.95 (0.86, 1.06)
Time Effects	
Time	1.24 (1.23, 1.25)
Sociodemographic Covariates	
Age	1.00 (0.99, 1.00)
Sex	
Male	Ref
Female	0.95 (0.90, 1.01)
Transgender	0.91 (0.63, 1.31)
Race/Ethnicity	
Non-Hispanic White	Ref
Non-Hispanic African-American	1.10 (0.94, 1.29)
Non-Hispanic Asian	0.88 (0.78, 1.00)
Non-Hispanic Other Race	0.96 (0.84, 1.09)
Hispanic Ethnicity	1.00 (0.91, 1.10)
Marital Status	
Married	Ref
Divorced, Separated or Widowed	0.87 (0.80, 0.96)
Never Married	0.75 (0.70, 0.81)
Highest Level of Education Completed	
High school graduate or less education	Ref
Some college or associate degree	0.88 (0.82, 0.94)
Bachelor's degree or more education	0.85 (0.79, 0.92)
Smoking Covariates	
Combustible cigarette dependence at baseline	0.95 (0.92, 0.98)
Age started smoking regularly	1.00 (0.99, 1.01)
Duration regular smoker	0.98 (0.97, 0.98)
No. days smoked cigarettes in past 30 days at baseline	0.97 (0.97, 0.97)
No. cigarettes smoked per day at baseline	0.99 (0.99, 1.00)

Note. N=63,003 observations; N=14,845 participants. Follow-up = 1-, 2-, 3-, 6-, 9-, 12-month follow-up assessments

abstinence from smoking across all follow-ups, but the association was not significant among those who stated “A very large part or all of the health risks” (aOR [95% CI] = 1.03 [0.92, 1.15]; **Table 3**).

- Compared to smokers who stated “None or a very small part” of the cancer risks caused by smoking comes from the nicotine (the reference group), those who stated a “A relatively small part” (adjusted odds ratio: aOR [95% CI] = 0.84 [0.76, 0.92]) and “A relatively large part” (aOR [95% CI] = 0.82 [0.75, 0.89]) had significantly lower odds of reporting past 30-day abstinence from smoking across all follow-ups, but the association was not significant among those who stated “A very large part or all of the cancer risks” (aOR [95% CI] = 0.95 [0.86, 1.06]) after covariate adjustment (**Table 4**).

Conclusions

- Among adult past 30-day smokers who purchased a JL ENDS, misperceptions regarding the harm of nicotine were relatively common.
- Beliefs that nicotine caused a relatively large part of the health or cancer risk of smoking (vs. none or a very small part) were prospectively associated with reduced odds of subsequent past 30-day abstinence from combustible cigarette smoking across a 12-month period.
- Accurately communicating the independent disease and cancer risk of nicotine may be important for supporting the efforts of smokers who use ENDS to transition away from combustible tobacco products.

References

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