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Use of Tobacco for Weight Control Across Products Among Young Adults in the U.S. Military

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Keywords

weight control; nicotine; dieting

Introduction

It is well documented that cigarettes are commonly used to attempt to lose or maintain body weight (Ayers et al., 2017; French & Jeffery, 1995; Potter et al., 2004). Nicotine facilitates modest weight maintenance by increasing metabolism and suppressing appetite, and using tobacco is a behavioral distraction from eating (Audrain-McGovern & Benowitz, 2011). Among adolescent and adult cigarette users, particularly females, weight concerns have been associated with uptake and increased cigarette consumption (French & Jeffery, 1995; Potter et al., 2004). Weight gain, which is experienced by most cigarette users after cessation (Aubin et al., 2012; U.S. Department of Health, 2014), is a commonly reported reason to not quit cigarettes (Klesges & Shumaker, 1992; Pirie et al., 1991) and has been related to relapse (Ockene et al., 2000).

Electronic cigarettes (e-cigarettes), widely perceived as a safer alternative to cigarettes (Glasser et al., 2017), were originally promoted as cigarette cessation aides (Glasser et al., 2017). However, with the increase in popularity of e-cigarettes among individuals who have never smoked cigarettes (McMillen et al., 2014), especially in youth, individuals are reporting additional reasons for initiation (Ayers et al., 2017; Soule et al., 2016). One study found 13.5% of those reporting past month e-cigarette use, and were also interested in losing

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weight, had vaped specifically for weight purposes (Morean & Wedel, 2017). In another study, among adolescent and adults who used e-cigarettes daily or less frequently, 4.6% vaped for weight control (Jackson et al., 2019). E-cigarettes deliver nicotine and are a similar behavioral distraction from eating (Glover et al., 2016). Additionally, certain e-cigarette flavors (e.g., vanilla) might help reduce food cravings (Morean & Wedel, 2017; Glover et al., 2016).

As e-cigarette marketing increasingly promotes weight loss benefits (Singh et al., 2017) and obesity researchers explore the effectiveness of e-cigarettes for weight maintenance (Glover et al., 2016), there is concern that some populations, specifically those with overweight [Body Mass Index (BMI) = 25.0–29.9 kg/m^2], obesity (BMI > 30 kg/m^2), or disordered eating, will be more vulnerable to initiation (Morean & Wedel, 2017; Morean & L'insalata, 2018; Strong et al., 2015). Importantly, having a higher BMI has been associated with increased e-cigarette experimentation (Morean & Wedel, 2017; Strong et al., 2015) and college e-cigarette users with weight concerns were more likely to consume e-cigarettes more frequently than those without such concerns (Bloom et al., 2019). Further, vaping for weight control has been associated with longer time spent vaping per day (Morean & Wedel, 2017). Although women are more likely to use cigarettes to control body weight than men (French & Jeffery, 1995; Klesges & Shumaker, 1992; Potter et al., 2004), recent research indicates that men and women may be equally likely to vape for weight loss purposes (Morean & Wedel, 2017). However, the generalizability of most previous studies exploring e-cigarettes and weight control is limited because they have primarily included college, White, and female samples (Bennett & Pokhrel, 2018; Bloom et al., 2019; Jackson et al., 2016; Strong et al., 2015). Additionally, demographic differences in the use of e-cigarettes for weight control have been infrequently explored (Morean & Wedel, 2017).

Despite continued widespread use of other tobacco products (i.e., cigarillos/little cigars, smokeless tobacco, hookah) in the United States (U.S.) (Wang et al., 2018), there has been less attention to the relationship between using these products and weight loss motives (Caria et al., 2009; Gerend et al., 1998; Saarni et al., 2004; Smith & Severson, 1999; Weg et al., 2005). Yet, there is some indication that using smokeless tobacco is associated with motivations for weight loss (Saarni et al., 2004; Smith & Severson, 1999) and a higher body weight (Weg et al., 2005). Although many U.S. adults (i.e., 9 million) currently are using two or more tobacco products, less is understood about the use of multiple products to attempt to maintain or lose weight (Bloom et al., 2019; Morean & Wedel, 2017; Wang et al., 2018).

The U.S. military is a population at high risk for tobacco use, with prevalence up to twice as high as the general population across products (Aguka et al., 2014; Creamer et al., 2019; Department of Defense, 2011; Little et al., 2016) including e-cigarettes (King et al., 2015; Little et al., 2015; Little et al., unpublished data). Further, contrary to the misconception that all military personnel have a normal BMI, almost two thirds of active duty military personnel have BMIs in the overweight or obese ranges (Meadows et al., 2018) and, on average, gain weight incrementally each year after enlistment (Webber et al., 2020). This is important, because annual fitness failures (based on a combination of waist circumference, 1.5-mile timed run, and BMI in the Air Force, for example) can impede military careers and

result in discharge (Webber et al., 2020). Given high rates of tobacco, and increased motivation for weight maintenance, the U.S. military population might be particularly vulnerable to use tobacco for this purpose.

Thus, the aim of the current study was to explore the prevalence, as well as demographic and behavioral correlates, of ever using tobacco (i.e., e-cigarettes, cigarettes, smokeless tobacco, cigarillos/little cigars, hookah) for weight maintenance among a military population. Additionally, this sample provided a unique opportunity to explore the ever use of these products for weight maintenance in a large non-college young adult population diverse in gender, ethnicity, and race. Further, because more than 250,000 people leave the military each year (Office of the Chairman of the Joint Chiefs of Staff, 2014), understanding the prevalence of using tobacco products for weight control in this population can have implications for both the military and civilian sector.

Based on previous research indicating a relationship between higher BMI and e-cigarette and smokeless tobacco use (Morean & Wedel, 2017; Strong et al., 2015; Weg et al., 2005) we hypothesized that those with a normal BMI would be less likely to report ever using products for weight maintenance. Given that Morean & Wedel (2017) found an association between weight loss motives and frequency of daily e-cigarette use, and this relationship has been shown for cigarettes (French & Jeffery, 1995; Potter et al., 2004) we hypothesized that individuals with weight motivations would consume all tobacco more frequently. In exploratory analyses, we explored whether those who perceived tobacco to be less harmful would be more likely to have used these products for weight control compared to those with more harmful perceptions. To our knowledge, previous research has not explored the relationship between tobacco harm perceptions and the use of these products for weight maintenance. Finally, we explored whether ever using e-cigarettes for weight control was associated with concurrently using other products more frequently (i.e., daily) rather than less frequently.

Methods

Study design and participants

Participants were 24,543 United States Air Force (AF) recruits attending Technical Training (TT) from four bases: Joint Base San Antonio-Lackland, Joint Base San Antonio-Fort Sam Houston, Keesler AF Base, or Sheppard AF Base. All trainees are required to complete 8.5 weeks of basic military training (BMT), during which tobacco and alcohol are banned. After BMT, trainees attend TT for job skills which can range from several weeks to two years depending on career field. Alcohol and tobacco are prohibited during the first two weeks of TT. Across bases, during their first two weeks of TT, participants consented to a one-time questionnaire about their history of tobacco use prior to BMT. The protocol used was approved by the Institutional Review Board at the 59th Medical Wing. Participants were recruited from March 2016 to January 2019. Of Airmen initially approached (N = 31, 187), 25,979 (83.3%) consented to the study. Participants were eligible if they were at least 18 years of age. They were not provided compensation but told that their participation could help with understanding tobacco use in the U.S. military.

Measures

Demographics.—Participants self-reported information on age, BMI (i.e., calculated from self-reported height and weight), gender, race, ethnicity, marital status and education.

Weight control.—Airmen responded "*yes*" or "*no*" to "To maintain your body weight, have you used X product?" for: e-cigarettes, cigarettes, smokeless tobacco, cigarillos/little cigars, and hookah.

Tobacco use.—Airmen reported history of tobacco use (i.e., e-cigarettes, cigarettes/roll your own cigarettes, cigarillos/little cigars, smokeless tobacco, hookah) prior to BMT (since current use was banned, as described above). Responses included: *I never used (product)*, *I used (product) but quit prior to BMT (at least 30 days), I used (product) less than monthly*, *I smoked/used (product) monthly (not weekly but at least once a month)*, *I smoked/used (product) weekly (not daily but at least once a week)*, *I smoked/used (product) every day*. Those who indicated daily use of a product responded to the statement: *I smoked/used (product) X amount per day*. To assess the prevalence of ever use of products for weight control, we examined this question among only those who reported using the product less than monthly or more frequently (i.e., monthly, weekly, daily) prior to the tobacco ban. We chose this definition as it is most consistent with definitions in previous articles on this topic (Jackson et al., 2019; Morean & Wedel, 2017). Previous studies examined prevalence of using products for weight control among those who indicated "daily or less frequent use" (Fidler et al., 2011; Jackson et al., 2019) or "past month use" (Morean & Wedel, 2017). Thus, these definitions are inclusive of infrequent product users similarly to the current definition. We also wanted our assessment of the prevalence of ever use of tobacco products for weight control to be measured among all personnel who defined themselves as a tobacco product user, even if using these products infrequently (i.e., less than monthly). Dual use was defined as using two products (i.e., less than monthly or more frequently) prior to BMT, and poly use was defined as using three or more products (i.e., less than monthly or more frequently). Never users were those who did not report use of a tobacco product prior to BMT.

Harm beliefs.—Airmen responded, "*don't know*," "*harmful to extremely harmful*," "*moderately harmful*," or "*not harmful to a little harmful*" in response to "Please rate how harmful (bad for your health) you think X product is" for: e-cigarettes, cigarettes, smokeless tobacco, cigarillos/little cigars, and hookah.

Data Analysis

Descriptive statistics were observed for tobacco use prevalence and frequency of ever using tobacco for weight control in the overall sample. Among those using less than monthly or more frequently, as well as former users, of each tobacco product, chi-square tests compared demographic characteristics (i.e., gender, race, ethnicity, educational background, BMI, age group) in relationship to having used each tobacco product (*yes* versus *no*) for weight control while controlling for all demographic factors. Additionally, chi-square tests compared demographic characteristics in relationship to dual or poly use of products for weight control. Secondly, chi-square tests compared harm beliefs of each tobacco product in

relationship to having used that product for weight control. Thirdly, Mann-Whitney U tests were run to compare the relationship between the reported frequency of use of each product (i.e., daily, weekly, monthly, less than monthly) having used that product (*yes* versus *no*) for weight control. In additional analyses, among daily users, frequency of daily use was compared to having used that product (*yes* versus *no*) for weight control using Mann-Whitney U tests. Finally, chi-square tests compared the tobacco status (i.e., former user, daily, weekly, monthly, less than monthly user) of other products (i.e., cigarettes, smokeless tobacco, cigars, cigarillos/little cigars, hookah, pipe) in relationship to having ever used e-cigarettes (*yes* versus *no*) for weight control. In our analyses, to account for multiple comparisons, a Bonferroni -corrected significance level of 0.0083 was used considering that we had six formal comparisons under each smoking modality definition. For this manuscript, we restricted the final data (N = 25,979) to those providing complete demographics characteristics, as well as complete data of enrollment weight and status of all tobacco product use. These restrictions resulted in a final sample size of 24,543.

Results

Sample

Overall (N = 24,543), the majority was male (73.5%), non-Hispanic/Latino (81.9%), single (88.1%) and active duty (82.7%). The sample [Mean = 20.7 (SD = 3.3) years of age] was diverse in racial (i.e., 67.0% White/Caucasian, 16.8% Black/African American, 4.4% Asian, 2.7% Other race, 9.2% multiple races) and educational backgrounds (i.e., 55.2% high school diploma/GED or less). Most either had a normal BMI (65.0%) or overweight BMI (BMI = 25.0–29.9) (33.6%).

Prevalence of Tobacco Product Use

Approximately 17.8% of the entire sample used e-cigarettes monthly and 12.7% used cigarettes monthly (Table 1). Monthly use of other products ranged in prevalence; specifically, 6.9% used smokeless tobacco, 13.1% used cigarillos/little cigars, and 0.4% used hookah. The prevalence of dual and poly tobacco use (i.e., less than monthly or more frequently) was high, with 8.0% of the overall sample using two products and 12.1% using three or more tobacco products.

Use of Tobacco Products for Weight Control

Among the entire sample, 1.3% (n = 308) had used e-cigarettes, 1.4% (n = 343) had used cigarettes, 1.1% (n = 271) had used smokeless tobacco, 0.7% (n = 159) had used cigarillos/little cigars, and 0.6% (n = 135) had used hookah for weight control. In addition, 1.0% (n = 240) had used two tobacco products and 0.5% (n = 112) had used three or more products to control their weight.

Among monthly or less frequent users of each of these tobacco products, approximately 5.5% (n = 239) had used e-cigarettes for weight control and 7.3% (n = 227) had used cigarettes to maintain weight. Approximately 12.2% (n = 327) of smokeless tobacco users had used this product for weight control. Further, 3.3% (n = 107) had used cigarillos/little cigars and 3.2% (n = 81) had used hookah products for weight control.

Among former users of each of these tobacco products, 4.3% (n = 45) had used e-cigarettes and 7.2% (n = 94) had used cigarettes for weight control. Approximately 8.4% (n = 64) of former smokeless tobacco users had used this product to maintain weight. Further, 3.5% (n = 27) had used cigarillos/little cigars and 5.0% (n = 32) had used hookah to control their weight.

Demographic Comparisons.

E-Cigarettes.—Among e-cigarette users (including former use), while controlling for all other factors, differences in education (p=.0006) and BMI (p=.0018) were observed between those who had used them to control weight (Table 2). A greater proportion of those with a high school degree/GED reported using e-cigarettes for weight control (6.1%) compared to those with more education (4.0%). Those with a BMI = 25.0 – 29.9 were more likely (6.6%) to use them to control weight compared to those with a normal BMI and a BMI > 30 (4.6%, 1.9%, respectively). No other differences were observed (p's > .0083).

Cigarettes.—Among cigarette users (including former use), controlling for all other factors, differences in gender (p<.0001), BMI (p<.0001), and ethnicity (p=.0055) were observed in the use of cigarettes for weight control (Table 2). Approximately 13% of women compared to 5.9% of men had used cigarettes for weight control. Among those with obesity (i.e., BMI > 30), 17.0% had used cigarettes to control weight compared to 9.4% of those with an overweight BMI and 5.7% with a normal BMI. Those who identified as non-Hispanic/Latino were more likely (7.7%) to have used this product for weight control than those who identified as Hispanic/Latino (5.3%). No other differences were observed (p's > .0083).

Smokeless tobacco.—Among smokeless tobacco users (including former use), controlling for all other factors, differences in BMI (p<.001) were observed in the use for smokeless tobacco for weight control (Table 2). Those with obesity were the most likely to have used smokeless tobacco for weight control (19.6%), followed by those with an overweight BMI (11.4%) and those with a normal BMI (6.8%). No other differences were observed (p's > .0083).

Cigarillos/little cigars.—Among cigarillos/little cigar users (including former use), controlling for all other factors, Black/African American individuals and those classified as Other race were more likely to report using them for weight maintenance (5.3%, 5.2%, respectively) compared to White/Caucasian (2.6%) and Asian (3.7%) (p=.0007) (Table 2). Personnel with a high school diploma/GED were more likely (4.1%) to have used cigarillos/little cigars for weight maintenance compared to those with more education (2.4%) (p=.0017). No other differences were observed (p's > .0083).

Hookah.—Of hookah users (including former use), controlling for all other factors, those with a high school diploma/GED were more likely (4.7%) to have used hookah for weight control compared to those with more education (2.5%) (p=.0014) (Table 2). No other differences were observed (p's > .0083).

Dual Use.—Overall, men were more likely than women to report using two tobacco products to control their weight (1.1% versus 0.7%; $p = .0025$). Non-Hispanic/Latino individuals were more likely to report dual use of products for weight control compared to Hispanic/Latino individuals (1.1% versus 0.6%; $p = .0059$). No other differences were observed (p's > .0083).

Poly Use.—No differences were observed (p's > .0083).

Harm Perceptions

Individuals who perceived e-cigarettes as less harmful were more likely to have used e-cigarettes to control weight ($p<.0001$) (Table 3). Specifically, 2.7% ($n = 175$) of individuals who reported e-cigarettes were "*not harmful to a little harmful*" had used them to maintain weight compared to 1.3% ($n = 51$) of those who believed they were "*moderately harmful*," 0.8% ($n = 15$) who did not know about e-cigarette harm and 0.6% who believed they were "*harmful to extremely harmful*." Similar associations were found for all other products (Table 3).

Frequency of Product Use

Having used a product (*yes* versus *no*) for weight control was associated with the frequency of use of that product (i.e., daily, weekly, monthly, less than monthly). Specifically, among e-cigarette users, 9.1% of daily users had used this product for weight control compared to 5.8% of weekly, 3.5% of monthly and 2.3% of less than monthly users ($p<.001$). Among cigarette users, a higher prevalence of daily users (15.6%) had used these products to maintain weight compared to 8.3% of weekly, 5.7% of monthly, and 1.5% of less than monthly users ($p<.001$). Among smokeless tobacco users, 16.1% of daily, 10.3% of weekly, 5.0% of monthly, and 2.4% of less than monthly had used this product for weight control ($p<.001$). Among hookah users, 7.5% of daily users had used this product to maintain weight compared to 6.8% of weekly, 4.6% of monthly, and 2.1% of less than monthly users ($p<.001$).

In additional analyses, among daily users of each product, having used a product for weight control was associated with a higher mean frequency of daily use of that product (p's <.05).

Vaping for Weight Control & Other Product Use

Using e-cigarettes for weight control was significantly related to the tobacco status of all other products ($p<.0083$) (Table 4). A higher percentage of those who had vaped for weight control were daily and former cigarette users (4.5%, 4.2%, respectively) compared to 3.7% weekly, 3.0% monthly, 2.0% less than monthly, and 0.8% never cigarette users ($p<.001$). Vaping for weight purposes was most common among weekly and former smokeless tobacco users (4.6%, 5.0%, respectively) compared to daily, monthly, less than monthly, or never users. Additionally, vaping for this purpose was most common among daily cigar users (26.7%) compared to those using cigars formerly and less frequently ($p<.001$). Using e-cigarettes for weight maintenance was more prevalent among more frequent and former users of cigarillos/little cigars, hookah, and pipe.

Discussion

Ever use of tobacco for weight maintenance ranged in prevalence, with smokeless tobacco the most common product used for this purpose (12.2%), followed by cigarettes (7.3%), e-cigarettes (5.5%), cigarillos (3.3%), and hookah/pipe (3.2%). Approximately 18% of this sample used e-cigarettes monthly or more frequently, which was higher compared to past month rates among both U.S. young adults (7.6%) (Creamer et al., 2019) and other Air Force samples (15.3%) (Little et al., unpublished data); which may reflect increasing use prevalence of this form of tobacco product. Further, due to the 8 ½ week tobacco ban within the recruitment year, this rate of e-cigarette use might underrepresent those who had used in the past month prior to Air Force training but did not identify themselves as a monthly or more frequent user. Prevalence of those who had vaped for weight maintenance was smaller compared to other weight loss seeking adults (13.5%) (Morean & Wedel, 2017), but was comparable to a sample of e-cigarette users older than 16 years in England (4.6%) (Jackson et al., 2019). Weight maintenance is a requirement in the military and failure to meet fitness requirements can ultimately result in discharge. Because recruits are screened for health, most of this sample had normal BMI (65%). As a result, perhaps fewer individuals in our sample were concerned with weight loss. However, although not assessed in the current study, some personnel possibly used these products for losing weight and might have been missed. Thus, similarly, to Jackson & colleagues (2019), these findings are likely most generalizable to those interested in maintaining weight. Additionally, previous young adult samples measured e-cigarette weight motives among college students (Bennett & Pokhrel, 2018; Bloom et al., 2019; Strong et al., 2015); thus, current results might help reflect the beliefs of young adults not enrolled in college.

Because two thirds of military personnel are overweight or obese (Webber et al., 2020), weight stigma in the U.S. military is common (Schvey et al., 2017), and career promotion and retention is dependent upon fitness standards (Webber et al., 2020), military tobacco interventions might need to include strategies for weight control. The literature is limited on whether e-cigarettes are actually an effective weight maintenance tool (Glover et al., 2016), and the CDC has issued a statement about some serious short-term consequences of these products, including hospitalizations and death (CDC, 2019). This belief that tobacco, including e-cigarettes, helps to prevent weight gain might continue to exacerbate military tobacco disparities (Aguka et al., 2014; Creamer et al., 2019; Department of Defense, 2011; King et al., 2015; Little et al., 2015; Little et al., 2016; Little et al., In Press). Thus, health education about the harm of these products, and discussion about other lifestyle factors which might promote weight control, could possibly help reduce tobacco rates among young adults.

This sample had used smokeless tobacco for weight maintenance more commonly than other products. This rate (12.2%) was lower than reports among female users (16.6% - 37.3%) (Gerend et al., 1998; Smith & Severson, 1999), but higher compared to a previous male sample (1.7%) (Smith & Severson, 1999). Consistent with the literature (French & Jeffery, 1995; Potter et al., 2004), 7.3% of cigarette users had used them for weight control purposes. However, use of other products for weight maintenance is less known. In this sample, 3% of both cigarillo and hookah users had used them to control weight. Although many

participants reported at least infrequent (i.e., less than monthly) use of two products (8.0%) and three or more products (12.1%), it was relatively uncommon to use two (1%) or multiple (.5%) products specifically for weight control.

Differences in BMI, gender, education, race and ethnicity were found in the likelihood of using all products for weight maintenance. Only having an overweight BMI was associated with having vaped for weight control, inconsistent with findings indicating an association with both an overweight and obese BMI (Bennett & Pokhrel, 2018; Morean & Wedel, 2017; Strong et al., 2015). Having both an overweight or obese BMI was associated with having used cigarettes and smokeless tobacco for weight maintenance. However, because obesity in this sample was uncommon (1.3%), generalizability is limited. Similarly, to previous literature, women more commonly had used cigarettes for weight control (French & Jeffery, 1995; Potter et al., 2004) and men were just as likely as women to have vaped for weight control (Morean & Wedel, 2017). In fact, no gender differences were found in the use of any other product for weight maintenance, despite research indicating women use smokeless tobacco more commonly for this purpose (Gerend et al., 1998; Smith & Severson, 1999). Vaping and using hookah for weight control was more common among those with only a high school diploma/GED. Differences in racial background were observed in cigarillo/little cigar use; specifically, those classified as Black and Other race were more likely to have used this product for weight control compared those White or Asian. Additionally, non-Hispanic/Latino personnel were more likely to have used cigarettes for weight control than those who were Hispanic/Latino. Results highlight that ever using tobacco for weight maintenance is more prevalent among certain demographic groups. Additionally, motives for weight control are likely different (e.g., concern about physical appearance, maintaining fitness) across personnel (Maclin-Akinyemi et al., 2017).

Those who had used tobacco to maintain weight were more likely to perceive that product as less harmful. To aid in tobacco cessation, it would be helpful to provide education about tobacco harm, particularly for those using for weight control. Additionally, vaping for weight control was associated with more frequent use consistent with prior research (Bennet & Pokhrel, 2018; Morean & Wedel, 2017). As many as 9.1% of daily e-cigarette users had used them for weight control compared to only 5.8% of weekly users. In fact, ever using all products for weight maintenance was associated with using them more regularly, as well as at a higher daily frequency. Across daily users, approximately 16% had used cigarettes and smokeless tobacco, 9% had used cigarillos/little cigars, and 7.5% had used hookah for weight purposes. Perhaps, those who use tobacco to manage cravings or as a behavioral distraction from eating, might be more likely to use that product every day, as well as more frequently throughout the day. Further, frequent use of tobacco products might be due to multiple reasons in addition to nicotine dependence.

Ever vaping for weight maintenance was also associated with being a daily, weekly or former user of other products, rather than a less frequent or never-user. Because these data are cross-sectional, it is unknown if those who began using e-cigarettes subsequently became current or former users of other products. However, results do suggest many individuals who have vaped for weight maintenance currently use other products. Because dual use is common among civilians and the U.S. military (Creamer et al., 2019; Dall et al., 2007; Little

et al., 2016), it will be important for tobacco interventions implementing a weight maintenance component to acknowledge that many individuals using e-cigarettes for weight purposes might concurrently be using other products.

Limitations

This sample consisted of an Air Force sample and therefore might be limited in generalizability to other military branches or civilian populations. However, all military branches have similar fitness standards (Dall et al., 2007) and these recruits were reporting their tobacco use prior to entering the service. Further, this sample offered a unique opportunity to include a large population of generally lower income young adults not enrolled in college, as well as examine a more racially and gender diverse sample (Bennett & Pokhrel, 2018; Bloom et al., 2019; Strong et al., 2015). An important consideration is that it is unknown if the current sample was able to successfully maintain weight due to using these products. Additionally, given the wording of the questionnaire, it is likely that individuals who had used these products specifically for weight loss were underrepresented. Thus, it is possible that our results underestimate the phenomenon of U.S. military personnel using tobacco products for weight purposes. Future studies should assess whether individuals use tobacco for either weight maintenance or weight loss. Further, due to the military nature of the sample, participants had just completed an 8 ½ week enforced tobacco ban during basic military training. Assessment of tobacco product use for weight purposes was examined among personnel who used products less than monthly (or more frequently) prior to the tobacco ban. Although other studies similarly observed the prevalence of using products for weight control among both infrequent and frequent product users (Fidler et al., 2011; Jackson et al., 2019; Morean & Wedel, 2017), this study does not examine prevalence exclusively among current users of these products. Thus, further explorations should examine the use of these products for weight purposes among only current (past month) users. Given the cross-sectional nature of this sample, it will be important for future studies to explore how use of products for weight control is associated with long-term use. Finally, it is not clear why personnel initiated tobacco use; but, clearly for some, tobacco use was associated with weight control.

Conclusion

Many military young adults had used a tobacco product for weight control and this motivation was associated with more frequent use and believing the product to be less harmful. Important demographic differences in the use of products for weight control were also found. Specifically, for e-cigarette users, those with a higher BMI and less education were more likely to have used this product for weight control. This is concerning given rising rates of e-cigarettes among young adults, as well as higher rates of e-cigarettes in the military compared to civilian populations and the prevalence of military members who are overweight. Tobacco cessation programs, particularly among young adults in the military, should assess for weight motivations and provide alternative and healthier strategies for weight maintenance.

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Table 1.

Tobacco Use Prevalence of Sample (N = 24,543)

Tobacco Product	At least monthly current use N (%)	Less than monthly use N (%)	Former Use N (%)
E-Cigarette	2886 (11.8)	1460 (6.0)	1045 (4.3)
Cigarette	1870 (7.6)	1242 (5.1)	1299 (5.3)
Smokeless tobacco	1682 (6.9)	1001 (4.1)	762 (3.1)
Cigarillo/little cigars	1391 (5.7)	1830 (7.5)	765 (3.1)
Hookah	839 (3.4)	1721 (7.0)	636 (2.6)

Note: % are in the overall population; Electronic cigarette (e-cigarette)

Table 2.

Demographic Differences Across Product Use for Weight Control

	E-cigarettes	Cigarettes	Smokeless tobacco	Cigarillos/Little cigars	Hookah
	N (%)	N (%)	N (%)	N (%)	N (%)
Gender					
Male	223 (5.1)	213 (5.9) *	240 (9.0)	109 (3.3)	88 (3.8)
Female	61 (6.0)	110 (13.0) *	9 (5.7)	25 (3.8)	25 (2.8)
Race					
White	211 (5.2)	244 (7.0)	224 (9.2)	75 (2.6) *	59 (2.9)
Black	21 (4.5)	19 (6.5)	6 (6.5)	33 (5.3) *	26 (4.3)
Asian	7 (3.4)	19 (11.4)	2 (4.4)	3 (3.7) *	5 (4.0)
Other	45 (7.1)	41 (8.2)	17 (7.1)	23 (5.2) *	23 (5.4)
Ethnicity					
Hispanic/Latino	41 (4.7)	39 (5.3) *	16 (4.9)	16 (2.8)	27 (3.9)
Non-Hispanic/Latino	243 (5.4)	284 (7.7) *	233 (9.3)	118 (3.5)	86 (3.4)
BMI					
Normal	162 (4.6) *	157 (5.7) *	111 (6.8) *	80 (3.3)	78 (3.9)
Overweight	118 (6.6) *	154 (9.4) *	129 (11.4) *	53 (3.7)	34 (3.0)
Obese	1 (1.9) *	8 (17.0) *	9 (19.6) *	1 (1.8)	1 (2.6)
Education					
>High school	81 (4.0) *	161 (7.6)	154 (9.6)	41 (2.4) *	43 (2.5) *
High school/GED	203 (6.1) *	162 (7.0)	95 (7.9)	93 (4.1) *	70 (4.7) *
Age group					
17–30 years	281 (5.3)	305 (7.1)	245 (8.9)	132 (3.4)	110 (3.5)
30–40 years	3 (5.1)	18 (14.0)	4 (8.2)	2 (3.5)	3 (5.7)
40 + years	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)

Note:

** P-value significance was Bonferroni corrected (p<.0083);* Chi-square tests were used for comparisons*; %* are among less than monthly or more frequent, as well as former, tobacco users; GED = Generalized Educational Development; BMI = Body Mass Index.

Table 3.

Harm Perceptions of Tobacco Products in Relationship to Prevalence of Using Product for Weight Control

	Harm Perceptions of Each Tobacco Product			
	Harmful – Extremely Harmful	**Moderately Harmful**	**Not Harmful – Little Harmful**	**Don't know**
E-Cigarettes				
Used for weight control N (%)	67 (0.6)	51 (1.3)	175 (2.7)	15 (0.8)
Cigarettes				
Used for weight control N (%)	290 (1.3)	32 (3.7)	19 (6.7)	1 (0.6)
Smokeless tobacco				
Used for weight control N (%)	117 (0.6)	75 (3.7)	78 (7.2)	0 (0.0)
Cigarillos/Little cigars				
Used for weight control N (%)	103 (0.5)	23 (1.0)	30 (2.4)	1 (0.1)
Hookah				
Used for weight control N (%)	56 (0.4)	21 (0.7)	44 (1.1)	11 (0.3)

Note: All comparisons significant $p<.0001$ using chi-square tests

Table 4.

Prevalence of Vaping for Weight Control Across Tobacco Status of Other Products

	N (%)
Cigarettes	
Daily	41 (4.5)
Weekly	16 (3.7)
Monthly	16 (3.0)
Less than monthly	25 (2.0)
Former	55 (4.2)
Never	153 (0.8)
Smokeless tobacco	
Daily	21 (2.4)
Weekly	18 (4.6)
Monthly	14 (3.5)
Less than monthly	22 (2.2)
Former	38 (5.0)
Never	490 (1.1)
Cigar	
Daily	4 (26.7)
Weekly	7 (4.5)
Monthly	20 (3.6)
Less than monthly	34 (1.9)
Former	18 (4.7)
Never	221 (1.0)
Cigarillos/little cigars	
Daily	4 (2.2)
Weekly	22 (5.3)
Monthly	27 (3.4)
Less than monthly	48 (2.6)
Former	26 (3.4)
Never	177 (0.9)
Hookah	
Daily	2 (5.0)
Weekly	12 (5.1)
Monthly	22 (3.9)
Less than monthly	50 (2.9)
Former	29 (4.6)
Never	186 (0.9)
Pipe	
Daily	2 (11.8)
Weekly	1 (2.1)
Monthly	6 (5.7)

	N (%)
Less than monthly	9 (2.5)
Former	17 (10.0)
Never	267 (1.1)

Note:

* *P-value significance was Bonferroni corrected (p<.0083);* Chi-square tests were used for comparisons