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'Stand by Me' Designated Tobacco Areas on U.S. Military Installations

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This is to certify that the doctoral dissertation by

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Abstract

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by

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MS, Mississippi State University, 2010

BS, Lindenwood University, 2013

BA, University of Guam, 1995

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Public Health

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Abstract

U.S. Air Force (USAF) active duty Airmenshowunusually high tobacco prevalence rates (TPR); i.e., smoke, smokeless, both(SSL-B), when compared to civilian publics in the United States. Tobacco control efforts have proven largely ineffective inlowering nicotine habits among Airmen, while outdoor designated tobacco areas (DTAs) sited near worksites and popular localeson USAF bases (USAFBs) likelyswayAirmen to continue riskynicotine habits. The aim of this inquiry was to assess whetherquantities of DTAs on USAFBs and U.S. airbases (USABs) with 4 mediator variables(quality of DTAs,sites of DTAs, execution of a tobacco cessation program, and types of tobacco cessation programs) wereassociated with TPR (SSL-B) among Airmen at 21 sampled USAF installations worldwide. Organizational cultural theory was the theoretical outline chosen. One USAF surveillance system was accessed,and a survey tool was providedby15 USAF health promotion coordinators and6base civil engineer staff.Correlation assessments and regression analyses were conducted to analyze the survey data. The results of the study revealed that there was a moderate positive correlation among quantities of DTAs and TPR(SSL-B) withAirmen across sampled USAF installations(r= .56, p< .01), and there was a low positive correlation between quantities of DTAs on lower security threat USABs and Airmenpopulace numbers(r= .10, p< .048). Quantities of DTAs were also the strongest predictor of TPR (SSL-B) among Airmen[F(2, 18) = .00, p< .013].Results indicate that fewer or no DTAs on USAFBsand USABs could positively improve the health statuses of active duty USAF Airmen and civilian forces, improve mission duties, lessen health care costs, and foster tobacco-free lifestyles as the normalized behavior on U.S. military installations, and thus promote social change.

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Dedication

This dissertation research is dedicated to my parents, who made sacrifices to provide a safe home environment and who enabled me and my siblings to develop honorable characterand deep respect for others.

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The continued love, verbal and emotional support, and positive encouragement provided by my lovely wife, Mary, and by my two “impossibly beautiful” children, Amelia and Robert Jr., with this dissertation process will be forever remembered.

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Chapter 1: Introduction to the Study

Introduction

Tobacco use of any type introduces lethal health risks among individuals and is a behavior that is associated withnumerous acute and chronic disease concerns for populaces in the United States and across the globe (Danaei et al., 2011). Over two decades of tobacco-related research among U.S. Air Force (USAF) active duty military personnel (i.e.,Airmen) have indicated that those with tobacco habits (e.g., smoke, smokeless, both [SSL-B]) demonstrate unhealthier lifestyles, aremore prone to physical injuries, have a greater likelihood of being separated from military service within the first year, and aremore likely to have reduced work output and higher illness-related job absences when compared to Airmenwithout tobacco behaviors (Talcott et al., 2015). Financial costs borne by the USAF and other U.S.armed services for tobacco-related sicknesses (e.g., asthma, oral dysfunction, respiratory infections, sore throats, etc.)and for nicotine-associated physical injuries surpass $1.6 billion annually, adding to a public health burden with increased health insurance payments (Haddock et al., 2014).Moreover, continuous tobacco breaks among Airmen at conveniently located worksite-designated tobacco areas (DTAs) on USAF bases (USAFBs) and U.S. air bases (USABs) promote nicotine addiction, encourage resumption of tobacco habits among ex-tobacco users, and stall war-fighting tasks and daily mission requirements (Smith et al., 2014). Likewise, environmental secondary-smoke contaminants(Rose, 2012) from excessive quantities of DTAs on USAFBs and USABs cause headaches, shortness of breath, coughing episodes, visual annoyance, and throat irritation among Airmen and throughout military communities, increasing healthcare expenses. The significant health consequences attributed to DTAs that could influence tobaccouse frequency among Airmen and civilian populaces on U.S.military installations and in public have deleterious health implications through the lifespan (Offen, Smith, & Malone, 2013). DTAs, in the context of military personnel having liberal opportunities to frequent readily available and attractive locations to pursue tobacco addiction, remain an overlooked health concern forthe Department of Defense (DoD).By focusing on this issue,this investigation could lead to enhanced social environments and improved societal outcomes, with fewer DTAs, repositioning of DTAs, or elimination of DTAs from USAFBs and USABs, which would reduce rates of nicotine-related diseases and premature tobacco-related death.

Primary sections of Chapter 1 include the background of the study, the problem statement, the purpose of the study, research questions and hypotheses, and the theoretical foundation for the inquiry. Additional segments of Chapter 1 containedinformation on the nature of the study, definitions, assumptions, limitations, the significance of the inquiry, and a review of the key points of the chapter.

Background

Prior research has demonstrated that comfortable DTAs (e.g., shaded shelters, enclosed areas, temperature-controlled areas; Offen et al., 2013) positioned in highly frequented locales on USAFBs, USABs, and otherservice branch installations influence Airmen and other U.S.service members to continue tobacco abuse and encourage ex-tobacco users or nonusers to usenicotine. Smith and Malone (2012,2013) emphasized how DTAs enable U.S.military personnel with tobacco habits to gather duringauthorized work breaks to enhance social networks yet stall work assignments, how senior military leaders use DTAs as a venue to directly or indirectly influence lower ranking personnel to join them, why guidelines regardingtobacco use in DTAs in deployment areas areroutinely ignored, and whyU.S. naval ships areobligated to provide DTAs to accommodate U.S.military members' tobacco habits during lengthy tours at sea. Similarly, Klesges and colleagues (2015) reported that availability of DTAs along with lenient military smoking policies encouragedU.S. service members to use tobacco products to offset stress in deployment conditions, andOffen et al. (2013) described how the powerful tobacco industry influenced Congress to uphold the rights of veterans to freely choose tobacco products. This led to Congress directing$27 millionof taxpayer monies to construct 783 temperature-moderated tobacco shelters on Veterans Administration (VA) hospital grounds in 2005, which increased veterans' exposure to environmental toxicants and consequently, their risk for the development of chronic diseases. Evidence has also shown that tobacco addiction andrelated illnesses contribute to over 893 thousand workforce hours lost annually among USAF Airmen alone (Haddock et al., 2014).

Smith andMalone (2014) emphasized that tobacco breaks at DTAswere perceived as a meansto manage high workloads,claimingthat tobacco use is part of U.S.military culture. In keeping with this pattern,approximately 50% of Airmen surveyed felt strongly that U.S. military leaders did not commonly encourage those with nicotine addictions to quit (Smith & Malone, 2014). Despiteproof regardingharmful tobacco-related health consequences (e.g., chronic obstructive pulmonary disease [COPD], heart disease, cancers, stroke, osteoporosis)and evidence that tobacco habits among USAF Airmen accelerate early discharge and burden the DoD with increased training expenses (Talcott et al., 2015), the exceptional rights and benefits associated with serving in the U.S. armed forces haveoften been cited as primary reasons why U.S.military membersshould be permitted to remain nicotine dependent if they wish (Smith et al., 2014). However, Lando and colleagues (2015) contendedthat whileDTAs providerelaxedsites for tobacco users to practice harmful behaviors while communicating socially, it isequally important that the exceptional rights of non- or ex-smokers to be protected from smoke toxicants also be recognized. Mediating variables (MVs) that could also contribute to unusually high rates of tobacco useinclude quality of DTAs(Offen et al., 2013; e.g., padded seats vs.nopadded seats, shaded areas vs.noshaded areas, enclosed shelters vs.open shelters, seating vs. standing only),position of DTAs (e.g., near worksites vs.near undesirable locations such as garbage dumpsters;U.S. Department of Health & Human Services, 2014), implementation of a tobacco prevention/cessation program (AFI 40-102, 2015), and types ofavailable basewide tobacco cessation programs(Smith et al., 2014)among USAF Airmen on USAFBs and USABs. Consequently, assessment of 97 tobacco-related policies among the four primary U.S.military branches (e.g., Air Force, Army, Marine Corps, Navy)indicatedthat DTAs were consistently identified as an important influence on all forms of tobacco use among U.S.military members (Hoffman et al., 2011).

Although many variables have been associated with tobacco prevalence rates (TPR) among U.S. active duty military personnel in prior investigations, deficiencies in the literature exist concerning DTAs as an independent predictor with four MVs of quality and location of DTAs, establishment of tobacco prevention/cessation programs, and forms of base-wide tobacco cessation programs among USAF Airmen that are associated with tobacco behaviors. Therefore, this investigation assessed the correlation of DTAs and four MVs with abnormally high tobacco consumption rates among USAF active duty Airmen on U.S. military installations. Subsequently, this research might influence DoD and U.S. military leadership to reexamine tobacco policies with the aim of reducing, repositioning, or removing DTAs for improved socio-environmental conditions and healthier outcomes for thousands of U.S. active duty military members, medical beneficiaries, DoD contractors, and civilians on U.S. military bases.

Problem Statement

USAF active duty Airmen(i.e., officers, enlisted, aged 17+ years) are obligated to maintain exceptional physical fitness levels and to pass annual fitness tests in order tolessen risks of early discharge from the military (Smith et al., 2014), yet appealing DTAs positioned on USAFBs and USABs promote high tobacco consumption rates (SSL-B; (Hoffman et al., 2011) among Airmen that increase nicotine-related health concerns and health care costs, thereby running counter to war-readiness missions (Smith & Malone, 2012). On many USAFBs and USABs, DTAsmaycontribute to significantly higher TPR(i.e., 22.5%—Moody Air Force Base (AFB) Georgia;21.4%—Seymour Johnson AFB, South Carolina;20.8%—Eielson AFB, Alaska;Aerospace Information Management System [ASIMS]& Air Force Corporate Health Information Service [AFCHIPS], 2016) than the national average among adults aged18+ years in the United States (17.8% in 2014; Centers for Disease Control and Prevention [CDC],2015). While nicotine habits increase tobacco-related morbidities and physical injuries among U.S.military personnel that affect duty requirements, Airmen with tobacco dependency gather frequently forauthorized breaks at outdoor DTAs, further stallingthe achievement ofmission readiness requirements (Smith & Malone, 2012; Smith & Malone, 2013; Smith et al., 2014). Additionally, availability of DTAs likely contributes to nicotine-associated illnesses among Airmen, leading to an average of 893,128 lost workforce days per year as well as financial burdens forall military agencies that mustprovide clinical care for tobacco dependency and health-related injuries for U.S.service members, with costs surpassing $1.6 billionannually (Haddock et al., 2014).

There is reason to believe that DTAs on all USAFBs and USABs embolden an organizational culture of hurtful nicotine habits in direct opposition to required peak fitness levels and completion of war-readiness tasks (Smith & Malone, 2012). The appeal of DTAs (e.g., cushioned benches, shaded locations, sheltered areas) positioned in worksite locations and highly frequented areas (i.e., medical clinics, community centers, commissaries, retail outlets, etc.) on U.S. military bases further endorse a tobaccoopen culture of acceptednicotine habits among Airmen, with both short- and long-term health implications. DTAs on USAFBs and USABs remain approved locales for "stand by me" tobaccosharing behaviors among Airmenasthey stand, congregate, and socialize duringduty hours, withevidence further showingthat U.S. senior military leaders with SSL-B behaviorsroutinely pressured younger enlisted Airmen to engage in tobacco socialization breaks (Smith & Malone, 2012). Prior studies have demonstrated that DTAs are part of a recognized cultural phenomenonin military environments, where they are sites for socialization, information gathering, and work pausesamong tobacco users, and that tobacco behaviors harm U.S. service members'health and negatively affect mission requirements (Gierisch et al., 2012; Smith & Malone, 2012, 2014). This investigation adds to previous research concerningthe influence of DTAsonTPR (SSL-B) among USAF Airmen. This inquiry helps to fill aresearch gap (Fitness, 2015; Haddock, Jahnke, Poston, & Williams, 2013; Talcott et al., 2015)related towhether quantities of DTAs on sampled USAFBs and USABscould be a primary predictor for unusually high tobacco consumption rates (SSL-B) among Airmen.

Purpose of the Study

The aimof this quantitative inquiry was to assessthe correlation between quantities of DTAs and TPR (none, SSL-B) among active duty Airmen on sampled USAFBs and USABs. To address agap in the literature, a statistical approach assessedwhetherthe independent variable (IV); quantities of DTAs on USAFBs and USABs,was useful inpredicting the dependent variable (DV; SSL-B) prevalence rates among USAF Airmen in the context of four MVs: (a) quality of DTAs (U.S. Department of Health & Human Services, 2014), (b) location of DTAs(U.S. Department of Health & Human Services, 2014), (c) implementation of a tobacco prevention/cessation program(yes/no; AFI 40-102, 2015), and (d) types of available base-wide tobacco cessation programs (Smith et al., 2014). This strategy helpedin establishing whether a significant relationship existedbetween two variables of interest:(a) quantities of DTAs positioned on USAFBs and USABs and (b) SSL-B tobacco ratesamong USAF Airmenassigned to U.S. military installations in different geographic locations.

Research Questions and Hypotheses

RQI—Quantitative: Was there a significant relationship between quantities of DTAsandTPR (none, SSL-B) among the proportion of total Airmenon sampled USAFBs and USABs?

The null hypothesis was that there was not a significant relationship between quantities of DTAs and TPR (none, SSL-B) among the proportion of Airmenon sampled

USAFBs and USABs. The alternate hypothesis was that there was a significant relationship between quantities of DTAs and TPR (none, SSL-B) among the proportion of Airmenon sampled USAFBs and USABs.

RQ2—Quantitative: DidTPR (none, SSL-B) differ significantly with quantities of DTAs and four MVs(i.e., quality of DTAs, location of DTAs, implementation of a tobacco prevention/cessation program [yes/no], types of base-wide tobacco cessation interventions)in proportion to total Airmen assigned to sampled USAFBs and USABs?

The null hypothesis was that TPR (none, SSL-B) with quantities of DTAs and fourMVsin proportion to total Airmen assigned to sampledUSAFBsand USABs were approximately the same. The alternate hypothesis was that TPR (SSL-B) with quantities of DTAs and four MVs were significantly higher in proportion to total Airmen onsampled USAFBs and USABs.

RQ3—Quantitative:Were there greaterquantities of DTAsin proportion to total Airmen onsampled USABs positioned in higher security threat areasworldwide (e.g.,Turkey, South Korea) compared to lower security threat areas worldwide(e.g., Guam, Italy, United Kingdom)?

The null hypothesis was that there was not a significant difference in quantities of DTAs in proportion to total Airmen on USABs regardless of location of bases worldwide. The alternate hypothesis was that there were significantly higher quantities of DTAs in proportion to total Airmen on USABslocated in higher security threat areas worldwide (e.g., Turkey, South Korea) compared to lower security threat areas worldwide (e.g., Guam, Italy, United Kingdom).

RQ4—Quantitative: Did greater quantities of DTAs on sampled USABs worldwide demonstrate increased TPR (none, SSL-B) in proportion to total Airmen compared to USAFBs in the United States?

The null hypothesis was that greater quantities of DTAs on sampled USABs worldwide did notshow any significant increase in TPR (none, SSL-B) in proportion to total Airmen compared to sampled USAFBs in the United States. The alternative hypothesis was that increased quantities of DTAs on sampled USABs worldwide didshow a significant increase in TPR (SSL-B)in proportion to total Airmen compared to sampled USAFBs in the United States.

The IV was the quantity of DTAs positioned on sampled USAFBs and USABs, and the DV was the TPR (none, SSL-B) in proportion to total Airmen at sampled USAFBs and USABs.The four MVs werequality of DTAs (e.g., padded seats vs. no padded seats, shaded areas vs.no shaded areas, enclosed shelters vs.open shelters, seating vs. standing only), location of DTAs (e.g., near worksites vs.near undesirable locations such as garbage dumpsters; U.S. Department of Health & Human Services, 2014), implementation of a tobacco prevention/cessation program (yes/no; AFI 40-102, 2015), and types of base-wide tobacco cessation interventions offered (Smith et al., 2014). The association of greater quantities of DTAs on USAFBs and USABs (IV) and possibly higher TPR (none, SSL-B) among Airmen (DV) was measured with a nominal scale questionnaire (yes/no) onsubjects' concurrent self-reported tobacco behaviors (none,SSL-B) captured on a data set froman USAF surveillance system (i.e., ASIMS/AFCHIPS—tobacco usage summary; [TUS]).

Theoretical Framework for the Study

The conjectural framework for this investigation was emphasized with organizational cultural theory (OCT; Schein, 1992). The OCT model has been usedto better assess organizational leaders' outlooks, actions, and intellectual beliefswith employees and could be used to better appreciate how unique military organizational cultures shape Airmen's normative attitudes, value systems, and fundamental principles associated with tobacco behaviors (Gerras, Wong, & Allen, 2008).This theory has also been used to provide additional insights onorganizational cultures associated with behavioral and psychosocial health threats among adults, including tobacco dependency, obesity, and physical inactivity (Goetzel et al., 2012; Henke, Goetzel, McHugh, & Isaac, 2011; Rai, 2011).VariousUSAF organizational factors (e.g., actions, principles, norms) are likely associated with Airmen's "exceptional" rights to smoke that have made DTAson bases an integral part of U.S. military culture (Smith & Malone; 2012, 2013). There is strong evidence that the USAF and all other U.S. military branches provide a cooperative cultural environment for frequenttobacco use with passive enforcement of tobacco cessation programs (Smith & Malone, 2014),in which there isdecreased awareness among U.S. military and civilian leaders of the deleterious health effects of tobacco use and disengagement from U.S. military tobacco policies (Hoffman et al., 2011).The provision of convenient DTAs on worksites and at popular base locales (e.g., commissaries, fast food outlets)stimulates social interaction and reinforces nicotine useas an accepted norm among U.S. military members (Haddock et al., 2009).The decreased importance given to the harmful effects of tobacco use on U.S. service members' health and wellness within U.S. military organizational cultures was emphasized when 24

Veteran Service Organization (VSO) websites were assessed from July 2011 through January 2012 for tobacco-related topics (i.e., quit programs, cessation medications, etc.), with tobacco verbiage only discovered four times among 277 health articles, with no information provided on tobacco cessation opportunities (Poston, Haddock, Jahnke, &Jitnarin, 2013). Althoughthe USAF and other U.S. military branches oversee many personal decisions among Airmen (e.g., hair length, weight, uniform, medals, food, exercise schedules, tattoo wear, etc.), military and civilian leaders in distinctive DoD organizational and cultural environments view anti-tobacco guidelines as an affront to Airmen's and military members' personal choices (Jahnke, Haddock, Poston, &Lando, 2010; Smith & Malone, 2012).OCT, which is described in more detail in Chapter 2, related to the approach of this inquiry and to the research questions, with evidence that quantities of DTAson USAFBs and USABs supported by military and civilian leadership practices likely encourage, sanction, and endorse USAFtobacco-friendly cultural environmentswith harmful health consequences among Airmen.

Nature of the Study

For this study, I selected a quantitative, cross-sectional approach. Quantitative research wasconsistent with the primary aim of this analysis, which wastoevaluate whetheran IV (i.e., totals of DTAs)is useful inpredictingaDV (i.e., tobacco use prevalence; none, SSL-B) among USAF Airmen in the context of four MVs. The OCT agenda (Schein, 1992) helpedto frame why U.S.military organizations employ and support DTAs on USAFBs and USABsthat encourage tobacco abuse among Airmen,as well ashow U.S. military leaders perceive Airmen as "exceptions" to civilian anti-tobacco policies despite tobacco's solidly established health hazards (Smith & Malone, 2013). To assess whether quantities of DTAs were useful inpredictingTPR (none, SSL-B) among Airmen, sampled USAFBs and USABs across geographic regions worldwide were evaluatedto determine whetherbases with increased numbers of DTAs were associated with higher TPR (none, SSL-B) among Airmen. This quantitative strategy helpedin ascertaining whether DTAsacted as a predictor for SSL-B tobacco abuse among USAF Airmen.Concurrent data from the ASIMS/AFCHIPS-TUSthat captured self-reported tobacco habits (SSL-B) inpercentages from self-reported questionnaires completed by Airmen withannual dental assessments were uploadedby USAF dental technicians with a corporate dental application (CDA) in the ASIMS/AFCHIPS-TUS surveillance system. Tobacco data percentages accumulated from Airmen's self-reported questionnaireswere displayed in the ASIMS/AFCHIPS-TUSwith base population totals for each USAFB and USABinstallationwithin each Major Command (MAJCOM). Base civil engineer (BCE) personnelwith the assistance ofhealth promotion coordinators (HPCs) assigned to USAFBs and USABspartially control how many DTAs are available and where theyare positioned on USAFBs. Data wereextracted from the ASIMS/AFCHIP-TUSreport concurrentlyupdated with TPR (none, SSL-B) among Airmen assigned to USAFBs and USABs.HPC and BCE personnel were contacted via email or telephoneto provide quantities of DTAs positioned on USAFBs and USABs. Additionally, HPC and BCE personnel provided information with four MVs that included quality of and locations of DTAs on USAFBs and USABs, whether a tobacco cessation program had beenestablished, and types of base-wide tobacco cessation/interventionsoffered. Datasets were assessed to statistically determinewhether greater numbers of DTAsin the context of four MVs demonstrated higher self-reported tobacco habits (none, SSL-B) in ratio to total Airmenassigned to USAFBs and USABs in geographic regions.

Operational Definitions

In this study, the following definitions applied:

Independent variable (IV): Totals of DTAs positioned on sampled USAFBs and USABs worldwide.

Dependent variable (DV): TPR (none, SSL-B) on sampled USAFBs and USABs worldwide among USAF Airmen.

Mediating variables (MVs): Quality of DTAs, locations of DTAs, whether a tobacco cessation program was established (yes/no), types of base-wide tobacco cessation/interventionsofferedon sampled USAFBs and USABs worldwide.

Designated tobacco areas (DTAs): Solely positioned in outdoor locations on USAFBs and USABs; the only authorized sites for tobacco users whouse nicotine-delivered products (e.g., cigars, cigarettes; smokeless products that are chewed, dipped, sniffed) with minimum distances of at least ≥50 feet from building accesses, walking pavements, parking locales, food service areas (e.g., outdoor patios, picnic grounds), and sporting and recreational venues (e.g., tracks, footpaths, basketball and volleyball courts) and of at least ≥100 feet from family playgrounds to lessen human exposure to secondary smoke toxicants (Air Force Instruction [AFI] 40-102, 2015).

Health promotion coordinator(HPC): Manages, plans, and conducts installation health promotion programs, including tobacco cessation interventions and programs offered to USAF Airmen, family members, DoD contractors, and government civilian employees as needed to promote a tobacco-free environment (AFI 40-101, 2014).

Major Commands (MAJCOMS): Important subsections of the USAF that operate with assigned war-related missions and flying units in different global theatres (Global Security.org, 2016).

Tobacco Use Summary (TUS): Current statistical self-report survey of tobacco habits (none, SSL-B) completed by USAF Airmen with annual dental visits at USAF medical treatment facilities and uploaded by USAF dental technicians to ASIMS/AFCHIPS-TUS dataset.

Assumptions

The ASIMS/AFCHIPS-TUS dataset with information on self-reported tobacco habits among USAF Airmen uploaded by dental technicians with a CDA provided data about subjects held to be factual butnot verified. Similarly, the abilities of USAF dental technicians to use a CDA to accurately upload data on Airmen's self-reported tobacco habits (none, SSL-B)to the ASIMS/AFCHIPS-TUS surveillance system were not verified. Recall bias and reporting bias in relation toself-reported, publicly undesirable health behaviors such as tobacco frequencies (Popova &Ling, 2013) require assumptions of subjects' honesty on the part of investigators, yet prior research has indicatedthat many subjectswho completed self-report questionnaires tended to overreportfavorable, socially acceptable habits and underreport unfavorable, socially unacceptable behaviors(i.e., tobacco use; Borland, Partos,Yong, Cummings, & Hyland, 2012; Krumpal, 2013). While these assumptions were important considerations inthis research, a large sample size of self-reported questionnaires completed by USAF Airmen,n>15,000, lessenedeffects of self-report partialities and recall biases. An additional assumption was that the dataset, ASIMS/AFCHIPS-TUS, reflected the most current self-report data about tobacco habits among Airmen. The ASIMS/AFCHIPS-TUS dataset was continually updated with self-reported tobacco habits among Airmen by USAF dental technicians via a CDA process on a weekly basis that helpedto verify validity in relation to tobacco habits (none, SSL-B) among Airmen.

Scope and Delimitations

The scope of this research encompassed determining the relationship between quantities of DTAswith four MVs and TPR (none, SSL-B) among USAF Airmen on sampled USAFBs and USABs. The cross-sectional study design supported the dataset of TPR (none, SSL-B) among Airmen with sampled USAF military installations from anUSAF surveillance system (i.e., ASIMS/AFCHIPS-TUS), as well as the data collection of quantities of DTAs from BCE and HPC personnel with fourMVs. The proper statistical examinations supported the inquiry's internal validities, whereas the inquiry's application of DTAs and tobacco dependencies to other military and nonmilitary populations upheld external validity constructs (Kukull&Ganguli, 2012). This investigation's possible generalization to alternate populaces was dependent upon my ability as the researcher to differentiate pertinent from non-pertinent data and capabilities to arrive at decisions from analyses of datasets that supported statistical outcomes that were subsequently applied to other study groups and research situations (Kukull&Ganguli, 2012).

Limitations

One limitation ofthis cross-sectional study was that Airmenwhocompleted self-reported questionnaires on tobacco behaviors were not assigned to random controlled categories, and contributory factors to nicotine dependencies other than DTAs existedamong participants (Piper, Cook, Schlam, Jorenby, & Baker, 2011). A second limitation was that this inquiry relied upon self-reported responses with tobacco habits among Airmen,with dependencies upon their recall abilities (Brown, Beard, Kotz, Michie, & West, 2014). For instance, some Airmen might have used tobacco products marginally (e.g., once or twice monthly), whichcould have affected recall skills with self-report data.Additionally, biomarkers were not used to confirm tobacco dependencies and non-dependencies among Airmen, which could have affected self-reporting prejudices with questions (Sreeramareddy, Ramakrishnareddy, Kumar, Sathian, &Arokiasamy, 2011), and some Airmen who self-reported tobacco frequencies may have provided false replies for fear of patient identifiers in USAF medical systems or surveillance systems or due toapprehension concerning the reliability of USAF surveillance systems. Equally important, interpretations from a cross-sectional design associated with the timeframe data were assembled from participants, and this made it difficult to predict how data were related toparticipants' future behaviors (Sullivan, 2012, p. 9). Likewise, a further constraint was that tobacco habits (none, SSL-B) had already been formedamong USAF Airmen, and this made it difficult to determine chronological events or intervening variables that influenced tobacco use(Sullivan, 2012, p. 9). An additional limitation was that the quality of data collection was reliant on Airmen's self-report of tobacco habits in response to intervieweeadministered questions, and questions could have beenmisinterpreted on the part ofparticipants.Moreover, a drawback was that tobaccorelated questions answered by Airmen and updated by dental technicians via CDA to anASIMS/AFCHIPS-TUSreport must provide valid and reproducible data for statistical analyses (Kirby& Barry, 2012), yet whether questions had been tested for validity was not confirmed.Other concerns involvinginternal validity included a change in surveillance tool (e.g., ASIMS/AFCHIPS-TUS) between observations, selection bias involvingsampled USAF installations, discrepancies with quantities of DTAs on sampled installations provided by BCE or HPC personnel, and history (e.g., cost of cigarettes could have declined on installations, which might have influencedAirmen to begin or to continue tobacco habits).These limitations were addressed through use of an established USAF secondary dataset(ASIMS/AFCHIPS-TUS),withdata collection among USAF professional BCE and HPC personnel, with utility and validity of data, with self-reported questionnaires completed by Airmen positioned at USAF bases across different geographic regions, bycapabilities to generalize todifferent populations,and by using a large sample of Airmenthat provided more efficient and effective data analyses with lessened effects of recall inconsistencies.

Significance

This study contributestoknowledge aboutrelationshipsbetween quantities of DTAswith four MVs and TPR (none, SSL-B) among Airmen on sampled USAFBs and USABs across geographic regions. This investigation was distinct, in that it provided information on an overlooked area of a predictor (i.e., quantities of DTAs on USAFBs and USABs)oftobacco behaviors (none, SSL-B) among Airmen (Offen et al., 2013). The outcomes of this inquiry demonstrated harmful influences and conveniences of DTAs in connection with Airmen's lifestyle behaviors that could have influenced them to continue injurious tobacco frequencieswith adverse health implications. This research mightinfluence the DoD and U.S. military and civilian leadershipto consider reducing the number of DTAs, relocating DTAs, or removing DTAsfromUSAFBs and USABs in order to make it more inconvenient and impractical for Airmen to practice tobacco habits. While high tobacco consumption rates (SSL-B) among U.S. service members have historically impacted war-readiness concerns and increased likelihood of short- and long-term health problems, insights into quantities of DTAs and associations with TPR (SSL-B)among Airmen could lead tosocial change across all U.S.military branches. Increased awareness of harmful effects of DTAs thatprovide Airmen with convenient and comfortable locales to continue nicotine dependenciescould increase tobaccoindependence support fromDoD and military and civilian leadership and strengthen anti-tobacco policies currently in place for tobaccofree lifestylesamong USAF Airmen.

Summary

In this chapter, I introduced thetopic of the investigation (e.g., association of quantities of DTA with four MVs in aproportion of USAF Airmen across sampled USAFBs and USABsin different geographic regions), emphasized the importance of the study in the context ofhealth implications forAirmen and family members, and stressed possible social change consequences of thisresearch. Additionally, I briefly summarized literature associated with the investigation, highlighted the research gap related tothis topic, and framed the problem concisely in terms ofhow the investigation built on prior tobaccorelated research among military members. Ifurther defined the study as quantitative in nature with a cross-sectional design, delivered definitions of IV and DV,identified research questions with null and alternate hypotheses, and explained how IV and DV variables were assessed. Moreover, I provided four MVs:(a) quality of DTAs,(b) locations of DTAs (U.S. Department of Health & Human Services, 2014), (c) implementation of a tobacco prevention/cessation program on USAFBs and USABs (yes/no; AFI 40-102, 2015), and (d) types of base-wide tobacco cessation interventions offered (Smith et al., 2014)by HPCs. Likewise, Irecognized the OCT (Schein, 1992) as the framework that guidedmy examination of factors ina tobaccoenabling culture among Airmen on USAFBs and USABs, concisely described the research methodology with key variables, and described assumptions that Ibelieved but did not prove to be true. Next, I explained the scope of the investigation, applied rules of generalizationinresearch, and emphasized possible limitations involvingself-reported biases among Airmen, selection bias, and secondary data concerns. Finally, I stressed the significance of the investigation and possible implications for social change and improved health outcomes forUSAF Airmen and other U.S.service members in all U.S.military branches with reduction, relocation, or removal of DTAs from USAFBs and USABs to lessen TPR (none, SSL-B).

In Chapter 2, I present a thorough outline of current literature associated with DTAs and unusually high TPR (none, SSL-B) among Airmen, theliterature search strategy, and a literature review related to primary concepts ofthis investigation.

Chapter 2: Literature Review

Introduction

The accessibility of DTAs on USAFBs and USABs likely promotes unusually high tobacco use behaviors (SSL-B) among active duty Airmen (Richey et al., 2012) and influences nicotine habits that lead to decreased aerobic fitness abilities, increased military healthcare expenses (Smith, Poston, Haddock, & Malone, 2016), greater workforce illnesses and lost productivity (Poston et al., 2010), and enormous public and monetary impacts with increased acute and chronic morbidities (e.g., heart disease, chronic obstructive pulmonary disease, cancers; Offen, Arvey, Smith & Malone, 2011). DTAs also deliver tobaccofriendly messages that encourage individuals to use tobacco products, and DTAsfurther increase environmental contaminant exposures associatedwith over 600,000 mortalities annually worldwide from cancers, heart attacks, and respiratory ailments (Carpenter, Postolek, & Warman, 2011). DTAs also influence individuals to sustain or commence nicotine abuse (Lee, Ranney, & Goldstein, 2013), and assemblage of tobacco users outside DTAs' perimeters further extends harmful environmental pollutants (McNabola, Eyre,& Gill, 2012). The DoD's tobaccorelated financial burden exceeds $1.6 billion annually, with healthcare provisions to offset tobaccoconnected sicknesses and workforce absenteeism (Offen et al., 2011). Thus, DTAs were associated with significant tobaccorelated health concerns and monetary expenses forUSAF Airmen and family members and forpopulaces exposed to secondary smoke impurities.

Prior investigations further demonstrated that DTAs on U.S. military installations enabled U.S. service members to engage in tobacco behaviors to counter stressful conditions (Smith & Malone, 2014), boredom, and mood swings (Gierisch et al., 2012);to pause duringwork tasks (Poston et al., 2010);and to network in unhealthy environments with individuals connected by a common theme (i.e., tobacco; Gierisch et al., 2012). Additionally, availability of DTAs likely contributes to nicotineassociated illnesses among Airmen, which lead to an average of 893,128 lost workforce days per year, as well asfinancial burdens forall U.S. military agencies linked toproviding clinical care for tobacco dependency and healthrelated injuries for U.S. service members, which surpass $1.6 billionannually (Haddock et al., 2014).

The aim of this quantitative cross-sectional inquiry was dual: (a) to assess the relationship between quantities of DTAs on USAFBs and USABs and TPR (none, SSL-B) among Airmen and (b) to further consider the connection between DTAs and tobacco behaviors among Airmen positioned at USAFBs and USABs worldwide. With both evaluations, four MVs including quality of DTA (e.g., padded seats vs.nopadded seats, shaded areas vs.noshaded areas, enclosed shelters vs.open shelters, seating vs. standing only), position of DTA (e.g., near worksites vs.near undesirable locations such as garbage dumpsters; US Department of Health & Human Services, 2014), implementation of tobacco prevention/cessation program (yes/no; AFI 40-102, 2015), and types of base-wide tobacco cessation interventions offered (Smith et al., 2014)were involved in the examination.

Literature Search Strategy

With this literature search approach, I accessed databases and search engines including Academic Search Complete, CINAHL & MEDLINE Simultaneous Search, CINAHL Plus with Full Text, Cochrane Database of Systematic Reviews, EBSCO ebooks, Education Research Complete, Google, Google Scholar, MEDLINE with Full

Text, Military and Government Collection, ProQuest Central, Pub Med, SAGE Premier, and Taylor and Francis Online. I used the following terms and combinations of expressions to explore appropriate peer-reviewed articles: *tobacco, harms, prevalence rates, designated tobacco areas, smoke pits, smoking areas, cigarettes, smoke and smokeless tobacco, smoke camps, Air Force and tobacco, cessation, secondhand smoke, environmental toxicants, military tobacco habits, culture, organizational leadership, origin, history, wars, combat, trauma, behaviors, predictors, tobacco influences, DoD tobacco regulations, barriers, military policies, health care costs, myths, stress, socialization, and warrior*. I searched for literature primarily within the prior 5years, 2012 to 2016, yet I did occasionally include articles outside this time span if the research was deemed central to my inquiry.

Chapter 2 containssections on the following topics: (a) origin of tobacco, (b) bodily and functional impacts of tobacco use inhumans, (c) tobacco practices inthe U.S. military from World War I (1914-1918) through the end of the Vietnam War (1975), (d) DoD policy changes with tobacco and DTA, (e) harmful effects of tobacco smoke and smokeless tobacco, (f) predictors of tobacco use, (g) behavioral factors associated with tobacco habits, (h) the study's theoretical framework, and (i) studies related to the methodology and constructs of interest. The chapter endswith a summary of the significance of this inquiry and how it filled a research gap about the associations of DTAs with TPR (SSL-B) among USAF Airmen and thusmay contributeto social change.

Origin of Tobacco

It is understood that tobacco originatedapproximately 10,000 years ago in both Central and South America (Russo, Nastrucci, Alzetta, &Szalai, 2011), with tobacco growing wild in wet environments. The poisonous substance nicotine, naturally contained in tobacco leaves, produces a self-protective reaction that incapacitates destructive pests' muscular actions and kills them (Kumar, Pandit, Steppuhn& Baldwin, 2013). The Spanish word *tabaco* led to the English word *tobacco*and is closely related to both the Arabic word *tabbaq* from the ninth century, when the substance was associated with therapeutic effects, and the Arawakan word *taino*, which was linked to assembled tobacco foliage (Russo et al., 2011).Russo and colleagues (2011) explained that upon Christopher Columbus's maiden expeditionary arrival to South America in 1492, the local Native Americans (NAs) presented Columbus's crew with handouts of dried tobacco foliage that subsequently influenced a crewman, Rodrigo de Jerez, to begin to smoke.

It was Friar Ramon Pane, who joined Columbus on his second voyage to South America in 1507, whodetected NAs rolling and snuffing smokeless tobacco (Williams, 2014, p. 69). Thus, Pane has been credited with bringing this smokeless behavior back to Europe and familiarizing Europeans with tobacco habits, leading tothis behavior spreading within the European Continent (Russo et al., 2011). In turn, as European colonization spread, tobacco plantations were formed and tobacco usedeveloped among populations within most continents of the world.AsBurcham (2014, pp. 285-286) explained, this tobacco behavior subsequently resulted in historic human costs.

Bodily and Functional Impacts of Tobacco Use inHumans

The central theme of tobacco use is that nicotine properties from the tobacco plant produce physically and emotionally satisfying impulses in the brain (Mayo Clinic, 2016), leading to behavioral tobacco addiction (SSL-B) in humans (Russo et al., 2011).While smoking is the principal method of consuming tobacco used by humans, tobacco can also be eaten, chewed, snuffed (Tushingham et al., 2013), dipped, or inhaled. More importantly, the nicotine found in tobacco is absorbed through the skin and lungs, delivering physical and physiological returns thatinclude improved cognitive abilities (England et al., 2015), stimulated mental attentiveness, decreased food and drink desires, accelerated heartbeat, and a pleasurable sense of peacefulness (Tushingham et al., 2013).

Additionally, tobacco users anticipate the sensations and experiences provided bynicotine (e.g.,the sounds of unwrapping cigarette packs, exhaled smoke, feelings of satisfaction, opportunities to socialize), which adds to the desire (Domino et al., 2013) to use tobacco products. This experience stands in contrast to nicotine absence(NA) in tobacco users, which commonly involvesa group of diverse emotional effects that occurwithin 24 hours to 7days of nicotine cessation and include insomnia, annoyance, sadness, depression, accelerated hunger, nervousness, frustration, decreased focus, and restlessness (Cleveland Clinic Foundation, 2015; Soyster, Anzar, Fromont, & Prochaska, 2016).

TheInitiation of a Relationship Between Tobacco and the U.S.Military—World War I

While U.S. per capita TPR were roughly 151 cigarettes annually in 1910 (Schultz, 2014), with use occurring predominantly among adult males pre-World War I (WWI;1914-1918), technological advances in machine-based cigarette manufacturing coupled with tobacco companies' increased promotional efforts(Cole & Fiore, 2014) made tobacco products more stylish, in particular among the wealthy and eventually with adult women. Another essential development was that the U.S. War Department partnered with aprominent American tobacco companyduring WWI (Army History.org, 2016) that provided free cigarettes and matches in daily meal ration kits (Talcott et al., 2015; Warner, Sexton, Gillespie, Levy, &Chaloupka,2014) to American Expeditionary Forces (AEF; Cole & Fiore, 2014) deployed to the trenches of Europe for 2years, 1918 to 1919, in order tocounter the pressures of war, dullness, and anxiety while delivering moments of relaxation (Gierisch et al., 2012). The belief that cigarettes became invaluable to the American war effort was confirmed by General John Pershing, AEF Commander in WWI, when he proclaimed that cigarettes sent from America were more vital to soldiers' wellbeing than bullets (ArmyHistory.org, 2016).

Three cigarettes and matches were provided in each of three daily meal ration kits per AEF throughout WWI(i.e., nine daily cigarettes). Approximately 4,628,475 nonmortally wounded AEF served from 1918-1919 (Department of Veterans Affairs, 2016), and with an average of nine daily cigarettes provided per AEF throughout WWI, AEF were delivered nearly 30.5 billion cigarettes to smoke. Subsequently, many AEF personnel returned from Europe after WWI with addictive smoking habits that made tobacco use more socially tolerable in America among smokers and nonsmokers (Prasad, Prasad, & Baker, 2016). Consequently, following WWI, U.S. per capita TPR increased 216% annually to 477 (1920) from 151 (1910; Schultz, 2014). Moreover, the U.S. War Department's partnership with apopular American tobacco company throughout WWI introducedthe tobaccowelcoming culture experienced presently across all US military branches.

Tobacco inthe U.S. Military—World War II

The agreement between the U.S. government and one American tobacco company that provided free cigarettes and matches in daily ration kits to U.S. military personnel during WWI expanded with additional tobacco companies and continued throughout World War II (WWII—1939 to 1945; Warner, Sexton, Gillespie, Levy, &Chaloupka, 2014). The U.S. government also developed and implemented tax-free incentives fortobacco purchases at all U.S. military commissaries (Lillard, 2015, p. 58) that influenced American military members to consume tobacco products throughout WWII. Equally important, U.S. President Franklin Roosevelt made the tobacco crop a protected resource during WWII (Russo et al., 2011); this action not only increased the importance of tobacco nationwide, but also enabled tobacco firms to capitalize on the enhancedstatus of cigarettes with promotional campaigns that encouraged furtherconsumption among American military forces. With 16,112,566 U.S. service members deployed to European and Asian theaters during WWII (Department of Veterans Affairs, 2016), millions of free cigarettes in food ration kits (Russo et al., 2011) provided U.S. Soldiers with chain-smoking opportunitiesthat likely counteracted battle stress, separation from families, loss of comrades, and loneliness.

Another signal of tobacco's significance inthe U.S. military throughout WWII was the establishment of many U.S. military camps in parts of liberated France that were used as transient areas for returning American troops and named after many popular American cigarette brands (Coffey, 2016; Hockett, 2016; Skylighters.org, n.d.; Thorley, 2015). U.S. military camps named after cigarette brands emphasized the strong reinforcement thattobacco firms received from the U.S. government throughout WWII

(Thorley, 2015), and this relationship strengthened the tobaccofriendly culture of the U.S. military. Subsequently, these U.S.military camps named after popular American tobacco companies and associated with a plethora of tobacco products provided even more available tobacco merchandise, with increased opportunities for American troops to become tobacco reliant. In brief, an entire generation of American military members who had been exposed to daily tobacco usein WWII returned to the United States with glamorized cigarette frequencies among movie celebrities and professional athletes, with many U.S. military members addictedto permanent tobacco abuse habits (Thorley, 2015).

Tobacco inthe U.S.Military in the Korean and Vietnam Wars

Over 1.7 million American service members served in the Korean War (1950-1953; Department of Veterans Affairs, 2016), when free cigarettes and matches continued to be offeredin daily food ration kits (Poston et al., 2010). In 1964, approximately one decade after the end of the Korean War, a widely acclaimed report from the Surgeon Generalassociated tobacco use with lung cancer risks among men (Proctor, 2012; Warner, Sexton, Gillespie, Levy, &Chaloupka, 2014). At this time, cigarettes were still provided to nearly 7.8 million U.S. military personnel (Department of Veterans Affairs, 2016), and the provision of cigarettes continued throughout the Vietnam War (1964-1975; Poston et al., 2010). Although the delivery of free cigarettes in ration kits was halted by the U.S. government in 1975 (Conway, 1998; Joseph, Muggli, Pearson, &Lando, 2005; Poston et al., 2010), the promotion of free cigarettes and matches in food ration kits for over 60 years from WWI through the end of the Vietnam War solidly established tobacco abuse as an accepted organizational and cultural norm on every U.S. military installation.

DoD Policy Changes with Tobacco—DTAs

After 1975, a marked shift in DoD tobacco policies countered tobacco promotions that occurred from WWI through the Vietnam War as officialsattempted to lessen the adverse health effects of tobacco and address unusually high TPR among U.S. active duty service members in all branches (Poston et al., 2010). DoD Directive (DoDI)1010.10, Health Promotion (March 11,1986; 2003; 2014) established the DoD with responsibilities to institute health promotion, injury, and disease prevention programs, including tobacco use guidelines, in line with Healthy People Health Indicators. Additionally, Air Force Instruction (AFI) 40-102 (August 1, 1998; 2001; 2002; 2012b; 2015), Tobacco Use in the Air Force, authorized Air Force installation commanders to develop, when possible, DTAs that would provide reasonable accommodations for employees with some weather-related protections, though AFI 40-102 (March 4, 2015) did not mention that employees should have judicious access to DTAs or that DTAs should provide weather-associated protections.

AFI 40-102 (2015) further added that USAFB and USAB commanders provide monies for DTAs' signage, butt-cans, and cigarette receptacles, and that commanders provide DTA maps and approvethequantity and locations of DTAs with the assistance of BCE. In the same way, DoDI 1010.15, Smoke-Free DoD Workplace (March 7, 1994; 2001) previously mandated that outdoor smoking areas on U.S. military installations be established that provided practical accommodations for members with some protections from the elements. However, DoD policies also requiredthat DTAs be normally positioned long walks from duty sections and in undesirable locations (e.g., near garbage dumpsters; U.S. Department of Health & Human Services, 2014). Likewise, the DoD directed that tobacco cessation classes be developedwithin all U.S. military branches, that anti-tobacco advertisements be established, and that all avenues of promotions emphasize harmful effects of tobacco abuse with treatment options (AFI 40-102, 2015; DoDI 1010.15, 2001).

Harmful Effects of Tobacco: Smoke, Smokeless, Both

It has been evidenced that tobacco use is the most avoidable cause of morbidities and mortalities among adults in the United States (Centers for Disease Control and Prevention [CDC], 2015; Mushtaq, Williams, & Beebe, 2012) and among individuals inevery corner of the world (Cheng, McBride, & Phillips, 2015). Explicitly, tobacco occurrences(SSL-B) were associated with increased risks of cardiovascular disease and stroke (Cheng, McBride, & Phillips, 2015); cancers of the oral cavity and esophagus (Mazurek, Syamlal, King,& Castellan, 2014), mouth and pancreas (Bergman, Hunt, &Augustson, 2012), and bladder (Bassett et al., 2014);and respiratory syndromes(Vander Weg, Mengeling, Booth, Torner, & Sadler, 2015). Similarly, it has been explained that tobacco frequencies of all types (SSL-B) have deleterious effects unique to women that include menstrual alterations, sterility, pregnancy dysfunctions, unprompted abortions, placenta maladies, and lung and cervical cancers (Vander Weg et al., 2015). Likewise, a volume of research has demonstrated that tobacco occurrences lead to adverse psychosocial and behavioral outcomesamong adults with lethal health implications (Jitnarin, Haddock, Poston &Jahnke, 2013; Jitnarin, Poston, Haddock, Jahnke, & Day, 2014).

Furthermore, tobacco habits are associated distinctively with U.S. military personnel with nearly one in seven mortalities among current and prior U.S. service members, decreased work output, increased hospitalizations, lessened nighttime vision, and consequences of significant diseases and diminished quality of life through the lifetime (Boyko et al., 2015). Also, it has been suggested that tobacco habits are attributed to increased suicide tendencies among U.S. service members (Goodwin et al., 2014), and nicotine abuse has been projected to cause up to 8.4 million global, untimely mortalities yearly by 2020 (Cheng et al., 2015). While nearly 20% of all deaths (i.e., between 443,000 to 480,000 yearly in the United States alone; CDC, 2015; Wolf et al., 2016) were attributed to tobacco use, tobacco frequencies (SSL-B) among USAFAirmen increased acute onset of diseases, impaired military preparedness especially with conflict deployments (Goodwin et al., 2014) and encumbered the Veterans Administration (VA) with nearly $5 billion for tobaccoconnected healthcare interventions (Sindelar&Torsiello, 2012). Hence, tobacco occurrences(SSL-B) have detrimental health repercussions among USAF Airmen that diminish the quality of lives of those positioned to protect the safety and security of the United States and of regions across the globe.

Predictors of Tobacco Use

Key predictors of tobacco use among adults include age, educational levels, residency locals, culture, careers, gender, and economic disadvantages (Palipudi et al., 2012). Palipudi and colleagues (2012) described adults who practice tobacco habits usually experienced lower educational exposures and increased financial struggles, resided more in rural locations rather than urban milieus, and were predominantly more male gender vs. female gender. Similarly, characteristics of USAF military recruits from 2013 to 2014 demonstrated essentially single, young males (i.e., <21 years)with mostly high school educational levels (Little et al., 2015) and similarly, US Marine Corps recruits identified primarily as single, young males young (i.e., <19.8 years)who desired employment to earn an income, yet also experienced high prevalence's of past adverse events (e.g., parents divorced, physical or emotional mistreatment; Horton, Phillips, White, LeardMann, & Crum-Cianflone, 2014). Additional predictors of tobacco habits(SSL-B) among adults were mediarelated tobacco promotions along with peer pressures, selfperceptions with thinness, exercise irregularities, and various stressrelated emotions (e.g., familial, neighborhood environments, depression; O'Loughlin, Dugas, O'Loughlin, Karp, &Sylvestre, 2014). Another critical point with adults was that accessibilities of DTAs influenced increased opportunities with TPR (SSL-B; O'Loughlin et al., 2014).

MannersAmong Adults Related to Tobacco Dependency

Prior studieson tobacco reliance among adults focused on nicotine properties that affected neuronal nicotinic acetylcholine receptors (nAChRs) in the brain (Picciotto& Kenny, 2012). While nAChRs genetic subtypes in the brain differ in number, variations in these subtypes appear to increase nicotine dependencies that further impact emotions, taste, and concentration (Picciotto& Kenny, 2012). Also, nicotine addiction was associated with increased uptake of alcohol and with alcohol dependencies (Leão et al., 2015), served as a precursor of marijuana and cocaine abuse (Kandel&Kandel, 2014), provided sensations of pleasure with mediation of hunger, and affected mood swings (Picciotto&Mineur, 2014). Moreover, research indicated that adult smokers stimulated by nicotine rewards that produced emotional cravings used tobacco products until nicotine needs had been achieved, thereby preventing nicotine withdrawal sensations (Rubinstein et al., 2013). While tobacco dependencies associated with NAare complex, 20 million prior tobaccorelated mortalities across the world coupled with ominous projections of 5.6 million children that could die prematurely from tobacco abuse in adulthood (US Department of Health and Human Sciences, 2014), emphasize the health threats of tobacco relatedconcerns.

Theoretical Framework

I selected the OCT model, originated by Schein (1992), as the theoretical model with this inquiry. The OCT framework associated an organization's culture with employees' behavioral perspectives, principles, knowledge's, characters (Busch, 2012), interpersonal relationships, performance of duties (Deselle, 2016) and examined how organizational leaders' decisions, standards, and priorities affected lifestyle choices and behavioral patterns among employees (Glisson, 2015). The OCT outline further demonstrated how leaders' actions within an organizational environment affected employees' social communications, behavioral habits, decisions and reactions to organizations' priorities (Janićijević, 2015). The OCT structure helps explain how the DoD and U.S. military branches created a tobaccoendorsed culture (Ulanday, 2014) among U.S. military members through sanctioned, regular tobacco breaks (SSL-B)at DTAs. Thus, U.S. military members commonly view DTAs as places that pause work tasks and provide time off the job, enhance socialization contacts and interpersonal communications with battle buddies, alleviate tedium, and delay stressful work-life conditions (Smith et al., 2016; Smith, Poston, Haddock, & Malone, 2016).

Research with constructs of the OCT framework also demonstrated that public health civilian leaders seemed to be unaware of historical DoD and U.S. military organizational and cultural connections with tobacco policies, while some civilian leaders further believed that restriction of tobacco items from U.S. service members would be adverse to members' gained privileges (Grundy, Smith, & Malone, 2014). An additional investigation discovered that civilian leaders believed that tobacco frequencies were solidly integrated into U.S. military cultural settings,that smoking in combat environments should be allowed, that tobacco usagehelped countered stressful battle conditions, and that it might not be practical to restrict U.S. active duty service members from tobacco practices (Smith & Malone, 2013). While some public health civilian leaders in Congress could have a beneficial impact on DoD decisions with tobacco control guidelines (Smith & Malone, 2013), some leaders also believed that nicotine addictions had low priorities in U.S. military environments which further reinforced U.S. military organizational cultural environments of tobacco consumption. To elaborate, civilian and military leadership in an organizational culture are likely responsible for establishing and reinforcing values, norms, and discipline (Vitalariu&Mosoiu, 2016) with health responsibilities and risklessening behaviors. However, Smith and others (2016) emphasized that civilian leaders required more knowledge and background information about tobaccorelated issues (i.e., tax-free tobacco products on military installations) in order to integrate tobaccoindependence strategies.

Moreover, an investigation among U.S. military websites used with veterans' service organizations (VSO) from January 2011 to June 2011 found that tobaccoassociated articles that depicted health hazards of cigarettes and smokeless tobacco were not only mostly absent, but 10% of newspapers delivered articles that promoted tobacco habits (Poston, Haddock, Jahnke, &Jitnarin, 2013). Furthermore, a review of 222 leadership messages with veterans and military service organizations

(VMSO) from January 2011 to December 2012 discovered that tobacco topics were not present, and health issues with tobacco information that included smoking cessation opportunities appeared less than 10% when compared to other healthconnected articles (Jitnarin, Walker, Poston, Haddock, &Jahnke, 2015). An additional investigation of 75 military newspapers among all U.S. military branches (e.g., Air Force, Army, Marines, Navy, Joint-Base Army and Air Force) with 2,479 healthcorrelated themes developed by U.S. military commanders from January 2012 to December 2012 discovered that tobaccorelated topics received minimal priority and were represented in only 0.4% of all themes (Poston, Haddock, Jahnke, Hyder, &Jitnarin, 2015). These studies suggest that U.S. military and civilian leaderships demonstrated low priorities with the health of U.S. military members by minimal tobaccoconnected topics in websites, articles, and newspapers that in turn, further endorsed the U.S.military culture of tobaccofriendly military installations. While U.S. military units' leaderships did have significant impacts on military members' behaviors, actions, and decisions (Larson, Wooten, Sayko Adams, & Merrick, 2012), leadership's inabilities to provide sufficient tobacco control information and healthprevention strategies with available social media avenues further emphasized an organizational culture of protobacco usage (Offen et al., 2013).

Furthermore, the OCT framework implied an organization's climate established standards, social relations of groups, defined management perspectives (Calin, 2014) and physical provisions (e.g., quantity of DTAs, DTAs' signage) that influenced employees' behavioral characteristics. In this way, DTAs, as physical properties on U.S.military installations, inclined tobacco abuse (Hoffman et al., 2011; Haddock, Jahnke, Poston, & Williams, 2013; Smith & Malone, 2012, 2014) through social interactions in unhealthy locales among U.S. military members. DTAs further provided permitted places for U.S.military members that practiced tobacco frequencies to network socially and to pause duty requirements that stalled mission readiness tasks (Smith & Malone, 2012). While physical properties of DTAs also occasionally provided areas for U.S. military personnel to abuse tobacco (SSL-B), secondhand smoke (SHS) from DTAs also exposed individuals to harmful carcinogens and toxins that acerbated asthma conditions (Tamimi, Serdarevic, &Hanania, 2012), and slowed down injury recovery (Smith & Malone, 2013). SHS exposures have also been attributed to reduced birth weight of children, increased threats of Sudden Infant Death Syndrome (SIDS) (Hernández-Martínez, Subías,& Sans, 2012),harmed respiratory and cardiovascular systems, and increased risks of development of lung cancer (Sureda, Fernández, López, &Nebot, 2013).

Subsequently, numerous research explained that DTAs established as physical properties on U.S.military installations and V.A. grounds afforded U.S. service members with tobacco breaks (SSL-B; Haddock, Poston, Jahnke, & Williams, 2013; Katz et al., 2016; Klesges et al., 2015; Smith & Malone, 2012; Smith et al., 2014), that weakened warfare training, impaired workforce resources (Smith & Malone, 2012), decreased individual job performances (Grundy, Smith & Malone, 2014), lengthened sicknesses and hospital stays, and increased physical injuries (Haddock et al., 2013). I concluded that the OCT framework applied to U.S.military organizational environments, whereby DTAs and many other U.S. armed forces' organizational cultural dynamics influenced tobacco incidences (Toblin, Anderson, Riviere, McGurk, & Sipos, 2016) among USAF Airmen, fellow U.S. service members in other U.S. military branches, and civilian adult populaces.

Studies Related to the Methodology and Constructs of Interest

Although I found no evidence of DTAs as an IV with tobacco habits used in prior multivariate analysis research, many studies have used cross-sectional designs with other tobacco related IVs (e.g., knowledge of tobacco, urban/rural residence, employment, educational level, age; Cheng, McBride, &Phllips, 2015), cigarettes per day, race/ethnicity, marriage status (Schmitz & Donley, 2015), height, weight, weight-bearing exercise (Puthucheary et al., 2015), self-confidence levels, and history of diagnosed chronic diseases (Shadel et al., 2014). For example, a logistical regression investigation conducted among 13,354 individuals aged 15 years and older in China that used demographic factors and knowledge of tobacco harms found that present tobacco users believed that lowtar cigarettes were less likely to cause adverse health implications when compared to cigarettes with normal tar contents (Cheng et al., 2015). Similarly, cross-sectional research was performed that used univariate and multivariate regression analyses among 52,419 Marine Corps military personnel with physical fitness variables (e.g., weekly exercise, body mass index, team sports involvements), and results discovered that participants who consumed cigarettes and were restricted from tobacco use over a 12-week period demonstrated significantly greater aerobic fitness levels when matched to nonsmoking participants (Feinberg et al., 2015). Thus, the advantages of tobacco quit habits and cessation interventions could be promoted as opportunities to achieve healthier physical fitness levels (Feinberg et al., 2015), regarded as a predictorfor U.S. active duty military personnel to remain in U.S. military service. Likewise, Minder and colleagues (2013) examined 2,800 Brazilian adults (aged 19 to 78 years) and used multivariate regression analyses to determine associations between physical activity and fitness levels with cardiovascular risks using IVs of gender, obesity and non-obesity, and outcomes revealed that higher fitness levels were related to improved anthropometric measurements; i.e., glucose, cholesterol, blood pressure.

Investigators also employed correlation and regression analyses models among men aged ≥18 years in the Republic of Georgia with IVs of mental disorders, trauma exposure, income, marital status, age, and educational levels that assessed relationships with nicotine reliance,and authors found that tobacco behaviors were significantly associated with trauma experiences, depression, and with older age (Roberts, Chikovani, Makhashvili, Patel, & McKee, 2013). Furthermore, trends in cigarette smoking habits and quit efforts with adults diagnosed with diabetes were assessed with logistic linear regression analyses, and outcomes were that participants with diagnosed diabetes demonstrated decline in cigarette use from 2001 through 2010 (Fan et al., 2013). An alternate research that employed analysis of variance (ANOVA) and linear regression models determined smoke toxicant levels increased in 135 bars and eateries as distances of bars and eateries furthered from urban locations in North Dakota (Buettner-Schmidt, Lobo, Travers, &Boursaw, 2015. The study by Buettner- Schmidt et al (2015) emphasized the significance of tobacco laws and compliance with ordinances that appeared to be more frequently enforced by citizens in urban environments when compared to rural locales.

Another cross-sectional investigation used multivariable models with logistical regressions that examined if military deployments and battlefield exposures among 68,472 military personnel with IVs of deployment history, life stressors, military occupation, service branch, mental impairments, and demographic characteristics were associated with tobacco frequencies and relapse episodes, and results indicated that those with deployments, combat exposure, and mental impairments likely commenced tobacco occurrences or relapsed into smoking abuse (Boyko et al., 2015). Similarly, cross-sectional research with logistic regression approaches assessed tobacco prevalence among 671 Sri Lanka Naval forces (SLNF) who were exposed to combat environments with IVs of rank, combat exposure, educational levels, age, service type, and marital status, and outcomes demonstrated that SLNF who experienced combat trauma had higher smoking incidences when compared to those who were exposed to less threatening combat environments (de Silva, Jayasekera, &Hanwella, 2012). Furthermore, a study was performed that used logistical and linear regression models that assessed adult per capita tobacco consumption in the United States from 1900 to 2011 with IVs of population numbers, historical events (i.e., wars, public health policies, price increases, television, radio, clean indoor air standards), and conclusions established that strong tobacco control policies had been instrumental with significantly reduced per capita tobacco utilization rates in the United States (Warner, Sexton, Gillespie, Levy, &Chaloupka, 2014). Richardson, Pearson, Xiao, Stalgaitis, and Vallone (2014) also employed weighted logistic analyses techniques that examined noncombustible tobacco (NT) items (i.e., electronic nicotine delivery systems [ENDS], chew, dip, snuff tobacco) among 1487 current and prior tobacco users in the United States with IVs of demographics, reasons for NT use, age, threat beliefs, and eight different U.S. market areas, and results reflected that only a minority of participants engaged in NT habits while younger aged adults were more expected to use NT products.

Summary

I selected important tobaccorelated studies that demonstrated the effectiveness of cross-sectional models with multivariate regression approaches, logistical models, and correlation analyses through numerous IVs with tobacco consumption preferences among diverse military and civilian populations. Although these previous investigations delivered important information about IVs associated with tobacco frequencies among participants, my study employed an IV not previously used; i.e., quantities of DTAs, with four MVs in relation to TPR (none, SSL-B) among USAF Airmen on sampled USAFBs and USABs that helped fill a research gap and extended knowledge about tobacco harms in the public health discipline. My information explained in Chapter 2 guided the research design and rationale for this inquiry in Chapter 3.

Chapter 3: Research Method

Introduction

I selected a cross-sectional (CS) design forthis investigation toexaminethe relationship between quantities of DTAs and abnormally high TPR (SSL-B) using four MVs among USAF active duty military personnel (Airmen) on sampled USAFBs and USABs. While USAFAirmen demonstrated the lowest TPR (SSL-B) among all active duty military service members inall U.S.service branches (Barlas, Higgins, Plieger, &Diecker, 2013), tobacco consumption rates among USAF Airmenwere significantly higher than rates among civilian populaces in the United States (e.g., 24% vs. 18% for cigarettes and 12.8% vs. 2.8% for smokeless tobacco(Agaku et al., 2014; Barlas et al., 2013)Little et al., 2016). CS designs that use regression models can provide analytical information from secondary data that researchers can use to examine contributory relationships with variables among participants (Rudestam& Newton, 2015a, pp. 34-35). For example, Li (2011) conducted a CS investigation that examined large secondary datasets with MVs such as maternalcommunity capital, delinquencies, children and adolescents' daily routines, and parentchild connections that associated effects on children and adolescent behavioral patterns. Similarly, researchers have performed many CS investigations with regression analyses toassess relationships in whichtobaccorelated behaviors area variable among U.S. active duty military personnel and veterans (Agorastos et al., 2014; Chapman & Wu, 2015; Crum-Cianflone, Powell, Leardmann, &Russell, 2016; Davenport et al., 2015; Falvo, Osinubi, Sotolongo, & Helmer, 2015; Hermes et al., 2012; Hou, Turkeltaub, McCarty, & El-Serag, 2015; Jones et al., 2016;

Little et al., 2015; Morris et al., 2014; Poston et al., 2016; Sill, 2016; Voelker, Simmer-Beck, Cole, Keeven, &Tira, 2013).

Major sections of Chapter 3address the research design and rationale along with the study variables. Additionally, the methodology, the defined target population, sampling procedures, and archival data collection approaches areaddressed. Descriptions of the inquiry's instrumentation, operational constructs, and data analysis methodsare alsopresented. Threats to validity, ethical considerations, significant aspects of thechapter, and a transition to Chapter 4 conclude the chapter.

Research Design and Rationale

I chose a CS approach that delivered statistical information on how variables drew a parallel with an outcome or outcomes (Field, 2014, p. 13). This CS study used an IVand four MVs to predict the DV (Field, 2014a, pp. 7-8). The IV was quantities of DTAs positioned on sampled USAFBs and USABs in different geographic regions. The four MVs includedquality of DTA (e.g., padded seats vs. nopadded seats,shaded areas vs.noshaded areas, enclosed shelters vs.open shelters, seating vs. standing only), position of DTA (e.g., near worksites vs.near undesirable locations such as garbage dumpsters), implementation of a tobacco prevention/cessation program (yes/no), and types of base-wide tobacco cessation interventions offered. The DV demonstrated the TPR (none-SSL-B) in proportion to total Airmen at sampled USAFBs and USABs in different geographic regions.Comparatively, Gunzler, Chen, Wu, and Zhang (2013) determined that social behaviors could act as a MV with tobacco frequencies in the context of a worksite tobacco cessation intervention (IV) to lessen TPR among participants (DV).

Research Plan

This CS investigation assessed the relationship between quantities of DTA (IV) and four MVs with TPR (none, SSL-B; DV) among USAF active duty Airmen. A CS design, which was observational in strategy with me uninvolved other than noting behavioral choices from a self-report questionnaire completed by participants (Sedgwick, 2014), was used to examine tobacco habits (none, SSL-B) among USAF Airmen at a single point intime. A CS model isappropriate to compute the relationship between an IV (e.g., quantities of DTA on sampled USAFBs and USABs) and aDV (e.g., tobacco frequency [SSL-B] among Airmen). Prevalence was the proportion of Airmen who demonstrated tobacco habits (none, SSL-B) at sampled USAFBs and USABs across different geographic regions. This CS study was representative of tobacco behaviors among USAF Airmen and assessed whether a relationship, and not causality, among variables waspresent(Sedgwick, 2014).

This CS inquiry was associated to four research questions, which addressed (a) whether there was a significant relationship between quantities of DTAs and four MVs on sampled USAFBs and USABs and TPR (none, SSL-B) proportionately among Airmen, (b) whether TPR (none, SSL-B) differed significantly proportionately among Airmen with four MVs of DTAs on sampled USAFBs and USABs, (c) whether there weregreater quantities of DTAs in proportion to total Airmen on sampled USABs positioned in higher security threat areas worldwide (e.g., Turkey, South Korea) compared to lower security threat areas worldwide (e.g., Guam, Italy, the United Kingdom), (d) and whether greater quantities of DTAs on sampled USABs worldwide demonstrated increased TPR (none, SSL-B) in proportion to total Airmen compared to sampled USAFBs in the United States.

Time and Resource Constraints With the CSCD

A CS model provided advantages with flexibility of variables associated with probability models that generalized outcomes, and therefore this investigation technique strengthened external validity measures (Frankfort-Nachmias, Nachmias, &DeWaard, 2015a, p. 117). Additionally, while this technique did not require random assignment of participants to experimental and control groups, which could have constrained internal validity processes, the assignment of participants to comparison groups, in a manner similar tosome prior investigations,was not reasonable in terms of time or resources (Frankfort-Nachmias et al., 2015a, p. 117). As a result of time and resource limitations, this inquiry used secondary data from self-reported questionnaires with TPR (none, SSL-B) among USAF Airmen and quantities of DTAs with four MVs that examined effects. Yet a CS approach was equally disadvantageous, in that absent variables could have influencedpersonal biases and might have led to misinterpretation of causality inferences (Bell & Jones, 2015).

Selection of CS Design to AdvanceKnowledge

Although there was no evidence that quantities of DTAs on USAFBs and USABs hadbeen used as an IV or MV intobaccorelated research, five investigations employed a CS design technique with diverse predictor variables toassess tobacco episodes among USAF military personnel. Consider that Kram and associates (2014) used a CS approach with regression models through selection of predictor variables such as gender, feelings, social connections, exposure to media publicity, geographic region, and types of tobacco frequencies among 8,956 surveyed USAF Airmentoestablishhow dual tobacco users (SSL-B) were more likely to form nicotineaddictive behaviors compared to users with daily single nicotine addictive habits (e.g., only cigarettes or only smokeless tobacco). An alternate CS investigation performed by Linde and colleagues (2015) applied logistic regression analyses with IVs such as marital status, race, education, and social environment among 10,997 surveyed USAF military members that distinguished how hookah use prevalence rates were similar to those in civilian populaces, and that hookah use could be impacted by tobacco addictions. Additionally, Little and associates (2016) used a CS framework with regression models with IVs such as age, race, gender, education, and so forth among 13,685 surveyed USAF Airmen and discovered that 26.9% of Airmen practiced tobacco habits that exposed them tonicotine toxicants. In another study, Little and others (2015) useda CS approach with regression techniques with MVs such as age, gender, ethnicity, education, and marital status among 10,043 USAF surveyed personnel in 2013-2014 and revealed that while e-cigarette prevalence rates wereminimally higher in USAF personnel than in civilian populaces, users of e-cigarettes were more predisposed to use them concurrently with other tobacco products. A further investigation by Davenport and colleagues (2015) used a CS technique that associated regression analyses with MVs such as tobacco habits, cholesterol measurements, physical activity, body mass index, age, and alcohol frequencies among 729 USAF current and prior aviators that identified how Wolff-Parkinson-White (WPW) dysrhythmia prevalence symptoms were clinically stable among asymptomatic USAF aviators. To conclude, investigators have developed many CS methods with multiple linear regression approaches through different IVs and MVs that related TPR as either a DV or MV among USAF Airmen.

Study Variables

The IV in this investigation was quantities of DTAs positioned on sampled USAF military installations in different geographic regions. The four MVs werequality of DTAs (e.g., padded vs. nopadded seats, shaded vs.noshaded areas, enclosed vs.open shelters, seating vs. standing only), position of DTAs (e.g., near worksites vs.near undesirable locations such as garbage dumpsters), implementation of tobacco prevention/cessation programs (yes/no), and types of tobacco cessation interventions offered on sampled USAFBs and USABs. The DV demonstrated the TPR (none-SSL-B) in proportion to total Airmen at sampled USAF bases. The IV assessed quantities of DTA on sampled USAFBs and USABs that were provided by USAF installation HPC and BCE personnel. Three MVs (i.e., quality of DTA, position of DTA, types of tobacco cessation interventions offered) were calculated with developed and recognized 3-point Likert scales found in research, whereas the fourth MV(i.e., implementation of tobacco prevention/cessation programs)wasconsidered with a dichotomous scale (yes/no)on sampled USAF military installations. The DV was measured with current TPR (none, SSL-B) among surveyed USAF active duty Airmen with population totals by military installation identified with the ASIMS/AFCHIPs-TUS report.

Methodology

Population

The objective population in this inquiry was USAF active duty Airmen (i.e., officer, enlisted, +17 years of age) stationed at USAFBs and USABs in different geographic regions. The Air Force Personnel Center (AFPC) in March 2016 indicatedthat the total number of current USAF Airmen (officer and enlisted) was 308,606, with gender distributions of 19.2% (*n*=59,292) women and 80.8% (*n*=249,314) men. Self-account racial data among Airmen revealed that72% were White, 14% wereBlack or African American, 3.5% wereAsian, and 9.9% identified as other races or declined to reply (AFPC, 2016).

As of May 8, 2017, the ASIMS/AFCHIPS-TUS report reflected 252,761 USAF active duty Airmen with current self-reported tobacco habits (none, SSL-B). For this investigation, data were obtained from the ASIMS/AFCHIPS-TUS(May 8, 2017), which was updated by self-reported surveys completed by USAF active duty Airmen currently assigned at USAFBs in the United States and USABs worldwide.

Sampling Procedures

A stratified sampling process ensuredthat different USAF Airmen populations on USAFBs and USABs in dissimilar geographic regions were appropriately represented, which raised the level of precision with projected data (Frankfort-Nachmias, Nachmias, &DeWaard, 2015b, p. 152). This stratified selection process achieved the lowest possible sampling error among diverse Airmen populations assigned to different USAFBs and USABs across the United States and worldwide (Randomsampling.org, 2016). Subsequently, a stratified sampling method achieved outcomes that best represented diverse USAF population groups in a fixed time, mainly when USAF population totals varied significantly on USAFBs and USABs (Randomsampling.org, 2016.).

The ASIMS/AFCHIPs-TUS report reflected current tobacco dataamong252,761 active duty Airmen assigned to 79 USAFBs and USABsacross four U.S. geographic regions—Northeast (*n*=7), South (*n*=27)), Midwest (*n*=8), and West (*n*=20)—and two world regions— Pacific (*n*=9) and Europe (*n*=10).Applying astratified sampling method, I used 30% of 79 USAFBs and USABs (*n*=24) effectively representing self-reported tobacco habits (none, SSL-B) among USAF Airmen positioned at diverse locations. Thus, a proportional sampling fraction of 30% was successively drawn from each stratum within each specified geographic region. For purposes of this sampling frame, inclusion criteria were USAFBs and USABs selected within each stratum that represented highest and lowest self-reported TPR (none, SSL-B) among USAF Airmen within geographic regions from the ASIMS/AFCHIPS-TUS dated May 8, 2017. The large sample size of USAF Airmen ensured representation of the entire population, and the sample size also contributed to relationships and outcomes that were likely associated to other populations and conditions (Frankfort-Nachmias, Nachmias, &DeWaard, 2015c, pp. 92-93).

I employed G*Power Calculator (Field, 2014b, p. 70) to compute the appropriate sample size. I applied G*Power 3.0.10 software with a priori power analysis, by an *F*-test, with linear multiple regression: fixed model, with five predictors, by an effect size of 0.20, a margin of error of 5% (0.05), and a power of 0.80, that demonstrated a sample size of *n*=995. Knofcynski and Mundfrom (2007) revealed that the minimum sample size recommendation for five predictor variables at the “good” prediction level (ρ^2) of .10 is*n*=550, whereas the minimum sample size recommendation for five predictor variables at the “excellent” prediction level (ρ^2) of .10 is*n*=2,200.

Table 1

Sampled USAFBs and USABs With Numbers of AirmenWith Completed Self-Reported Tobacco Frequencies by Geographic Regionas of May 8, 2017

Northeast (*n*=2)	South (*n*=8)	Midwest (*n*=2)	West (*n*=6)	Pacific (*n*=3)	Europe (*n*=3)
Dover AFB, DE: #2,774	Goodfellow AFB, TX: #2,022	McConnell AFB, KS: #2,426	Cannon AFB, NM: #3,840	Andersen AFB, Guam: #1,625	Aviano AB, Italy: #3,353
Bolling AFB, DC: #1,997	Lackland AFB, TX: #9,792	Wright-Patterson AFB, OH: #5,008	Holloman AFB, NM: #3,403	Kunsan AB, Korea: #1,854	Incirlik AB, Turkey: #1,160
	Little Rock AFB, AR: #2,726		Los Angeles AFB, CA: #1,130	Osan AB, Korea: #4,246	Lakenheath AB, United Kingdom: #4,192
	Moody AFB, GA: #3,537		Mountain Home AFB, ID: #2,716		
	Pope Field, NC: #1,369		Peterson AFB, CO: #3,025		
	Randolph AFB, TX: #2,646		Travis AFB, CA: #5,429		
	Seymour Johnson AFB, NC: #3,340				
	Vance AFB, OK: #1,027				

Procedures for Recruitment, Participation, and Archival Data Collection

This research drew on TPR (none, SSL-B) among USAF Airmen population numbers with archival data contained in the ASIMS/AFCHIPS-TUS report dated May 8, 2017. Therefore, no recruitment of participants for additional contributions was required.

My data collection approach included locating the website on the USAF public health database, use of my DoD common access card (CAC) for entry, extraction of data with TPR (none, SSL-B) and number of participants by sampled USAFBs and USABs within the ASIMS/AFCHIPS-TUS report onto a Microsoft Excel spreadsheet, and construction ofa new SPSS data file. This data file contained the collection of scores for Airmen who completed the self-report questionnaire on tobacco prevalence behaviors with annual visits to USAF dental clinics. Next, I created new SPSS data files with collections of scores from quantities of DTAs at sampled USAFBs and USABs and from data collected on four MVs (i.e.,quality of DTAs, position of DTAs, implementation of tobacco prevention/cessation programs [yes/no], and types of base-wide tobacco cessation interventions) from BCE and HPC personnel assigned to sampled USAFBs and USABs.

To gain access to the USAF ASIMS/AFCHIPS-TUS report, I completed an online DoD permission form that described in detail my reasons for right of entry. I emailed the completed permission form to USAF health analytics personnel in San Antonio, Texas for access authorization approval. This data collection from the USAF ASIMS/AFCHIPS-TUS report occurred after I had obtained Walden IRB approval.

For the aim of this research, the ASIMS/AFCHIPS-TUS report that contained large amounts of self-reported data and simplicity of ingress (Rudestam& Newton, 2015b, p. 282) represented the best source of current TPR (none, SSL-B) at a permanent date in time (i.e., May 8, 2017) among USAF Airmen assigned to dissimilar USAFBs and USABs in geographic regions. It was impractical for me to use a CS model to independently collect primary data among participants assigned to sampled USAFBs and USABs.The strengths of archival data with inquiry includea researcher's ability to examine large populations (e.g., USAF active duty military) on tobaccorelated frequencies, assessments with longitudinal data with end points (Carroll, Workman, Carlson, & Brown, 2014), examinations of continuous populations, and minimal manpower efforts with economic savings (North Carolina State Center for Health Statistics, 2012). In the same way, archival data best provide future investigators with identification of tobacco trends among USAF Airmen, with comparisons to other population groups for generality, and with approaches to examine any changes in participants' behaviors, beliefs, and perceptions concerningtobacco abuse (Frankfort-Nachmias, Nachmias, &DeWaard, 2015d, p. 262). To elaborate, Frankfort-Nachmias and associates (2015d, pp. 262-263) emphasized that archival data would best permit future researchers to duplicate study procedures for additional investigations, to pursue longitudinal research models, to further investigate tobacco behaviors among USAF active duty Airmen and military personnel from separate service branches, and to create research designs that are significantly less costly than primary data collection techniques. Thus, this archival data collection provided the best option for this studybased on availability, access, concurrent tobacco prevalence data among participants, cost effectiveness, and expediency.

Instrumentation

The primary survey instrument with this inquiry was the ASIMS/AFCHIPS-TUS report, an intact surveillance instrument created by the USAF (year unknown) to track TPR (none, SSL-B) in proportion to numbers of active duty Airmen assigned to USAFBs and USABs. Although reliability and validity measures with ASIMS/AFCHIPS-TUS were not available, other researchers used instruments with governmentbased datasets with sufficient reliability and validity measures for healthconnected behaviors among other groups. Emphasized was the Behavioral Risk Factor Surveillance System (BFRSS) that was developed as an intact instrument by the CDC (2013) with high reliability and validity measures to collect concurrent data on healthrelated habits (i.e., smoking frequencies, obesity, physical activity, binge drinking, fruits' and vegetables' consumption, etc.) among U.S. adult populations. While the BRFSS is updated with self-reported, telephone replies to health queries with weighted controls among adults, Pierannunzi and associates (2013) discovered amid 32 BRFSS investigations conducted from 2004 to 2011 that test-retest reliability answers for tobacco habits and alcohol frequencies and content validity with physical activity behaviors over nine-month timeframes and additional time periods were strongly associated with participants' responses. McCarrier, Zimmerman, Ralston, and Martin (2013) also assessed the BRFSS from 1996 to 2007 for validity measures of minimumskilled workers' abilities to access healthcare providers after changes to the minimum wage plan,and they verified that validity measures were in place when workers' responded factually with queries related to their accessibilities to healthcare. Zhang and cohorts (2015) further evaluated internal and external validity measures of the BRFSS connected to five health indicators (e.g., tobacco habits, diagnosed chronic obstructive pulmonary disease [COPD], diagnosed diabetes, obesity from height-to-weight information, healthcare coverage) among adult participants in Missouri (*n*=52,089) in 2011 with multiple regression analyses, and they established that high internal validation measures (0.94 to 0.99) and high external validation values (within 95% confidence intervals) were present with all indicators Yet, Hall, Kurth, and Hall (2012) performed a validity review of two BRFSS functional disabilityrelated inquiries among 368 participants, and they discovered that the inquiries only approximated an 80% sensitivity rate with nearly one in five participants excluded from statistical data. Thus, Hall and colleagues (2012) surmised that BRFSS functional disabilityrelated inquiries might not accurately identify all participants' responses.

Secondly, an intact instrument used with this research was developed by the USAF (i.e., Air Force [AF] Form 696-Dental Patient Medical History). AF Form 696 is a self-report questionnaire on tobacco usage (none, SSL-B) and tobacco frequency with yes/no responses and 45 other general and lifestyle health areas specific to dental treatment completed by Airmen with annual visits to USAF dental clinics. Subsequently, USAF dental technicians input Airmen's responses from AF Form 696 with a corporate dental application (CDA) upload to the ASIMS/AFCHIPS-TUS that is concurrently updated on a weekly basis. While reliability and validity values associated with AF Form 696 were not available, other research identified similar instruments with sufficient reliability and validity measures with health behaviors used among other populations. Terry-McElrath, O'Malley, and Johnston (2014) devised a CS design that used secondary data to examine U.S. adolescents (e.g., 8th, 10th, and 12th grades in 2010 and 2011) who had completed a self-reported lifestyle questionnaire (e.g., frequencies of energy drinksand sugar-sweetened beverages, prior 30-day smoking habits)that did confirm reliability and validity measurements of the substance abuse(i.e., smoking habits) data (Bachman, Johnston, O'Malley, &Schulenberg, 2011; Johnson, O'Malley, Bachman, &Schulenberg, 2012). Accordingly, Terry-McElrath and colleagues (2014) discovered that higher consumptions of energy drinks and sugarsweetened beverages were correlated with increased smoking patterns among adolescents. Ikeda (2016) also tracked reliability, viability, and comparability measures established from the Global Burden of Disease Study (Ng et al., 2014) with a lifestyle questionnaire (e.g., tobacco behaviors, nutritional habits, physical activity) completed by adult populations in Japan in large secondary datasets, and they discovered that tobacco smoking and high blood pressure measurements were the two primary predictors for death among adults aged 30+ years in Japan in 2007.

Thirdly, I provided an additional survey instrument with implementation of a 3-point Likert scale with values (e.g., poor, fair, good) from a smoking behavior survey from prior researchers (i.e., Tobacco-Free College Campus Initiative [TFCCI], 2012) that was used to collect data with three MVs (e.g., quality of DTAs, location of DTAs, types of tobacco cessation services available) specific to my research. Although deficiencies in the literature demonstrated no reliability and validity measures with the TFCCI survey, alternate research identified similar instruments with established reliability and validity measures for tobaccorelated conducts among adult populations. Lee and colleagues (2012) established a tobacco related survey instrument (i.e., tobaccofree, compliance assessment tool [TF-CAT]), with a 6-point rating criteria and a 13-point policy index that was used to examine tobacco indoor and outdoor policies among North Carolina (N.C.)

higher education public institutions (*n*= 110), and they found that the instrument produced strong reliability and validity measurements for assessment of higher educational campus tobacco policies. Fallin and associates (2012) also tested reliability and validity measures with the TF-CAT tool by Mann-Whitney and Geographical Information System Analysis approaches that assessed tobaccofree adherence guidelines at two North Carolina higher education facilities, and they found that there were consistencies with validity outcomes and high inter-rater reliability measures. Soulakova, Hartman, Liu, Willis, & Augustine (2012) further examined test-retest reliability for smoking history measures with the Tobacco Use Supplement to the Current Population Survey (TU-CPS) in a large secondary dataset among adults (*n*=15,770) from 2002 to 2003 and despite several inconsistencies, they confirmed that moderate to excellent test-retest reliability measures were produced.

The TFCCI survey instrument that I used was customized from an existing instrument that introduced possible compromises to original reliability and validity measures (Creswell, 2014, p. 160). Therefore, two Headquarters (HQ)-USAF active duty officersin Europe—Germanyfamiliar with policies of DTAs and health promotion internal controls were provided a copy of the survey questions and asked to establish if the survey demonstrated construct validity measures. From their replies and directions, minor changes were made to the verbiage of the survey instrument that strengthened validity measures. Thus, the TFCCI survey instrument was used to confirm reliability and validity measures with research questions.

Operationalization

The DV (e.g., TPR; none, SSL-B) was measured to assess the association of the IV (e.g., quantities of DTAs at sampled USAFBs and USABs) and four MVs (e.g., quality of DTAs, location of DTAs, establishment of a tobacco cessation program on sampled USAFBs and USABs [yes/no], types of tobacco cessation services available) in proportion of numbers among USAF active duty Airmen.The TPR (none, SSL-B) were defined as the percentage of self-reported tobacco use on AF Form 696 completed by USAF active duty Airmen with annual visits to USAF dental clinics and uploaded by dental technicians with a CDA concurrently to the ASIMS/AFCHIPS-TUS report by USAF installation within geographic region.

The IV assessed quantities of DTAs that were provided by USAF installation HPCs and BCE personnellocated on sampled USAFBs and USABs. Three MVs (e.g., quality of DTAs, position of DTAs, types of tobacco cessation interventions offered) were calculated with 3-point Likert scales found in research, while the fourth MV(e.g., implementation of tobacco prevention/cessation programs) wasconsidered with a dichotomous scale (yes/no)on sampled USAF installations. The DV was measured with current TPR (none, SSL-B) among surveyed USAF active duty Airmen with population totals by USAF installation identified with the ASIMS/AFCHIPs-TUS report.

Research Questions

Inferential Questions

RQI—Quantitative: Was there a significant relationship between quantities of DTAs and TPR (none, SSL-B) in proportion to total Airmen on sampled USAFBs and USABs?

RQ2—Quantitative: DidTPR (none, SSL-B) differ significantly with quantities of DTAs and MVs (e.g., quality of DTAs, location of DTAs, implementation of a tobacco prevention/cessation program [yes/no], types of tobacco cessation interventions) in proportion to total Airmen assigned to sampled USAFBs and USABs?

RQ3—Quantitative: Were there greater quantities of DTAs in proportion to total Airmen on sampled USABs positioned in higher security threat areas worldwide (e.g., Turkey, South Korea) compared to lower security threat areas worldwide (e.g., Guam, Italy, United Kingdom)?

RQ4—Quantitative: Would greater quantities of DTA on sampled USABs worldwide demonstrate increased TPR (none, SSL-B) in proportion to total Airmen compared to USAFBs in the United States?

Hypotheses

RQ1 H0: There was not a significant relationship between quantities of DTAs and TPR (none, SSL-B) in proportion to total Airmen on sampled USAFBs and USABs.

RQ1 Ha: There wasa significant relationship between quantities of DTAs and TPR (none, SSL-B) in proportion to total Airmen on sampled USAFBs and USABs.

RQ2 H0: There was not a significant difference in TPR (none, SSL-B) with quantities of DTAs and MVs (e.g., quality of DTAs, location of DTAs, implementation of a tobacco prevention/cessation program [yes/no], types of tobacco cessation interventions) provided on sampled USAFBs and USABs in proportion to total Airmen,as measured by the survey instrument.

RQ2 Ha: There was a significant difference in TPR (none, SSL-B) with quantities of DTAs and MVs (e.g., quality of DTAs, location of DTAs, implementation of a tobacco prevention/cessation program [yes/no], types of tobacco cessation interventions) provided on sampled USAFBs and USABsin proportion to total Airmen, as measured by the survey instrument.

RQ3 H0: There were not greaterquantities of DTAs onsampled USABs positioned in higher security threat areasworldwide (e.g., Turkey, South Korea) compared to lower security threat areas worldwide(e.g., Guam, Italy, United Kingdom)in proportion to total Airmen, as measured by the survey instrument.

RQ3 Ha:There weregreaterquantities of DTA onsampled USABs positioned in higher security threat areasworldwide (e.g., Turkey, South Korea) compared to lower security threat areas worldwide(e.g., Guam, Italy, United Kingdom)in proportion to total Airmen, as measured by the survey instrument.

RQ4 H0:Greater quantities of DTA on sampled USABs worldwide did not demonstrate increased TPR (none, SSL-B) in proportion to total Airmen compared to USAFBs in the United States, as measured by the survey instrument.

RQ4 Ha:Greater quantities of DTA on sampled USABs worldwide demonstrated increased TPR (none, SSL-B) in proportion to total Airmen compared to USAFBs in the United States, as measured by the survey instrument.

IV, DV, and MVs are listed in Table 2.

Table 2

Variables, Research Questions, and Items on Survey

Variable category	Research question	Item(s) on survey
Independent variable		
Quantities of DTAs	RQ1, RQ2, RQ3, RQ4	Survey Questions 1, 2, 3, 4
Setting: USAFBs and USABs in the United States and worldwide		
Dependent variable		
TPR (none, SSL-B) based on: Participants' self-reported tobacco frequencies on AF Form 696 with concurrent upload by USAF dental technicians to the ASIMS/AFCHIPS-TUS report	RQ1, RQ2, RQ3, RQ4	Survey Questions 1, 2, 3, 4
Four mediating variables	RQ2	Survey Question 2
Quality of DTAs, location of DTAs, implementation of a tobacco prevention/cessation program (yes/no), types of tobacco cessation interventions		

Data Collection and Analyses

The initialquestion collected data about quantities of DTAs on sampled USAFBs or USABs in the first section of the survey. Three additional questions employed a 3-point Likert scale (e.g., poor, fair, good) that defined quality of DTAs, position of DTAs, and types of tobacco cessation interventions, while a fourth question used a dichotomous scale (yes/no) that did or did not confirm implementation of a tobacco prevention/cessation program,and this data was collected in the second section of the survey. Inferential statistics that included bivariate and multivariate analyses were assessed with statistical software, SPSS version 21 (Table 3).

Table 3

Statistical Procedures per Research Question and Hypothesis

Research question	Hypothesis (Ha)	Variables	Statistical procedures/analysis
RQI—Quantitative: Was there a significant relationship between quantities of DTAs and TPR (none, SSL-B) in proportion to total Airmen on sampled USAFBs bases and USABs?	Ha: There was a significant relationship between quantities of DTAs and TPR (none, SSL-B) in proportion to total Airmen on sampled USAFBs and USABs.	IV: Quantities of DTAs DV: TPR (none, SSL-B) by proportion of Airmen on sampled USAFBs and USABs	Bivariate: Pearson *r* correlation if the variables were normally distributed, if not Spearman's *rho* correlation
RQ2—Quantitative: DidTPR (none, SSL-B) differ significantly with quantities of DTAs and MVs (e.g., quality of DTAs, location of DTAs, implementation of a tobacco prevention/cessation program [yes/no], types of tobacco cessation interventions) in proportion to total Airmen assigned to sampled USAFBs and USABs?	Ha: TPR (none, SSL-B) did differ significantly with quantities of DTAs and MVs (e.g., quality of DTAs, location of DTAs, implementation of a tobacco prevention/cessation program [yes/no], types of tobacco cessation interventions) in proportion to total Airmen assigned to sampled USAFBs and USABs.	IV: Quantities of DTAs DV: TPR (none, SSL-B) by proportion of Airmen MVs: Quality of DTAs, location of DTAs, implementation of a tobacco prevention/cessation program (yes/no), types of tobacco cessation interventions	Multiple linear regression if assumptions were met, if not logistic regression
RQ3—Quantitative:Were there greater quantities of DTAs in proportion to total Airmen on sampled USABs positioned in higher security threat areas worldwide (e.g., Turkey, South Korea) compared to lower security threat areas worldwide(e.g., Guam, Italy, United Kingdom)?	Ha: There were greater quantities of DTAs in proportion to total Airmen on sampled USABs positioned in higher security threat areas worldwide (e.g., Turkey, South Korea) compared to lower security threat areas worldwide(e.g., Guam, Italy, United Kingdom).	IV: Quantities of DTAs DV: TPR (none, SSL-B) by proportion of Airmen on sampled USABs	Bivariate: Pearson *r* correlation if the variables were normally distributed, if not Spearman's *rho* correlation
RQ4 -Quantitative: Did greater quantities of DTAs on sampled USABs worldwide demonstrate increased TPR (none, SSL-B) in proportion to total Airmen compared to USAFBs in the United States?	Ha: Greater quantities of DTAs on sampled USABs worldwide demonstrated increased TPR (none, SSL-B) in proportion to total Airmen compared to USAFBs in the United States	IV: Quantities of DTAs DV: TPR (none, SSL-B) in proportion to total Airmen on sampled USABs and USAFBs	Bivariate: Pearson *r* correlation if the variables were normally distributed, if not Spearman's *rho* correlation

Threats to Validity

This research involved analyses of TPR (none, SSL-B) among USAF active duty Airmen and recall bias with self-reported, undesirable lifestyle behaviors (i.e., tobacco use) that could have had an impact on internal validity measures (O'Keefe et al., 2016). Similarly, participants who infrequently used tobacco items might have misinterpreted frequency of tobacco use and self-reported tobacco habits erroneously. Since the survey was participantadministered and not interviewerconducted, participants could havealso misunderstood tobacco questions and underreported or overreported tobacco frequencies, thus further affecting internal validity. If participants' replieswere associated with exposures (Honeth et al., 2015) to tobacco products (e.g., smoke, smokeless) that providedthem with favorable emotions, internal validity measurementscould also have been jeopardized. However, previous research confirmed the validity of self-reported undesirable behaviors (i.e., tobacco habits) among adult participants, particularly for USAF active duty Airmenand similar populations identified at lowrisk for development of health related complications (White, Hartley, Musich, Hawkins, &Ozminkowski, 2013). The large sample size with USAF Airmen across different geographic regions enhanced external validity measures and generalization measurements with different populations, and the multiple regression analyses with sufficient statistical assessments that took into consideration four MVs (i.e., quality of DTAs, location of DTAs, implementation of a tobacco prevention/cessation program [yes/no], types of tobacco cessation interventions) further increased the validity constructs of this inquiry (White et al., 2013).

Ethical Procedures

Walden's IRB approval (# 02-07-17-0485085) wasgained on April 11, 2017 that enabled me to access USAF secondary datasets and to conduct this investigation. No personal identifiers or IP addresses were collected with secondary data collection approaches. Results of survey instrument feedbacks from BCE and HPC personnel assigned to sampled USAFBs and USABs were maintained in a secured, government-password protected file. I experienced no conflicts of interest with use of survey instruments and research datasets. I only had access to these secured files, and I will destroy them after five years.

Summary

Idesignedthis inquiry with a cross-sectional approach to examine the relationship of quantities of DTAs (e.g., IV) with four MVs and TPR (none, SSL-B) among USAF active duty Airmen proportionately assigned to USAFBs and USABs across geographic regions. The target population was USAF active duty Airmen who had completed a self-reported tobacco frequency questionnaire with annual dental visits to USAF dental clinics. A stratified sampling method of 30% of 79 USAFBs and USABs (n=24) wasused that represented self-reported tobacco habits (none, SSL-B) among USAF Airmen positioned at diverse locations. The sample size for five predictor variables with two dissimilar techniques approximated a quantity between n=550 and n=2,200. A customized survey questionnaire with an arrangement of researcherdeveloped questions and an established 3-point Likert scale was used to obtain data specific to research questions. Two HQ-USAF active duty officers in Europe—Germany reviewed the survey questions,and they providedappropriate feedback on data collection. Inferential statistics wereused to examine data input to SPSS version 21 software. Threats to internal validity included recall bias with self-reported, socially unacceptable habits (e.g., tobacco abuse, misinterpretation of self-reported tobacco questions, underreporting or overreporting of tobacco frequencies among participants), yet high participant numbers helped to minimize external validity measures. Ethical considerations were taken into consideration with no use of participant identifiers or IP addresses with secondary data collection, with data collection safely maintained in a secured, government- password protected file, and with procedures to destroy secured files after five years.Research outcomes fromuse of the instrument survey, data collection, and data analyses were described in Chapter 4.

Chapter 4: Results

Introduction

The aim of this research was to assess the relationship between quantities of DTAs and abnormally high TPR (SSL-B) with four MVs among USAF active duty military personnel (Airmen) on sampled USAFBs and USABs. Research Questions 1-4 with inferential questions and hypotheses were as follows:

RQ1—Quantitative: Was there a significant relationship between quantities of DTAs and TPR (none, SSL-B) in proportion to total Airmen on sampled USAFBs and USABs?

RQ1 Ho: There was not a significant relationship between quantities of DTAs and TPR (none, SSL-B) in proportion to total Airmen on sampled USAFBs and USABs.

RQ1 Ha: There wasa significant relationship between quantities of DTAs and TPR (none, SSL-B) in proportion to total Airmen on sampled USAFBs and USABs.

RQ2—Quantitative: Do TPR (none, SSL-B) differ significantly with quantities of DTAs and MVs (e.g.,quality of DTAs, location of DTAs, implementation of a tobacco prevention/cessation program [yes/no], types of tobacco cessation interventions) in proportion to total Airmen assigned to sampled USAFBs and USABs?

RQ2 Ho: There was not a significant difference in TPR (none, SSL-B) with quantities of DTAs and MVs (i.e.,quality of DTAs, location of DTAs, implementation of a tobacco prevention/cessation program [yes/no], types of tobacco cessation interventions) provided on sampled USAFBs and USABs in proportion to total Airmen, as measured by the survey instrument.

RQ2 Ha: There was a significant difference in TPR (none, SSL-B) with quantities of DTAs and MVs (e.g.,quality of DTAs, location of DTAs, implementation of a tobacco prevention/cessation program [yes/no], types of tobacco cessation interventions) provided on sampled USAFBs and USABs in proportion to total Airmen, as measured by the survey instrument.

RQ3—Quantitative: Were there greater quantities of DTAs in proportion to total Airmen on sampled USABs positioned in higher security threat areas worldwide (e.g., Turkey, South Korea) compared to lower security threat areas worldwide (e.g., Guam, Italy, United Kingdom)?

RQ3 Ho: There were not greater quantities of DTAs on sampled USABs positioned in higher security threat areas worldwide (e.g., Turkey, South Korea) compared to lower security threat areas worldwide (e.g., Guam, Italy, United Kingdom) in proportion to total Airmen, as measured by the survey instrument.

RQ3 Ha: There weregreater quantities of DTA on sampled USABs positioned in higher security threat areas worldwide (e.g.,Turkey, South Korea) compared to lower security threat areas worldwide(e.g., Guam, Italy, United Kingdom)in proportion to total Airmen, as measured by the survey instrument.

RQ4—Quantitative: Did greater quantities of DTA on sampled USABs worldwide demonstrate increased TPR (none, SSL-B) in proportion to total Airmen compared to USAFBs in the United States as measured by the survey instrument?

RQ4 Ho: Greater quantities of DTA on sampled USABs worldwide did not demonstrate increased TPR (none, SSL-B) in proportion to total Airmen compared to USAFBs in the United Statesas measured by the survey instrument.

RQ4 Ha: Greater quantities of DTA on sampled USABs worldwide demonstrated increased TPR (none, SSL-B) in proportion to total Airmen compared to USAFBs in the United Statesas measured by the survey instrument.

This chapter presents the results of the study, includinga description of data collection methods. Statistical analyses using SPSS version 21 software areexplained in this chapter, along with answers forthe research questions and hypotheses.

The survey questionswere modified from an established instrument by the TFCCI agency (2012).I madethree attempts via electronic email to acquire permission to use the public domain instrument;however,I received no reply from the TFCCI agency. Becausethe survey questions were slightly customized to pertain to USAF HPCs, two HQ-USAF active duty officers in Europe—Germany familiar with DTA policies and health promotion internal controls were provided survey questions to establish whetherthe questions demonstrated construct validity measures. One suggested modification was to provide HPCs with objective distances of locations of DTAs to better assess the distance of their sites from buildings (e.g., < 50 ft, < 100 ft, etc.), and an additional modification was to establish a deadline for HPCs to return answers to survey questions. After making these minor changes to survey questions, the survey questions were electronically transmitted via email on April 19, 2017 to 24 USAF HPCs.

Data Collection

I accessed the ASIMS/AFCHIPS-TUS reportdated May 8, 2017 following the procedures described in Chapter 3, and I extracted TPR (none, SSL-B)and number of participants by sampled USAFBs and USABs onto a Microsoft Excel spreadsheetthat were input into SPSS version 21 software. Data from the ASIMS/AFCHIPS-TUS report and datareceived via email and follow-up telephone communications with HPCs and BCE personnel were also input into SPSS version 21 software. Survey Question 2 (DidTPR[none, SSL-B]differ significantly with quantities of DTAs and MVs [e.g.,quality of DTAs, location of DTAs, implementation of a tobacco prevention/cessation program [yes/no], and types of tobacco cessation interventions] in proportion to total Airmen assigned to sampled USAFBs and USABs?) demonstrated a Likert 3-point scale that was reverse coded in SPSS (e.g., 1 = *good*, 2 = *fair*, 3 = *poor*) for quality and locations of DTAs andtypes of tobacco cessation interventions, so that the lowest possible number represented the highest level of tobacco cessation advantage among participants.

Descriptive Statistics

Descriptive statistics were conducted in SPSS to find the frequencies, the mean, and the standard deviation of variables. Results of descriptive statistics arepresented in Table 4.

Table 4

Mean Scores (±Standard Deviations) and Number of Cases by Variable

Variable	*N*	Mean
TPR % (none, SSL-B) on sampled USAF installations	21	15.07 ±5.18
Quantity of DTAs on sampled USAF installations	21	43.29 ±29.71
USAF Airmen populationon sampled USAF installations	21	2784.20 ±1137.89
Quality of DTAs on sampled USAF installations	21	2.10 ± .83
Location of DTAs on sampled USAF installations	21	2.90 ±.44
Implementation of tobacco cessation program on sampled USAF installations	21	1.14 ±.36
Types of tobacco cessation programson sampled USAF installations	21	1.52 ±.75

The total number of USAF installations with DTA-related data from survey questions returned via email or telephonic communications among HPCs and BCE personnel was 21, yielding an 88% response rate. Among those who provided DTA-related data, 15 were USAF HPCs, and six were BCE personnel.

The demographic characteristics of the sample population showed that USAF active duty Airmen (i.e., officer, enlisted, +17 years of age) had a population total of 308,606, with gender distribution of 19.2% (*n*=59,292) women and 80.8% men (*n*=249,314). Self-account racial data among Airmen indicated the following statistics:

72% White, 14% Black or African American, 3.5% Asian, 9.9% other races or declined to reply (AFPC, 2016).

As of May 8, 2017, the ASIMS/AFCHIPS-TUS report reflected 252,761 USAF active duty Airmen with current self-reported tobacco habits (none, SSL-B), which was a strong representative sample (81.9%) of the total USAF active duty Airmen military population.

Tests of Normality

Prior to hypothesis testing for Research Questions 1, 2, 3, and 4, Shapiro-Wilk tests ($p > .05$) were performed with each IV and DV to verify normality. The results of the Shapiro-Wilk tests were that quantities of DTAs, quality of DTAs, location of DTAs, implementation of tobacco cessation programs (yes/no), types of tobacco cessation programs, and TPR (none, SSL-B) demonstrated linear relationships, that all variables were normally distributed, and that there were no outliers.

Additional preliminary analyses with hierarchical linear regression for Research Question 2 showed that the four MVs (e.g., quality of DTAs, location of DTAs, implementation of a tobacco cessation program [yes/no], types of tobacco cessation programs) revealed > 20 cases; that predictor variables were not multicollinear, as assessed by Cook’s distance test (maximum < 1.00); and that minimum and maximum values for standard residuals were between -3.0 and 3.0.

Research Question 1 Results

Was there a significant relationship between quantities of DTAs and TPR (none, SSL-B) in proportion to total Airmen on sampled USAFBs and USABs (Table 5)?

The null hypothesis wasthat there wasnot a significant relationship between quantities of DTAs and TPR (none, SSL-B) in proportion to total Airmen on sampled USAFBs and USABs. The alternate hypothesis was that there wasa significant relationship between quantities of DTAs and TPR (none, SSL-B) in proportion to total Airmen on sampled USAFBs and USABs.

The variables' quantities of DTAs, TPR (none, SSL-B), and USAF Airmen population numbers across all sampled USAF installations were found to be normally distributed using the Shapiro-Wilk test. A Pearson's product-moment correlation was conducted to assess the relationship between quantities of DTAs and TPR (none, SSL-B) among USAF Airmen across all sampled USAF installations ($n = 21$)). There was a moderate positive correlation between quantities of DTAs and TPR among USAF Airmen across all sampled USAF installations, $r = .56$, $p < .01$ (Plonsky& Oswald, 2014). The two variables of quantities of DTAs and TPR (none, SSL-B) among USAF Airmen demonstrated a correlation of 0.56, which means that 31.4% of the variability in TPR was shared by quantities of DTAs (Field, 2013, p. 276). As the quantities of DTAs increased, the percentage of TPR increased. From these data, it was concluded that quantities of DTAs were significantly associated with TPR (none, SSL-B) among USAF Airmenpopulation numbers across all sampled USAF installations supporting the alternative hypothesis that there was a statistically significant effect between quantities of DTAs and TPR (none, SSL-B). The correlations between quantities of DTAs and the other variables in these datasets tended to be lower and were not significant.

Table 5

Pearson Correlations for Main Study Variables

Measure	1	2	3	*M*	*SD*
Quantities of DTAs	__	.56**	.27	43.29	29.70
TPR(none, SSL-B)	56**	__	.23	15.07	5.17
USAF Airmen population	.27	.23	__	2784.19	137.88

Note. *M* = mean, *SD* = standard deviation.
**$p< .01$.

Research Question 2 Results

DidTPR (none, SSL-B) differ significantly with quantities of DTAs and MVs (e.g.,quality of DTAs, location of DTAs, implementation of a tobacco prevention/cessation program [yes/no], types of tobacco cessation interventions) in proportion to total Airmen assigned to sampled USAFBs and USABs (Table 6)?

The null hypothesis was that there was not a significant difference in TPR (none, SSL-B) with quantities of DTAs and MVs (e.g.,quality of DTAs, location of DTAs, implementation of a tobacco prevention/cessation program [yes/no], types of tobacco cessation interventions) provided on sampled USAFBs and USABs in proportion to total Airmen, as measured by the survey instrument. The alternate hypothesis was that there was a significant difference in TPR (none, SSL-B) with quantities of DTAs and MVs (e.g., quality of DTAs, location of DTAs, implementation of a tobacco prevention/cessation program [yes/no], types of tobacco cessation interventions) provided on sampled USAFBs and USABs in proportion to total Airmen, as measured by the survey instrument.

The variables TPR (none, SSL-B), quantities of DTAs, USAF Airmen population numbers, quality of DTAs, location of DTAs, implementation of tobacco cessation programs (yes/no), and types of tobacco cessation programs on installations were found to be normally distributed using the Shapiro-Wilk test. A hierarchical multiple regression was conducted to assess whether the addition of four predictor variables (e.g., quality of DTAs, location of DTAs, tobacco cessation programs [yes/no], and types of tobacco cessation programs), improved the prediction of TPR (none, SSL-B) over and above quantities of DTAs and USAF Airmen population numbers on each sampled installation. The predictor variables TPR (none, SSL-B), quantities of DTAs, and USAF population on sampled installations for Model 1, $F(2, 18) = .00$, $p< .05$, and the same predictor variables for Model 1 with the additional predictor variable quality of DTAs for Model 2, $F(1, 17) = .04$, $p< .05$, were statistically significant. The predictor variables quantities of DTAs, TPR, and USAF population on sampled installations for Model 1, $F(2, 18) = .02$, $p< .05$, the same predictors for Model 1 with the additional predictor variable quality of DTAs for Model 2, $F(1, 17) = .02$, $p< .05$, the same predictor variables for Model 1 and for Mode1 2 with the additional predictor variable location of DTAs for Model 3, $F(1, 16) = .04$, $p< .05$, and the same predictor variables for Model 1, Model 2, and Model 3 with the additional predictor variable tobacco cessation programs (yes/no) for Model 4, $F(1, 15) = .04$, $p < .05$), were also statistically significant. From these data, it was concluded that quantities of DTAs for Models 1, 2, 3, and 4 were significantly associated with TPR (none, SSL-B) among USAF Airmen population numbers across sampled USAF installations supporting the alternative hypothesis that there was a statistically significant effect between quantities of DTAs and TPR (none, SSL-B).

However, the full predictor variables quantities of DTAs, USAF population numbers, quality of DTAs, location of DTAs, tobacco cessation programs (yes/no), and types of tobacco cessation programs to predict TPR for Model 5 was not statistically significant, $F(1, 14) = 1.27$, $p > .05$; adjusted $R^2 = .074$. The addition of the predictor variable quality of DTAs to the calculation of TPR for Model 2 did not lead to a statistically significant increase in R^2 of .00, $F(1,17) = 2.63$, $p > .05$; adjusted $R^2 = .20$. The addition of the predictor variable location of DTAs to the calculation of TPR for Model 3 also did not lead to a statistically significant increase in R^2 of .02, $F(1,16) = .17$, $p > .05$. The addition of the predictor variable tobacco cessation programs (yes/no), similarly to the calculation of TPR for Model 4, did not lead to a statistically significant increase in R^2 of .01, $F(1,15) = .13$, $p > .05$. Finally, the addition of the predictor variable types of tobacco cessation programs to the calculation of TPR for Model 5 did not lead to a statistically significant increase in R^2 of .00, $F(1,14) = .07$, $p > .05$. The results of the hierarchical multiple regression to determine if the addition of four predictor variables (i.e., quality of DTAs, location of DTAs, tobacco cessation programs [yes/no], and types of tobacco cessation programs) improved the prediction of TPR (none, SSL-B) over and above quantities of DTAs and USAF Airmen population numbers on sampled installations for Model 5 failed to reject the null hypothesis and therefore was not enough evidence to conclude that the addition of these four predictor variables produced a significant difference in TPR (none, SSL-B) over and above quantities of DTAs and USAF Airmen population numbers on sampled installations.

Table 6

Hierarchical Multiple Regression Analyses: Predictors Associated With Tobacco Prevalence Rates % (None, SSL-B)

Model 1	Model 2		Model 3		Model 4		Model 5			
Predictor	B	*p*	B	*p*	B	*p*	B	*p*	B	*p*
(Constant)	9.88	.00*	9.92	.04*	4.54	NS	3.26	NS	2.64	NS
Quantities of DTAs on installations	.09	.02*	.09	.02*	.09	.04*	.09	.04*	.09	NS
USAF population on installations	.00	NS	.00	NS	.00	NS	.00	NS	.00	NS
Quality of DTAs			-.01	NS	.20	NS	.01	NS	.07	NS
Location of DTAs					1.82	NS	1.45	NS	1.53	NS
Tobacco cessation programs (yes/no)							1.83	NS	2.94	NS
Types of tobacco cessation programs									-.69	NS
R^2	.32		.32		.34		.34		.35	
F	4.18		2.63		2.04		1.61		1.27	
ΔR^2	.32		.00		.02		.01		.00	
ΔF	4.18		.00		.49		.27		.06	

Note. NS = nonsignificant.
*$p < .05$.

Research Question 3 Results

Were there greater quantities of DTAs in proportion to total Airmen on sampled USABs positioned in higher security threat areas worldwide (e.g., Turkey, South Korea) compared to lower security threat areas worldwide (e.g., Guam, Italy, United Kingdom; Table 7)?

The null hypothesis was that there were not greater quantities of DTAs on sampled USABs positioned in higher security threat areas worldwide (e.g., Turkey, South Korea) compared to lower security threat areas worldwide (e.g., Guam, Italy, United Kingdom) in proportion to total Airmen, as measured by the survey instrument.The alternate hypothesis was that there were greater quantities of DTA on sampled USABs positioned in higher security threat areas worldwide (e.g., Turkey, South Korea) compared to lower security threat areas worldwide(e.g., Guam, Italy, United Kingdom)in proportion to total Airmen, as measured by the survey instrument.

The variables' quantities of DTAs on higher security threat USABs (e.g., South Korea, Turkey), quantities of DTAs on lower security threat USABs (e.g., Guam, Italy, United Kingdom), and USAF Airmen population numbers across sampled USAF installations were found to be normally distributed using the Shapiro-Wilk test. A Pearson's product-moment correlation was conducted to assess the relationship between quantities of DTAs on higher security threat USABs and quantities of DTAs on lower security threat USABs with USAF Airmen population numbers across sampled USAB installations (n= 3). There was a low positive correlation between quantities of DTAs on lower security threat USABs and USAF Airmen population numbers across sampled USAB installations, r= .10, p< .05. The two variables of quantities of DTAs on lower security threat USABs and USAF Airmen population numbers demonstrated a correlation of 0.10 which meant that 1% of the variability in quantities of DTAs was shared by USAF Airmen population numbers. As USAF Airmen population numbers increased, the quantities of DTAs increased. From these data, it was concluded that quantities of DTAs on lower security threat USABs were significantly associated with USAF Airmen population numbers across sampled USAF installations supporting the alternative hypothesis that there was a statistically significant effect between quantities of DTAs on lower security threat USABs (e.g., Guam, Italy, United Kingdom) and USAF Airmen population numbers.The correlations between quantities of DTAs on higher security threat USABs (e.g., South

Korea, Turkey) and the other variable in this dataset tended to be lower and were not significant.

Table 7

Pearson Correlations for Main Study Variables

Measure	1	2	3	*M*	*SD*
Quantities of DTAs on higher security threat USABS	__	.66	.60	30.33	11.59
Quantities of DTAs on lower security threat USABS	.54	__	.10*	46.77	14.22
USAF Airmen population	.60	.10*	__	2784.19	1137.89

*$p < .05$.

Research Question 4 Results

Did greater quantities of DTA on sampled USABs worldwide demonstrate increased TPR (none, SSL-B) in proportion to total Airmen compared to USAFBs in the United States (Table 8)?

The null hypothesis was that greater quantities of DTA on sampled USABs worldwide did not demonstrate increased TPR (none, SSL-B) in proportion to total Airmen compared to USAFBs in the United States, as measured by the survey instrument. The alternate hypothesis was that greater quantities of DTA on sampled USABs worldwide demonstrated increased TPR (none, SSL-B) in proportion to total Airmen compared to USAFBs in the United States, as measured by the survey instrument.

The variables' quantities of DTAs on USABs worldwide, quantities of DTAs on USAFBs in the United States, TPR (none, SSL-B), and USAF Airmen population numbers across sampled USAF installations were found to be normally distributed using the Shapiro-Wilk test. A Pearson's product-moment correlation was conducted to assess the relationship between quantities of DTAs on USABs worldwide, quantities of DTAs on USAFBs in the United States, TPR (none, SSL-B), and USAF Airmen population numbers across sampled USAF installations (n = 21). The results of the Pearson's product-moment correlation test failed to reject the null hypothesis, r= .30, p> .01, and therefore was not enough evidence to conclude that a difference in quantities of DTAs on sampled USABs worldwide demonstrated increased TPR (none, SSL-B) in proportion to total Airmen compared to quantities of DTAs on sampled USAFBs in the United States.

Table 8

Pearson Correlations for Main Study Variables

Measure	1	2	3	4	*M*	*SD*
Quantities of DTAs on USABs worldwide	__	.60	.68	.66	38.50	14.65
Quantities of DTAs on USAFBS in the U.S	.60	__	.00	-.17	45.21	34.20
TPR %	.68	.00	__	.24	15.07	5.18
USAF Airmen population	.66	-.17	.24	__	2784.19	1137.89

Summary

The purpose of this study was to assess the relationship between quantities of DTAs and unusually high TPR (SSL-B) with four MVs among USAF active duty military personnel (Airmen) on sampled USAFBs and USABs worldwide. Correlation assessments were performed to determine if quantities of DTAs had a statistically significant relationship with TPR (none, SSL-B) in the context of quality of DTAs, locations of DTAs, implementation of a tobacco cessation program (yes/no), and types of tobacco cessation programs among USAF Airmen population numbers on sampled USAF installations. Regression analyses were conducted to assess if the addition of four predictor variables; i.e., quality of DTAs, location of DTAs, tobacco cessation programs (yes/no), and types of tobacco cessation programs, improved the prediction of TPR (none, SSL-B) over and above quantities of DTAs and USAF Airmen population numbers on each sampled installation. Results of the study answered the research questions and hypotheses. The survey instrument questions assessed location and quality of DTAs, implementation of a tobacco cessation program (yes/no), and types of tobacco cessation programs among USAF Airmen population numbers on sampled USAF installations. Shapiro-Wilk tests were performed to confirm normality among the variables.

According to Pearson product-moment correlations, therewas a moderate positive correlation between quantities of DTAs and TPR among USAF Airmen across sampled USAF installations, and this outcome further revealed that there was a low positive correlation between quantities of DTAs on lower security threat USABs and USAF Airmen population numbers across sampled USAB installations. However, a Pearson product-moment correlation discovered that there was not enough evidence to conclude that a difference in quantities of DTAs on sampled USABs worldwide demonstrated increased TPR (none, SSL-B) in proportion to total Airmen compared to quantities of DTAs on sampled USAFBs in the United States.

Hierarchical multiple regression concluded that quantities of DTAs for Models 1, 2, 3, 4 were significantly associated with TPR (none, SSL-B) among USAF Airmen population numbers across sampled USAF installations, whereas the full model of quantities of DTAs, quality of DTAs, location of DTAs, tobacco cessation programs (yes/no), and types of tobacco cessation programs to predict TPR among USAF Airmen population numbers on sampled USAF installations (Model 5) was not statistically significant.

The results of the study were further discussed in Chapter 5, including limitations, generalizability of the results, and recommendations for practice and for further research.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

The objective of this research was to evaluate the correlation between quantities of DTAs and high TPR (none, SSL-B) with four MVs (i.e., quality of DTAs, locations of DTAs, implementation of a tobacco cessation program [yes/no], and types of tobacco cessation programs) among USAF active duty military personnel (Airmen) on sampled USAFBs and USABs worldwide. Becausequantities of DTAs vary across USAF installations, one additional aim of this study was to determine if increased numbers of DTAs affected higher TPR (none, SSL-B) among USAF active duty military personnel on sampled installations.

I entered the ASIMS/AFCHIPS-TUS surveillance report dated May 8, 2017, and I identified TPR (none, SSL-B)and number of Airmen participants by sampled USAFBs and USABs. I contacted 24 HPCs to acquire DTA-related information (i.e., quantity, quality, locations, implementation of a tobacco cessation program [yes/no], types of tobacco cessation programs) from the survey instrument via email and with follow-up telephone communications. Research Question 2 (DidTPR[none, SSL-B] differ significantly with quantities of DTAs and MVs [i.e., quality of DTAs, location of DTAs, implementation of a tobacco prevention/cessation program (yes/no), and types of tobacco cessation interventions] in proportion to total Airmen assigned to sampled USAFBs and USABs?) demonstrated a Likert 3-point scale that was reverse coded in SPSS (i.e., 1—*good*, 2—*fair*, 3—*poor*) for quality of DTAs, locations of DTAs, andtypes of tobacco cessation interventions, so that the lowest possible number represented the highest level of tobacco cessation advantage among participants. The total number of USAF installations with DTA-related data from survey questions returned via email or telephonic communications among HPCs and BCE personnel was 21, yielding an 88% response rate. Among those who provided DTA-related data, 15 were HPCs and six were BCE personnel.

From sampled USAF installations, TPR percentage had a mean average of 15.07 (*SD* 5.18), quantity of DTAs had a mean average of 43.29 (*SD* 29.71), USAF Airmen population numbers showed a mean average of 2784.20 (*SD* 1137.89), quality of DTAs revealed a mean average of 2.10 (*SD* 83), location of DTAs had a mean average of 2.90 (*SD* 44), implementation of a tobacco cessation program (yes/no) identified a mean average of 1.14 (*SD* 36), and types of tobacco cessation programs demonstrated a mean average of 1.52 (*SD* 75).

Interpretation of Findings

According to the key discovery, a Pearson product-moment correlation found that there was a moderate positive correlation between quantities of DTAs and TPR (none, SSL-B) among USAF Airmen across all sampled USAF installations, $r = .56, p < .01$. The two variables' quantities of DTAs and TPR (none, SSL-B) among USAF Airmen demonstrated a correlation of 0.56, which meant that 31.4% of the variability in TPR was shared by quantities of DTAs. As the quantities of DTAs increased, the percentage of TPR increased. From these data, it was concluded that quantities of DTAs were statistically significantly associated with TPR (none, SSL-B) among USAF Airmen population numbers across all sampled USAF installations. However, seven of 15 (47%) HPCs and three of six (50%) BCE personnel who provided replies to the DTA-related survey instrument reported that there were likely many unofficial DTAs that remained unaccounted for on their respective USAF installations. For instance, four HPCs stated that it was common for an individual to establish a DTA in the middle of an open field area with a butt can attached to a rod or thick branch inserted into the ground that became a permanent DTA for tobacco users. Similarly, two BCE personnel further mentioned that unofficial DTAs were positioned behind or adjacent to every building, yet these DTAs remained unaccounted for on the installation. While 13 of 15 (87%) of HPCs and all six BCE personnel who responded to the DTA-related survey instrument had access to official DTA maps on their respective USAF installation, nine of 15 (60%) HPCs also indicated that the maps were not routinely updated when new DTAs were added or when DTAs were abolished. Moreover, 11 of 15 HPCs (73%) reported that there was little to no enforcement of Air Force Instruction (AFI) 40-102, Tobacco-Free Living (March 4, 2015) policies on their respective installation among military and civilian line leadership with Airmen mandated to use tobacco products only in DTAs, and that many Airmen routinely practiced tobacco behaviors outside DTAs. This information was somewhat anticipated, given that much research had demonstrated that both U.S.military and civilian line leaderships demonstratedlow priorities with tobaccobehaviors that not only supported the U.S.military culture of tobacco-friendly attitudes (Grundy, Smith, & Malone, 2014; Jitnarin, Walker, Poston, Haddock, &Jahnke, 2015; Offen et al., 2013; Poston, Haddock, Jahnke, &Jitnarin, 2013; Poston, Haddock, Jahnke, Hyder, &Jitnarin, 2015; Smith & Malone, 2013; Smith et al., 2016; Smith, Poston, Haddock, & Malone, 2016; Ulanday, 2014; Ulanday, Jeffery, Nebeling, & Srinivasan, 2017)but adversely impacted tobacco-intervention actions among U.S. active duty military members. For instance, Smith and colleagues (2016) employed a qualitative approach among U.S. active duty service members to assess how U.S. military installation cultures affected antitobacco programs on U.S. military bases, and their findings revealed that many factors (i.e., access to pharmaceutical interventions, tobacco control assessment processes, military and civilian teamwork with establishment of DTAs, lax practices for tobacco breaks, particularly involving smokeless tobacco, tobacco sale prices) impacted leaderships' abilities to implement improved tobacco control measures. Additionally, Poston et al.(2015) emphasized that very low numbers of anti-tobacco messages in U.S. military installation newspapers from military and civilian line leadershipfrom January 2012 to December 2012 reinforced how tobacco cessation measures remained an understressed priority among U.S. active duty members. Moreover, Ulanday et al.(2017) discovered that perceptions of U.S. military leadership and military with lax enforcement of tobacco stop policies motivated U.S.military personnelwho valued their personal liberties to initiate or to continue nicotine habits. As I earlier reported from HPCs' verbal comments, outdated DTA maps among BCE personnel as well as lax enforcement of anti-tobacco policies with little to no emphasis on tobacco cessation interventions among U.S. military and civilian line leaderships continue to earmark DTAs as an accepted "stand by me" locale for U.S. active duty military members to practice tobacco habits on U.S. military installations.

An additional primary finding with a Pearson product-moment correlation showed that there was a weak positive correlation between quantities of DTAs on lower security threat USABs and USAF Airmen population numbers across sampled USAB installations, $r = .10$, $p < .05$. The two variables' quantities of DTAs on lower security threat USABs and USAF Airmen population numbers demonstrated a correlation of 0.10, which meant that 1% of the variability in quantities of DTAs was shared by USAF

Airmen population numbers. As USAF Airmen population numbers increased, the quantities of DTAs increased. From these data, it was concluded that quantities of DTAs on lower security threat USABs were statistically significantly associated with USAF Airmen population numbers across sampled USAF installations. This result was somewhat surprising, in thatI hypothesized that greater quantities of DTAs would be positioned in higher security threat areas (e.g., South Korea, Turkey) than in lower security threat areas (e.g., Guam, Italy, United Kingdom). Consider how Talcott and others (2013) reported that 53% to 63% of USAF Airmen (*n*=278) deployed to a highrisk deployment area practiced tobacco habits at all phases of their deployment, while Trautmann et al., (2014) found that regular smoking behaviors were common among German army soldiers (*n*=2372) positioned in high-stress deployment environments. Likewise, Japuntich and colleagues (2016) stressed that U.S. active duty military personnel (*n*=2013) in deployment conditions exposed to higher-risk threats and harassment stressors self-reported that they were more likely to initiate tobacco habits in deployment and to continue tobacco habits postdeployment, and Boyko and others (2015) further found that U.S. military members with high threat deployments and exposures to combat environments were more likely to initiate and sustain tobacco practices as well.However, Airmen population numbers with self-reported TPR (none, SSL-B) stationed at USABs in higher security threat areas (e.g., Incirlik AB, Turkey—1,160;Kunsan AB, Korea—1,854; Osan AB, Korea—4,246) were significantly smaller than Airmen population numbers with self-reported TPR (none, SSL-B) stationed at USABs in lower security threat areas (e.g., Andersen AFB, Guam—1,625;Lakenheath AB, United Kingdom—4,192; Aviano AB, Italy—3,353), and this research has shown that as Airmen population numbers increased on USAF military installations, so did quantities of DTAs. Furthermore, the three USABs in higher security threat areas are much smaller in physical land size when compared to USABs in lower security threat areas, and it could be that physical land size more so than installations positioned in high-threat areas might have predicted US military leadership's decisions on quantities of DTAs positioned on USAB installations worldwide.

According to another key finding, hierarchical multiple regression analyses revealed that the variable quantities of DTAs for Models 1, 2, 3, and 4 were statistically significantly associated with TPR (none, SSL-B) among USAF Airmen population numbers across sampled USAF installations, while the full model of variables' quantities of DTAs, quality of DTAs, location of DTAs, tobacco cessation programs (yes/no), and types of tobacco cessation programs to predict TPR among USAF Airmen population numbers on sampled USAF installations (Model 5) was not statistically significantly associated. This result was somewhat expected, as 11 of 15 (73%) HPCs reported that some of their respective DTAs provided overhead or partially enclosed shelters from weather-related elements, and 13 of 15 (87%) HPCs further reported that the large majority of DTAs were located within 50 feet of buildings to lessen distance from worksites and to increase convenience for Airmen who use tobacco. In contrast, 13 of 15 (87%) of HPCs had successfully developed and implemented a tobacco cessation program, with various types of interventions that included daily, weekly, and monthly one-on-one or group cessation sessions, 24-hour chat support, referrals to behavioral health specialists for dependency treatments and/or to a healthcare provider for cessation medications, and daily Internet-based quit lines. These forms of tobacco cessation programs implemented by HPCs represented the highest levels of tobacco cessation benefit among Airmen with tobacco addictions.

One further primary outcome with a Pearson product-moment correlation demonstrated that there was not enough evidence to conclude that a difference in quantities of DTAs on sampled USABs worldwide demonstrated increased TPR (none, SSL-B) in proportion to total Airmen compared to quantities of DTAs on sampled USAFBs in the United States. This result was also rather expected, as the mean average of DTAs on USABs was 38.5 (SD 14.65), whereas the mean average of DTAs on USAFBs in the United States was 45.21 (SD 34.2). It is highly conceivable that all sampled USAFBs in the United States were larger in physical size when compared to sampled USABs worldwide, and it appeared that physical sizes of USAF installations could have been a primary determinant of quantities of DTAs positioned on installations.

Limitations of the Study

One of the primary limitations of the study was dependence upon self-reported recalldata (Brown, Beard, Kotz, Michie, & West, 2014) concerning tobacco use among USAF Airmen. Airmen complete AF Form 696, Dental Patient Medical History, with annual visits to an USAF dental clinic, which is subsequently manually input by dental technicians into the ASIMS/AFCHIPS-TUS surveillance report. However, the tobaccorelated question “Do you use tobacco?” on AF Form 696 could be misinterpreted, in that there are no specific guidelines regarding frequency patterns (e.g., daily, weekly, monthly, last 30 days, prior 6 months). Moreover, although AF Form 696 does ask Airmen to provide tobaccoconnected recall data regarding cigarettes, cigars, and pipes, Airmen are not asked to provide self-reported frequencies of tobacco behaviors associated with e-cigarettes, which more than doubled in prevalence rates (3% to 6.5%) from 2013 to 2014 among USAF military personnel (Little et al., 2015) or frequencies of other tobacco-nicotine containing products (TNCP). Consequently, self-reported TPR (none, SSL-B) could be misrepresented on AF Form 696 among USAF Airmen, with skewed data reflected on the ASIMS/AFCHIPS-TUS surveillance report.

An additional limitation of the study was that although a sufficiently large sample of USAF Airmen with tobacco habits was assessed, the participants were nonrandom and constrained to the 21 USAF military installations. Consequently, there were Airmen who practiced tobacco use (none, SSL-B) at 63 other USAF installations in the United States and worldwide who were not assessed in this study.

Another limitation of the study was that while this research evaluated predictor variables of tobacco habits (e.g., quantities of DTAs, quality of DTAs, locations of DTAs, establishment of a tobacco cessation program [yes/no], types of tobacco cessation interventions) that had not been associated with TPR among USAF Airmen populations on sampled military installations in prior investigations, alternate influencers of tobacco use rates (e.g., discounted tobacco prices on USAF installations, current and previous deployments, age, gender, alcohol consumption, educational levels, prior nicotine cessation actions and familial tobacco frequencies [Talcott et al., 2013], history of tobacco habits) were not concurrently evaluated.

An added limitation of the study was that generalization of outcomes associated with an USAF active duty Airmen population to varied U.S. civilian populations and military and civilian populations of other countries may be imperfect secondary to cultural environments, work experiences, exposures to deployment atmospheres, nationwide dissimilarities, and intrapersonal and interpersonal differences among humans.

A further limitation of the study was the use of a cross-sectional approach with multiple regression analyses that did not permit me to confirm causal connections (Muilenburg, Laschober, &Eby, 2014) among predictor variables (i.e.,quantities of DTAs, quality of DTAs, locations of DTAs, implementation of a tobacco cessation program [yes/no], types of tobacco cessation programs for TPR [none, SSL-B])among USAF active duty Airmen. The study only confirmed an association among variables.

A supplementary limitation of the study was that the cross-sectional design also did not permit me to assess changes in TPR over time among USAF active duty Airmen from sampled installations in the United States and worldwide. In contrast, a longitudinal data approach would better evaluate behavioral changes and predictor variables (Muilenburg, Laschober, &Eby, 2014) of tobaccorelated frequencies among USAF active duty Airmen.

One final limitation of the study was the relatively small sample (n=21) (Lawless, Harrison, Grandits, Eberly, & Allen, 2015) of USAF military installations. A larger sample of USAF installations would have provided increased numerical power (Lawless et al., 2015) that might have confirmed stronger associations among variables and measures associated with quantities of DTAs and TPR (none, SSL-B) among USAF Airmen on sampled U.S. military installations.

Recommendations for Further Research and Practice

This study contributes to the literature by being the first study (to the best of my knowledge) to assess associations between quantities of DTAs, quality of DTAs, locations of DTAs, implementation of a tobacco cessation program (yes/no), types of tobacco cessation programs, and unusually high TPR among USAF active duty Airmen positioned at sampled military installations in the United States and worldwide. Nevertheless, proposals for additional research on this important healthrelated topic would contribute to filling the present gap that exists in the literature. Further research on this issue should be performed to provide outcomes that may be generalized to dissimilar military and civilian populations in the United States and in other countries.

This research technique used an initial email message with a survey instrument that addressed five DTA-related questions among 24 USAF HPCs and requested that data be provided via return email within an established suspense date. A recommendation for future research would be to coordinate data collection among HPCs initially with HQ-USAF Health Promotion military and civilian line leadership who could direct HPCs to adhere to email instructions and deadlines that would likely simplify and accelerate data collection on DTAs and tobacco-connected questions.

While this study evaluated associations among quantities of DTAs with four additional predictor variables and TPR among USAF active duty Airmen population numbers on sampled USAF military installations, it was not entirely certain that HPCs possessed sufficient awareness of the quality of DTAs (e.g., sheltered vs. unsheltered, padded vs. nopadded, shaded vs. unshadedseats) and of locations of DTAs on their respective installations. A recommendation for further research is to evaluate awareness of and familiarity with DTAs among HPCs prior to data collection, which could ensure that HPCs would deliver more precise data with a DTA-related survey instrument. A pre-datacollection measurement of HPCs' knowledge and expertise with DTArelated questions and their motivation to perform data collection would be important to this topic and could add integrity to data analyses.

Although this study employed a CS design, it might not have been the best approach for evaluation of predictor variables for TPR (none, SSL-B) among USAF active duty Airmen, since the CS design could not measure changes that might occur over time. Conversely, a longitudinal study design would enable predictor variables of TPR among Airmen to be assessed over a defined period of time. Thus, a longitudinal design would deliver more insight as to what specific predictor variables, if any, would influence tobacco frequencies among Airmen. For example, Otuyama and colleagues (2016) performed a longitudinal study with frequent tobacco predictor variables (e.g., exercise habits, alcohol consumption, gender, prior and present smoking status) among 13,483 dementia-free adults aged 65 years and older in seven low to middle income countries for an average of four years to assess the relationship between smoking and dementia, and investigators concluded that there was no health risk relationship between smoking habits and dementia.

One of the major discoveries of this research was that while most USAF HPCs did have knowledge of quantities of DTAs with data provided through installation maps produced by installation BCE personnel, HPCs demonstrated a general lack of awareness of quality and location of DTAs positioned on respective USAF installations. HPCs are an exceptionally trained group of healthcare professionals who serve as an important adjunct to behavioral health professionals with tobacco cessation interventions. One further recommendation would be to include installation HPCs and BCE personnel on U.S. military and civilian leadership meetings and decisions associated with quantities (e.g., two DTAs removed for each new DTA added), quality (e.g., no sheltered areas), and placements of DTAs (e.g., unattractive areas such as garbage disposals) to try to maximize all actions for reduced tobacco frequencies with improved short- and long-term health outcomes and increased mission capabilities among USAF Airmen.

Implications of the Study

The outcomes of this research have contributedto the literature to help establish associations with quantities of DTAs, quality of and location of DTAs,, implementation of a tobacco cessation program (yes/no), types of tobacco cessation programs, and TPR (SSL-B) among USAF active duty Airmen positioned at sampled U.S. military installations in the United States and worldwide. As the quantities of DTAs increased, TPR (SSL-B) also increased among USAF Airmen. While the mean TPR (none, SSL-B) among USAF active duty Airmen positioned on 21 sampled military installations was 15.07%, which was similar to the percentage of U.S. adults aged 18 years or older who were current cigarette smokers in 2015 (15.1%), many USAF sampled installations displayed significantly higher tobacco use rates among Airmen from the ASIMS/AFCHIPS-TUS report dated May 8, 2017 (e.g., Moody AFB, GA—21.7%, Seymour Johnson AFB, SC—21.8%, Little Rock AFB, AR—21.7%, Dyess AFB, TX—19.5%, Cannon AFB, NM—18.6%, Incirlik AB, TU— 17.5%). The literature provided substantial data on adverse health effects of both short- and long-term tobacco occurrences (e.g., shortness of breath, mild asthma, respiratory infections, heart disease, cancer, stroke, liver disease, high blood pressure, osteoporosis, increased physical injuries, decreased physical performance), mission essential detriments, and financial burdens with healthcare treatments among USAF Airmen, U.S. military members of other branches, and U.S. veterans (Agaku et al., 2014; Bergman, Hunt, &Augustson,2012; CDC, 2015; Grundy, Smith, & Malone, 2014; Jitnarin et al., 2015; Offen et al., 2013; Poston, Haddock, Jahnke, &Jitnarin, 2013; Smith & Malone, 2013; Smith et al., 2016;Smith, Poston, Haddock, & Malone, 2016; Ulanday, 2014; Walker, Poston, Haddock, &Jahnke, 2015).

Another key finding of this research was that although USAF military and civilian line leaderships have professional obligations to enforce current DoD tobacco-free living policies and to make final determinations on quantities, quality, and locations of DTAs on U.S. military installations, high numbers of DTAs close to highly populated areas (e.g., base commissary, base exchange [BX], food outlets, recreational activities) with passive to little enforcement of anti-tobacco policies continue to provide a tobaccoenabling culture on USAF and other U.S. military installations. This research demonstrated that it would be more beneficial for USAF military and civilian line leaderships to enforce current DoD tobacco-free living policies and to make concerted efforts to lessen quantities of or to remove DTAs and/or to position current DTAs in very inconvenient locations (e.g., near garbage disposals, greater distances from work environments). In turn, these actions could better help encourage USAF Airmen with tobacco behaviors to seek anti-tobacco living habits through the lifetime and thus promote social change.

Conclusion

Nearly 42,000 (i.e., 15.07%; ASIMS/AFCHIPS-TUS, May 8, 2017) USAF active duty Airmen self-reported that they practice tobacco behaviors, and it is very likely that this number of Airmen with TPR would be higher with inclusion of other tobacco consumption products such as electronic (e-) cigarettes or vapor cigarettes. The CDC's (2016) recommendations are for all individuals to develop tobacco free habits through the lifespan to minimize significant health risks connected with nicotine. Quantities of and conveniences of easily accessible DTAs near work places and highly frequented facilities on USAF military installations provide negative reinforcement locations for Airmen to participate in tobacco use with adverse short- and long-term health consequences that also impairs daily mission responsibilities. Moreover, tobacco behaviors with common shortness of breath symptoms have harmful effects on Airmen's abilities to achieve cardio-respiratory levels endurance essential to successfully pass yearly aerobic physical fitness requirements (e.g., 1.5 mile run; Smith et al., 2014) and to sustain repetitive tasks in work environments. Airmen's inabilities to pass yearly aerobic fitness tests can jeopardize career sustainment and career advancement actions and can further stall or prevent promotion opportunities and deployment requirements (Smith et al., 2014). A review of the literature overwhelmingly supported the adverse health effects that can occur among adults, adolescents, and children that engage in tobacco habits.

The aim of this study was to help fill the gap in the literature by evaluating the correlation between quantities of DTAs and abnormally high TPR (none, SSL-B) in the context of four MVs (e.g., quality of DTAs, locations of DTAs, implementation of a tobacco cessation program [yes/no], and types of tobacco cessation programs) among USAF active duty Airmenpositioned on sampled USAFBs and USABs worldwide. Pearson product-moment correlation and multiple regression analyses were conducted to assess relationships and effects between tobacco-connected variables. Results of correlation assessments shown that quantities of DTAs produced a moderate positive effect on TPR (none, SSL-B) among USAF Airmen, and that quantities of DTAs on lower security threat USABs shown a weak positive correlation with TPR and Airmen population numbers across sampled USAB installations. Outcomes from multiple regression analyses demonstrated that the variable quantities of DTAs for Models 1, 2, 3, 4 were statistically significantly associated with TPR (none, SSL-B) among USAF Airmen population numbers across sampled USAF installations, while the full model of variables' quantities of DTAs, quality of DTAs, location of DTAs, tobacco cessation programs (yes/no), and types of tobacco cessation programs to predict TPR among USAF Airmen population numbers on sampled USAF installations (Model 5) was not statistically significantly associated.

Implications of this study may lead to USAF military and civilian line leaderships providing more enforcement of established DoD tobaccofree living policies, less numbers of or removal of some or all DTAs, repositioning of DTAs to more disadvantaged locations for Airmen to practice tobacco behaviors, increased awareness of harmful tobacco-related habits, and more resources for tobacco cessation interventions on U.S. military installations. USAF HPCs could be a more valuable source to help U.S. leaderships assess numbers of DTAs and quality and locations of DTAs to better take advantage of anti-tobacco policies. Increased promotional campaigns supplemented with community outreach actions and increased public health education efforts could further stimulate Airmen with tobacco habits to reexamine their nicotine dependencies and to seek effective cessation interventions on U.S. military installations.

The social change component of this information with fewer numbers of or removal of DTAs with dramatically improved environmental conditions could positively affect the health statuses of over 2,870,000 (DMDC, 2017) US active duty military member, civilian workforces, and medical beneficiaries positioned at U.S. armed forces installations in the United States and worldwide, as well as improve mission task responsibilities, diminish healthcare costs, and increase awareness in U.S. military communities of the health benefits of tobaccofree lifestyles. Positive social change with lesser quantities of DTAs could further improve the health of all individuals on all U.S. military installations by reducing risks of cardiovascular disease, high blood pressure, stroke, cancers, osteoporosis, chronic obstructive pulmonary disease (COPD), asthma, emphysema, respiratory ailments, arthritis, and other conditions, and by minimizing exposures of everyone to secondary smoke contaminants that adversely affects short- and long-term health. Positive social change with reduced numbers of DTAs could also lower health insurance rates (e.g., tobacco users are deemed higher health risks) and make environments less opportune and more expensive for populaces to practice tobacco behaviors. Opportunistic social change might further occur on U.S. military installations by addressing DTAs as one of the root predictors of tobacco-related diseases that limit tobacco users abilities to initiate and sustain cessation habits. With significantly increased efforts and further commitments on the part of all US military and civilian line leaderships and U.S. active duty military personnel and civilian workforces among all DoD branches, tobaccofree living lifestyles could become the normalized behavior and positively change tobaccofriendly cultures present on all U.S. military installations.

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