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Risk Factors of Sexual Assault Victimization within the U.S. Military

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ABSTRACT

RISK FACTORS OF SEXUAL ASSAULT VICTIMIZATION WITHIN THE U.S. MILITARY: A META-ANALYSIS

By

Katherine Ann Hebrank

December 1, 2021

INTRODUCTION: Sexual assault (SA) victimization affects thousands of service members in the military each year and identifying risk factors of SA is essential to inform prevention efforts. AIM: To synthesize literature on SA within the military to determine risk factors of SA incidence. METHODS: Risk factors from 6 epidemiological studies were compared via meta-analysis. Odds ratios and tests of heterogeneity were calculated to illustrate the collective odds of SA given each risk factor across the studies and to show variability. Odds ratios were calculated separately for risk factors only mentioned in one study. RESULTS: Women (OR =16.37), persons reporting sexual harassment during service (OR = 14.54), persons with a SA history (OR = 3.99), enlisted rank (OR = 2.47), non-married persons (OR = 2) and persons with no college experience were at greater risk of SA (OR = 1.32). Being White was found to be a protective factor (OR = 0.76). Our descriptive analysis found that experiencing stalking (OR = 11.84), being a sexual minority (OR = 2.15) or transgender increased the risk of SA (OR = 1.91). However, transgender womxn were at lower risk of SA than transgender mxn (OR = 0.42). DISCUSSION: It may be useful to develop tailored prevention programs for those identified as at risk according to our findings. Further, more needs to be done to address the environmental and cultural factors specific to the military that perpetuate SA incidence.

RISK FACTORS OF SEXUAL ASSAULT VICTIMIZATION WITHIN THE U.S. MILITARY: A META-ANALYSIS

by

KATHERINE A. HEBRANK

B.S., GEORGIA STATE UNIVERSITY

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of Georgia State University in Partial Fulfillment
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APPROVAL PAGE

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Author's Statement Page

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Katherine A. Hebrank

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Chapter I - Introduction

Sexual assault, defined as nonconsensual sexual contact ranging from contact to penetrative sex, is a longstanding and widespread issue within the United States military that has not been eradicated, despite decades of efforts (U. S. Government Accountability Office, 2021) . An estimated 15.7% of current and former military personnel report either sexual harassment and/or assault, 3.9% of men and 38.4% of women (Turchik & Wilson, 2010). Sexual assault can have lasting negative effects and can destroy morale and trust among service members. Some of the most common psychopathological correlates of sexual assault are suicide, anxiety, depression, trauma and stressor related conditions, such as post-traumatic stress disorder (PTSD), bipolar disorder, and obsessive-compulsive disorders (Dworkin et al., 2017). A 2017 research study on military veterans found that having a positive screen for military sexual trauma (MST) was associated with 50% higher health care utilization and costs compared to those with no history of MST, \$10,734.00 more for women and \$11,484.00 more for men over a 5 year period (Brignone et al., 2017). The cost is not only monetary, but can come at the expense of jeopardizing military readiness when service members leave the service prematurely due to sexual assault exposure (Matthews et al., 2021) . A crucial step in preventing sexual assault within the military is identifying risk factors associated with sexual assault victimization. Although victims are not able to *prevent* sexual assault because the sole responsibility of the assault is with the perpetrator, understanding risk factors for victimization can inform the development of evidence-based risk reduction programs to reduce risk within a feminist framework while perpetration is still widely prevalent.

Chapter II – Literature Review

Risk Factors

Sexual assault reports made by service members in 2020 indicate victims were more likely to be women, age 20-24 and belong to the most junior grade/status (Department of Defense Sexual Assault Prevention and Response Office, 2021; Turchik & Wilson, 2010). Across both genders, White persons experience the highest rates of assault within the military, which is contrary to civilian studies which find Black women are more likely to experience assault than White women (Coulter et al., 2017; Kimerling et al., 2007; Mellins et al., 2017). As of 2017, Black people comprised 16% of the military, with Black females being overrepresented in the Air Force, Army and Navy compared to the civilian workforce (Amanda Barroso, n.d.; *Demographics of the U.S. Military*, n.d.). Apart from being White, being younger in age and a woman are consistent findings cited in civilian studies on sexual assault risk factors. A 2013 national study on close to 300,000 civilian sexual assault victims of all ages, found that 80% of victims were under 25 and 88% were women (Felson & Cundiff, 2014). One study of college students found that 28.1% of women and only 12.5% of men reported they were victims of sexual assault at some point since entering college (Mellins et al., 2017). Within the military, service members who are younger tend to belong to a more junior rank and status, enlisted versus officer, than their older military counterparts, which may contribute to why both rank and age are risk factors for sexual assault. One hypothesis is that perpetrators may target women and those with less “sociocultural power,” because these persons may be more likely to remain silent for fear of facing backlash from formally reporting an incident (Bell et al., 2018, p. 220). Men also tend to outrank and outnumber women significantly (Burns et al., 2014). Others with less power may be younger, enlisted service members and persons with less educational attainment (Bell et al., 2018). Further, unmarried civilians are often found at higher risk of victimization as, in some cases almost twice as much as married persons, according to one study (Elliott et al., 2004). One explanation for elevated risk of assault among unmarried women is that they may be exposed to

more environments and situations where assault is possible, for example, dating (Golding et al., 2002). Lacking a college degree is also associated with higher risk of assault both inside and outside of the military (Elliott et al., 2004; Kimerling et al., 2007; Suris & Lind, 2008). The military data and civilian studies support the limited findings that being a young, unmarried, white woman of lower rank and no college experience appear to place a service member at heightened risk for experiencing assault, however further analysis of independent epidemiological studies on the military population are needed to confirm this information.

Another group considered to have less sociocultural power are persons belonging to the lesbian, gay, bisexual, transgender, intersex and asexual (LGBTQIA+) community (Bell et al., 2018). A 2013 study found that among lesbian and bisexual women and heterosexual women veterans, lesbian and bisexual women are more likely to experience sexual assault (Mattocks et al., 2013; White et al., 2018). Conversely, another study of women veterans found that there was no difference in military sexual trauma among lesbian, bisexual and queer women versus heterosexual women, rather that women in general are at heightened risk for sexual assault in the military (Dardis et al., 2016). In a survey of LGBT service members, 83% of lesbian and bisexual women reported at least one incident of military sexual trauma versus just 74% of gay and bisexual men (Gurung et al., 2018). It is important to note that despite heightened risk for victimization among gay, bisexual, and queer men in the military, women are still disproportionately targeted, no matter their sexual orientation. Among civilian populations, when using heterosexuals as the reference group, bisexual women are most likely to experience assault, while among men, those identifying as gay are most likely to experience assault (Coulter et al., 2017; Mellins et al., 2017). One potential explanation of the unequal burden of assault for bisexual women may stem from biphobia, which manifests as maltreatment and stereotyping of bisexual persons on the part of monosexual persons (Seabrook et al., 2018). Furthermore, civilians categorizing their sexual orientation as something other than heterosexual, gay, lesbian, or bisexual (e.g., queer, pansexual) also have a

higher likelihood of victimization (Mellins et al., 2017). Transgender persons in the military are also considered high risk, according to a study of veterans that finds transgender persons experienced significantly higher rates of military sexual trauma during their service than non-transgender persons (Brown & Jones, 2015). This is echoed in civilian populations as well. One such study finds that transgender persons often report higher rates of assault than cisgender men and women (Coulter et al., 2017). Some transgender veterans have attributed their sexual victimization to being targeted for not being cisgender, almost as if being punished for not conforming to the gender they were assigned at birth (Bell et al., 2018; "Still Serving in Silence," 2013). Less is known about whether transgender wxmen are more susceptible to victimization than transgender mxn and vice versa. Research consistently has shown that LGBTQIA+, or non-cisgender, non-heterosexual service members are a vulnerable population for sexual assault within the military. Aside from sexual orientation and gender identity, there are also other forms of victimization that are associated with sexual assault.

Civilian studies report a prior history of sexual assault and harassment victimization places someone at a higher likelihood for revictimization (Conley et al., 2017; Mellins et al., 2017; Walker et al., 2019). This is found to be true in military settings as well, with veterans and women soldiers with a history of childhood sexual assault also experiencing higher rates of assault during their service (Himmelfarb et al., 2006; Sadler et al., 2003; Suris & Lind, 2008). In addition to childhood sexual victimization, adult sexual assault prior to entering the military is also associated with sexual assault while serving (Sadler et al., 2003). Other forms of victimization, such as stalking and sexual harassment are also found to be correlated with sexual assault. Service members who are sexually harassed are also much more likely to also experience an assault (Wood & Toppelberg, 2017). Stalking has been correlated with assault as well, both in and outside of the military (Logan & Cole, 2011; Lucas et al., 2019). One study on veterans found that service members who experienced stalking were significantly more likely to also have experienced military sexual trauma (Lucas et al., 2019). A 2011 study on civilian women

who had obtained protective orders against a male partner showed that 25% of participants had been both raped and stalked by the person they sought a protective order against (Logan & Cole, 2011). Some of these forms of victimization occur while a victim is serving in the military, which may be due to power dynamics, as well as a culture that encourages aggression and de-individualism (Turchik & Wilson, 2010).

The military setting itself has its own unique environmental risk factors associated with elevated risks of sexual assault, such as, branch of service, unit component (active duty versus Reserves or National Guard) and deployment history. According to SAPRO, of the four military branches, Marine Corps had the highest reporting rate or sexual assault per thousand in 2020, 5.9%, versus 5.5% in Army, 4.7% in Navy and 4.5% in Air Force (Department of Defense Sexual Assault Prevention and Response Office, 2021). Several cultural variables may be operating in tandem to explain why the Marine Corps may be riskier in terms of SA, however one potential explanation is the uneven ratio of men to women, with the number of men far outweighing the number of women (Burns et al., 2014; *Demographics of the U.S. Military*, n.d.). Men far outnumber women in the military, however this is even more exaggerated in the Marine Corps. A service member's unit component, whether they are active duty or reserves/National Guard, is another risk factor as well. For men, being on active duty may increase their odds of experiencing an assault, however this factor does not seem to impact rates of assault among women (Burgess et al., 2016). Deployment can impact sexual assault as well, with one study finding that nondeployed women experienced sexual assault more often when in a non-deployed location versus when on deployment (Sadler et al., 2017). There appears to be a time-related factor at play here, as risk estimates of sexual assault were higher in deployed locations versus non-deployed locations the longer a woman stayed at that location (Sadler et al., 2017). This suggests that chances of sexual assault may increase the longer a woman spends in the military, and that this risk is even higher if she is in a deployed location (Sadler et al., 2017). A study of women who experienced military sexual trauma while deployed also cited an extended length of time as a potential factor, along with, "deprivation of sexual

activity, high stress levels, high prevalence of risk behaviors such as alcohol use, and changes in perceptions of “normal” behavior that may occur during war” (Burns et al., 2014). Isolation from other employees and the public may play a role, with one study finding that rapes often occurred in the late evening or early morning (Sadler et al., 2003). This isolation may explain why risk for sexual assault is higher in deployed versus non-deployed locations, when controlling for time spent at each location. Additionally, the degree of inappropriate sexual conduct that is tolerated in any of these particular work environments may have an influence on incidence of sexual assault (Sadler et al., 2003). Whether service members perceive a lack of consequences for perpetrating sexual victimization also impacts whether or not they choose to follow through with it (Burns et al., 2014). With these many combined environmental factors at play, it is apparent why sexual assault has flourished in certain sects and settings within the military.

Each of the risk factors mentioned above, gender identity, age, rank, race, marriage status, educational attainment, branch of service, unit component, deployment status, sexual orientation, race, prior history of stalking, prior history of sexual stressors and sexual harassment, is examined in the studies we selected for our meta-analysis and descriptive analysis. While there may be an ample amount of research on some of these variables in sexual assault among civilians, less is known about how such characteristics influence sexual assault within a military setting.

Scope and Prevalence

For fiscal year 2020, there were 6,290 reports of sexual assault by service members as alleged victims for incidents that took place while the victim was in military service (Department of Defense Sexual Assault Prevention and Response Office, 2021). However, when looking at results from the anonymous Office of People Analytics (OPA) survey from past years, it can be observed that the actual number of sexual assaults often far surpasses the number of reports filed (Department of Defense Sexual Assault Prevention and Response Office, 2021). For example, for fiscal year 2018, there were only

6,053 reports of sexual assault, however the OPA survey estimated 20,500 service members experienced sexual assault within that past year (Department of Defense Sexual Assault Prevention and Response Office, 2021). To provide a broader scope of these 2018 numbers by gender, roughly 6.2% of women and 0.7% men in the military reported experiencing sexual assault within the past year (Department of Defense Sexual Assault Prevention and Response Office, 2021). Looking back over the past 6 years, in 2014, sexual assault estimates were at 20,300, with 4.9% of women and 0.9% of men being affected, which then decreased to 14,900 in 2016, affecting 4.3% of women and 0.6% of men (Department of Defense Sexual Assault Prevention and Response Office, 2021). It is important to note that despite women being at an increased risk for assault, as of 2018 they only accounted for 16% of enlisted forces and 19% of office corps (*Demographics of the U.S. Military*, n.d.). Therefore, even though men may not experience assault at the same rates as women, they still account for a large number of assaults due to the fact that they comprise the majority of the military population. These recent trends illustrate that sexual assault plagues the lives of many serving in the military, and it does not appear to be waning.

Shift in Policy

Thus far, the majority of the military's efforts to reduce sexual victimization have been response-based, with some of the more recent legislation focusing on victim advocacy and oversight, rather than prevention (U. S. Government Accountability Office, 2021). With sexual assault rates ever on the rise, it has become clear that a different approach must be taken to reduce incidents of assault, which is the military has begun to adopt more of a public health approach in tackling this problem. The public health approach has several steps, the first is surveilling and collecting information on an issue in order to define it and understand its etiology, the second is identifying risk and protective factors of the issue, the third is determining the most effective interventions for the target population and the fourth is then implementing those selected interventions (U. S. Government Accountability Office, 2021).

Through government legislation, there have been recent improvements in enhancing surveillance of sexual assault within the military and mandatory requirements for yearly reports to be published, ensuring officials and the public have the most accurate information on incidence and prevalence (U. S. Government Accountability Office, 2021). Part of this was due to the Prevention Plan of Action (PPoA), which was released by SAPRO on May 2, 2019 to address sexual assault and victimization from a preventative/public health approach (*Sexual Assault Prevention Plan of Action (PPoA) | SAPR*). The PPoA, “identifies actions necessary to measurably and systematically reduce sexual assault in the military,” and recognizes that, “effective sexual assault prevention requires an optimized prevention system that has the capacity to execute the necessary steps of the prevention process” (*Sexual Assault Prevention Plan of Action (PPoA) | SAPR*).

Research Relevance

While there have been efforts to stop sexual assault in the military for many years, there has been a renewed focus with the murder of Vanessa Guillén in 2019 that sparked the subsequent independent investigation into Fort Hood in 2020 (*The United States Army*). The findings of the independent commission’s review of Fort Hood showed major flaws in the installation’s climate, conditions, functioning and culture and particularly, its handling of sexual assault and sexual harassment accusations (*The United States Army*). An additional spotlight was shown on sexual assault in January 2021 when the newly appointed secretary of defense, Lloyd J. Austin III, pledged to consider changes in how the military responds to claims of sexual assault (*Lloyd Austin Tackles Military’s Sexual Assault* understand more about the *Problem - The New York Times*, 2021). There is currently a great momentum for making drastic changes within the military to reduce incidents of sexual assault. Coupled with the budding prevention workforce and new focus on utilizing a public health approach to address sexual assault, now is a crucial time to provide updated epidemiological research. As stated above regarding the public health approach, identifying risk and protective factors are an essential step to formulating

interventions. By uncovering the variables most closely linked to sexual victimization, prevention experts can administer programs and policies in the most effective manner. Several risk factors have been identified by the military via sexual assault reports and OPA survey data, however a review and analysis of independent epidemiological studies are necessary to pinpoint additional risk factors not captured by military data. The following analysis on the selected studies will help to reveal any new patterns in sexual victimization and help to inform further military efforts to reduce these types of incidents. It is important to note that the only way to *prevent* sexual assault is to target perpetrators and prevent perpetration; however, there is limited research on military perpetration. Therefore, this meta-analysis provides an initial step to help identify risk factors for victimization to inform risk reduction programs. More work is needed to understand perpetration to *prevent* sexual assault in the military.

Chapter III – Methods and Procedures

Literature Search

Two literature searches were performed, on 11/25/2019 and 01/07/2021. The first search was requested by a Centers for Disease Control (CDC) contractor working with the Department of Defense Sexual Assault Prevention and Response Office and Prevention (SAPRO) and was carried out by two CDC librarians. The intention of the search was to conduct a systematic review on sexual assault prevention and response within the United States military. Ten research databases were utilized in the search: Medline via OVID host (1946-), Embase via OVID host (1947-), PsycInfo via OVID host (1967-), Global Health via OVID host (1973-), CINAHL via EBSCOhost, Scopus, Military Database, Criminal Justice Database, Sociological Abstracts, NTIS via EBSCOhost. The following terms and Boolean operators were utilized in the search: sexual assault OR sexual abuse OR sex abuse OR sexual trauma OR rape OR sexual offense OR sex offense OR sexual offender OR sex offender OR sexual violence OR sexual crime AND prevent OR prevention AND military OR Army OR Navy OR Air Force OR Armed Services OR Armed Forces OR veteran OR soldier OR service member. The Boolean operators, 'AND' and 'OR,' were chosen to string together the set of terms in order to return the most accurate results (Chan, n.d.). The search terms and Boolean operators used were relatively the same across all databases, however the exact phrases entered into the search bar for some of the databases varied slightly to maximize the results from each of the databases. The specific search phrases for each database can be found in Appendix A.

A member of the research team conducted a second search from 11/25/2019 to 12/31/2020 to recover additional articles published. Due to access barriers, only the following 7 databases were searched: Medline via EBSCOhost, Embase via Elsevier host, APA PsycInfo (formerly PsycInfo) via EBSCOhost, Global Health via EBSCOhost, CINAHL via EBSCOhost, Criminal Justice Database via ProQuest and Sociological Abstracts via ProQuest. The first search returned 843 unique items and the second search returned 58 unique items.

Article Screening

Over the two searches from 2019 to 2021, there were 10 researchers from SAPRO, Georgia State University, CDC, and the MarineCorps that assisted in these screening processes. Each study was reviewed by at least two independent researchers to ensure each item of the eligibility criteria was met. The article screening took place in two stages, the first of which was an elimination process to exclude any items the searches returned that were not articles published since 2009. Being that most of the relevant literature had been published in more recent years, we decided to exclude any manuscripts published prior to 2009. Of those remaining items published in the interim period, the following were excluded: book reviews, books, magazines, manuscripts in a language other than English, reports published by the federal government, viewpoints/editorials/commentaries, manuscripts not focused on prevention, manuscripts focused on a single case, and manuscripts where the population of focus was not adults in the military. Any articles with a titles or abstracts not indicating sexual assault prevention as an outcome or relating to sexual assault were also excluded.

The first screening stage left a remaining number of 44 articles from the first search and 26 items from the second search. A screening manual was utilized for the second stage of screening to ensure uniformity in the article categorization and eligibility criteria. Each article was categorized into one of four research categories: epidemiology/etiology, development and education, communications, dissemination and/implementation and enabling systems factors. Since the goal of the analysis was to identify risk factors associated with the outcome of sexual victimization within the U.S. military, only studies from the epidemiology/etiology category were considered for the meta-analysis, which was 35 articles. The screening manual categorized these studies as, "Research that examines the incidence, causes and effects, and patterns of sexual assault, to include studies of risk and protective factors across levels of the social ecology, identification of groups at highest risk, etc. This research often assesses the

magnitude and burden of sexual assault; for purposes of this review, the focus is on military populations.”

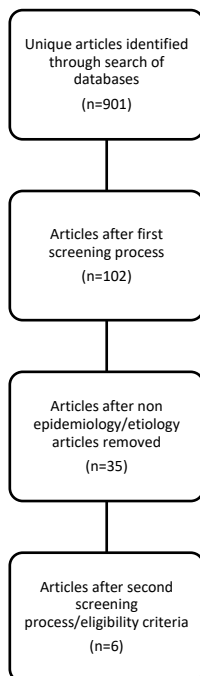
Since the analysis focused on sexual assault victimization, any articles that only examined risk factors of perpetration were excluded, which was 2. Any article that did not focus on sexual assault or did not specifically measure whether a participant experienced sexual assault was excluded. Our criteria for sexual assault was any nonconsensual sexual contact ranging from contact to penetrative sex so any studies that did measure sexual assault by that definition were excluded, which was 12 articles. It was also important that studies measured assault on its own and did not combine it with harassment or another type of victimization. For instance, one article did not differentiate between harassment and assault and that study was excluded. Studies that examined any post-assault treatment, risk factors or correlates were also excluded being that our analysis’ aim was to inform prevention, which ruled out 11 studies. We were only interested in the U.S. military so any study that focused on another country was excluded, which was one. One article focused on creating a model for predicting sexual assault using data on reported military assaults, which was excluded due its use of an administrative dataset versus self-reported experiences of assault, as well as its focus on creating a model to predict assault versus measuring overall prevalence. Any article in which the number of assaults was unclear or ambiguous was also excluded as we needed exact numbers of assaults versus estimates, which ruled out one study. Only studies with a sample size of 100 participants or more were considered to ensure the findings would be considered representative of the population. Many of our eligibility criteria items were implemented in order to rule out the potential risk of bias. By screening each article based on our criteria items, we reduced the risk of either overestimating our outcome, sexual assault, or unintentionally producing misleading results. Ultimately, our criteria left 6 epidemiological studies on which to conduct a meta-analysis to determine which risk factors were strongly associated with sexual victimization.

Eligibility Criteria

To be eligible for the meta-analysis, articles had to meet the following requirements:

- Epidemiological studies that examine incidence, cause and effect, patterns, risk factors and/or magnitude of sexual assault
- Article must have been published in or after 2009
- Study Population: active or former U.S. military service members
- Sample size of 100 participants or more
- Contain unambiguous counts of self-reported sexual assault, measured as its own outcome (separate from harassment and other forms of sexual victimization)
- Focus on victimization versus perpetration and prevention versus response
- Must provide clear counts of assaults instead of estimates

Figure 1. Flowchart of Literature Search



Measures

Study Demographics

Our total sample size (N) across the six studies was 199,050. The sample for one of the studies was all female, however the other five were a mixture of cisgender men, women and transgender mxn and womxn. Studies reported only the percentage of participants of different races and studies differed in how race was reported. To make the analysis as uniform as possible, we categorized participants as White or non-White. Any missing or unknown data on race was not included since these were unable to be categorized. Half of the studies sampled veterans and the other half sampled service members that were active at the time of the study. Each of the studies administered a different survey to participants, which are listed in Table 1.

Table 1. Study Demographics

Study	Population	Sample size (n)	% Women	% White	Measure of SA	Type of Survey Administered
Kintzle et al. 2019	Chicago veterans	1035	13.5	67.6	Participants were asked if they experienced the following types of unwanted sexual contact during their military service: (1) forced touching of a sexual nature; (2) oral sex; (3) vaginal intercourse; (4) anal intercourse (5) sexual penetration with a finger or object; (5) participation in sexual activities because threatened with bodily harm.	Chicagoland Veterans Study
LeardMann et al. 2019	women in military	13262	100	63.5	Participants were asked if they "suffered forced sexual relations or sexual assault" in the past 3 years.	Millennium Cohort Study
Schuyler et al. 2020	LGBT & non-LGBT service members	559	participant self-identified as: female (29.4%), transgender female or trans womxn (4.2%)	60	Participants were asked whether they experienced any nonconsensual or unwanted sexual contact during service involving a military member or civilian, someone known to the participant, or a stranger.	Mixed-methods study designed to understand the integration, acceptance, and well-being of LGBT service members in the U.S. military
Barth et al. 2016	Veterans who served during the Operation Enduring Freedom/Operation Iraqi Freedom eras	20563	21.2	70.2	Participants were asked if anyone ever used force or the threat of force to have sex with them against their will.	2009–2011 National Health Study for a New Generation of U.S. Veterans
Walsh et al. 2014	Ohio Army National Guard service members	1674	10.2	90.6	Participants were asked if leaders/unit members "forced you to have sex") during their most recent deployment.	telephone survey
Beckman et al. 2018	transgender veterans	503	86.4 (transgender womxn)	88.2	Participants were asked if they experienced any type of sexual assault (oral, vaginal, anal) during active military service.	Anonymous Internet-based survey about "the health and life experiences of transgender veterans"

*For full description of sexual assault measures for each study, see Appendix A.

Sexual Assault

The measurement for sexual assault varied for each study. Each measurement is listed in Table 1 and the full measurement descriptions can be found in Appendix A. Despite the variation in measurement of sexual assault, they all shared the same general definition, which was, nonconsensual sexual contact ranging from contact to penetrative sex.

Independent Variables for Meta-Analysis

Similar to our eligibility criteria for the articles, any unclear risk factor counts were not included in the meta-analysis. If explicit counts of any variable could not be determined from the data, those were not used for the meta-analysis as to not skew the results in one direction or the other. The variables we selected for the meta-analysis are listed below, along with their descriptions and reference categories.

- *Cisgender Gender Identity*-This measured the gender of cisgender participants. Men were our reference category.
- *Race*-The race variable measured whether participants were White or non-White. We used non-White persons as the reference category.
- *Rank*-Rank measured whether participants were of enlisted or officer status within the military. We used officer status as the reference category.
- *History of Deployment*-Here we measured whether participants had a history of deployment or no history of deployment. Our reference category was history of deployment.
- *Unit component*-The unit component measured whether participants were in the Reserves or National Guard versus Active Duty. Our reference category was Reserves/National Guard.
- *Branch of Service*-The branch of service variable measured whether participants belonged to the Air Force, Army, Navy or Marine Corps. Our reference category was Air Force.

- *Education*-Education measured whether participants had any college experience or no college experience. We used some college experience as the reference category.
- *Prior Sexual Harassment or Sexual Assault*-This variable measured whether participants experienced any sexual stressors, such as sexual harassment, sexual assault or any other sexual trauma prior to entering the military. Our reference category was no sexual stressors.
- *Sexual Harassment*-This variable indicated if sexual harassment was measured in the study, along with assault. Our reference category was no sexual harassment.
- *Marital Status*-This variable measured whether participants were married or not married at the time of the study. We used married persons as the reference category.

Independent Variables for Descriptive Analysis

There were four risk factors we wanted to examine, however they were only captured in one of each of our six studies. Since there was only one dataset available for each of these variables, we could only perform a descriptive analysis. These variables, their descriptions and reference categories are listed below.

Sexual Orientation-This measured the sexual orientation of participants. Heterosexual participants were our reference category.

Cisgender vs. Transgender-This measured whether a participant identified as cisgender or transgender. Cisgender participants were our reference category.

Transgender Gender Identity- This measured the gender of transgender participants. Transgender mxn were our reference category.

Stalking-This measured whether a participant experienced stalking prior to sexual assault. Participants who had not experienced stalking were our reference category.

Statistical Analysis for Meta-analysis

We extracted the numerical data from each of the 6 articles for each individual risk factor. The data were either provided in the articles as counts or as odds ratios. Using the program, R, we performed a fixed effect meta-analysis on the data for each risk factor. This analysis produced an estimate for the mean log-odds ratio for experiencing sexual assault among the risk factor group versus the reference group (ex: the ratio of women experiencing sexual assault versus men experiencing sexual assault). The mean odds ratio and its confidence interval are also provided, which is the format in which our results are provided below. Tests of heterogeneity were also performed in our analysis to show the level of variability between the studies used for each risk factor.

Statistical Analysis for Descriptive Analysis

Odds ratios and corresponding 95% confidence intervals were computed for the risk factors in our single-study descriptive analysis.

Chapter IV – Results

Mean Odds Ratios and Heterogeneity for Independent Variables from Meta-Analysis

Women were shown to have higher odds of sexual assault when compared to men, OR = 16.37 and the analysis showed a considerable amount of heterogeneity between the studies, $I^2 = 89.23\%$. In addition to being a woman, the risk factor with the second highest odds was sexual harassment, OR = 14.54. There was a moderate level of heterogeneity among those studies, $I^2 = 47.66\%$. Persons with a history of prior sexual harassment or sexual assault prior to joining the military were also more likely to experience assault, OR = 3.99, and the studies showed no heterogeneity, $I^2 = 0.00\%$. Service members of the enlisted status showed an elevated risk when compared to those of officer status, OR = 2.47 with considerable heterogeneity among the studies, $I^2 = 85.13\%$. Non-married persons were also more likely to experience sexual assault, OR = 2, with the studies possessing a considerable amount of heterogeneity, $I^2 = 90.6\%$. Having no college experience increased odds of assault as well, OR = 1.32, with an I^2 of 96.58%. There did not appear to be a difference in non-deployed versus deployed persons, OR = 1.09, and there was considerable heterogeneity with an I^2 of 96.83%. Among the branches of service, there was not a significant difference, when compared to Air Force, Marine Corps OR = 1.26, Army OR = 1.17 and Navy OR = 1.14. The most heterogeneity among the studies on branches of service was found in the Marine Corps, $I^2 = 90.71\%$, the heterogeneity among the Army, $I^2 = 38.14\%$ and Navy, $I^2 = 9.32\%$. It must be noted that the LeardMann et al. study included Coast Guard participants with participants from the Navy so this may have affected the Navy data from that article. Active duty service members did not appear to show a substantial difference in assault when compared with those in the National Guard or Reserves, OR = 1.11 and these studies also showed a low level of heterogeneity, $I^2 = 34.58\%$. White persons were actually shown to have a lower odds of sexual assault compared to non-White persons, OR = 0.76 and had a considerable amount of heterogeneity, $I^2 =$

83.67%. All mean odds ratios, their corresponding confidence intervals, effect sizes, q-statistics and p-values are displayed in Table 2. The forest plots for each of the risk factors can be found in Appendix C.

Table 2. Meta-analysis Results

Risk Factor			
<i>Risk factor group vs. reference group</i>	OR [95% CI]	Effect sizes (k)	Q-statistic
Cisgender Gender Identity			
<i>Women vs. Men</i>	16.37 [13.41, 20]	3	18.57**
Race			
<i>White vs. Non-White</i>	0.76 [0.66, 0.88]	4	18.38**
Rank			
<i>Enlisted vs. Officer</i>	2.47 [1.74, 3.5]	2	6.72**
History of Deployment			
<i>Non-Deployed vs. Deployed</i>	1.09 [0.94, 1.27]	2	31.52**
Unit Component			
<i>Active Duty vs. Reserves and National Guard</i>	1.11 [0.87, 1.41]	2	1.53
Branch of Service			
<i>Air Force vs. Army</i>	1.17 [0.98, 1.40]	4	4.85
<i>Air Force vs. Marine Corps</i>	1.26 [0.92, 1.73]	4	32.29**
<i>Air Force vs. Navy</i>	1.14 [0.91, 1.43]	4	3.31
Education			
<i>Some College vs. No College</i>	1.32 [1.10, 1.6]	3	58.5**
Prior Sexual Harassment or Sexual Assault			
<i>Prior Sexual Harassment or Prior Sexual Assault vs. Prior Sexual Harassment or Prior Sexual Assault</i>	3.99 [3.11, 5.12]	2	0.26
Sexual Harassment			
<i>Sexual Harassment vs. No Sexual Harassment</i>	14.54 [11.51, 18.35]	2	1.91
Marital Status			
<i>Married vs. Non-Married</i>	2.00 [1.73, 2.31]	3	21.28**

**p<.01

Odds Ratios for Independent Variables in Descriptive Analysis

Of the single-study risk factors, stalking showed the highest odds of sexual assault, OR = 11.84, followed by non-heterosexual persons, OR = 2.11. Transgender persons were also more likely to experience assault than cisgender persons, OR = 1.91. Transgender womxn had a decreased odds of assault when compared with transgender mxn, OR = 0.42.

Table 3. Descriptive Analysis Results

Risk Factors	OR [95% CI]	Study
Sexual Orientation		
<i>Non-Heterosexual vs. Heterosexual</i>	2.11 [1.30, 3.41]	Schuyler et al. 2020
Transgender		
<i>Transgender vs. Non-Transgender</i>	1.91 [1.03, 3.54]	Schuyler et al. 2020
Trans Woman vs. Trans Man		
<i>Trans Womxn vs. Trans Mxn</i>	0.42 [0.17, 1.00]	Beckman et al. 2018
Stalking		
<i>Stalking vs. No Stalking</i>	11.84 [7.74, 18.09]	Kintzle et al. 2019

Age

Age was a variable examined in most of our studies, however there was variability in how age was broken into groups for each study. Due to the lack of uniform age categories, we were unable to perform any statistical analyses on age. Two of the studies showed assault concentrated among the younger age groups, while the other two saw assault more concentrated for those in their 30's and those born prior to 1960. The studies that showed assault in the younger age groups had surveyed active duty service members, whereas the studies that reported assault at older age groups had surveyed veterans. Veterans likely spent a longer duration in the military compared to their active duty counterparts, thus having a greater opportunity to experience a sexual assault. It should also be noted

that when assault was measured in each of these studies, participants were not asked to report the age at which the assault occurred, but rather their age at the time of the study.

Chapter V – Discussion

With the 2019 murder of Vanessa Guillen and subsequent Fort Hood Report of 2020, there is renewed interest in addressing sexual assault within the military. This has been reinforced by the newly appointed Secretary of Defense and his pledge to make sexual assault one of his top priorities as Secretary. There is a strong momentum and fertile ground for instituting changes and policies within the military, which is why now more than ever, research on assault is imperative. Specifically, there is a need for synthesis of the current literature on risk factors to identify patterns and other pertinent epidemiological information to reduce future incidents of assault.

The most well-documented risk factor of sexual assault, whether in the civilian or military environment, is being a woman. Our results support this, showing a robust effect for being a woman and having a significantly increased odds of sexual assault, when compared to men. There are many theories as to why women are victimized at higher rates than men within the civilian population, however within the military the uneven ratio of women to men may account for the difference in burden of assault (Himmelfarb et al., 2006). Women make up only 16% of enlisted service members and 19% of officers, which creates an environment where men are in power (*Demographics of the U.S. Military*, n.d.). Having a history of prior sexual stressors and reporting sexual harassment were also correlated with sexual assault. This exhibits a need for interventions that target persons who have been sexually victimized prior to their military service, as they seem to be at higher risk for revictimization. There is also a need for identifying persons that are currently being sexually harassed while serving as they are a vulnerable population for more serious victimization. Prior studies have suggested that environments in which inappropriate sexual behavior is tolerated can encourage sexual assault and other forms of victimization (Himmelfarb et al., 2006; Sadler et al., 2003). Given the power differential between women and men in and an environment that may be more tolerant of lewd sexual behavior, we can understand how victimization can easily occur.

Among the branches of service and unit components, there was not a remarkable degree of variation in assault, however the Marine Corps did have a slightly higher effect than the other branches. Although marginal, the increased assault among the Marine Corps does reflect the most recent victim data from SAPRO (Department of Defense Sexual Assault Prevention and Response Office, 2021). If our sample of studies was larger, we may be able to deduce from these findings that the burden of assault is distributed fairly equally across the military, however a more robust sample would be needed to make such a claim. A history of deployment did not appear to have a notable impact on assault in our analysis, but again this does not imply there are no differences to be observed, rather that a larger dataset is needed. Despite the little variability across the branches and unit components, there was an appreciable difference in enlisted versus officer service members, with enlisted service members bearing the brunt of sexual assault. Unmarried persons and those with no college experience were also found to be more susceptible to assault. These characteristics, being unmarried, of enlisted status and having no college experience are all variables we found in the literature search to be associated with victimization. As previously mentioned, unmarried persons may be more vulnerable due to situational factors, such as being single and thus exposing oneself to more opportunities where assault may occur, like dating (Golding et al., 2002). Persons with less educational attainment may have less “sociocultural power,” which could predispose them to victimization (White et al., 2018).

In our descriptive analysis, we also found that being transgender or non-heterosexual can increase the risk of assault. With these persons being a minority group, they can also be seen as having less power in a military environment. Additionally, it has been proposed that persons belonging to the LGBTQIA+ community may be victimized as a sort of punishment for being other, for not conforming to traditional gender roles and heterosexual lifestyles (“Still Serving in Silence,” 2013; White et al., 2018). Among transgender persons, we found that being a transgender womxn may be a protective factor for assault. Another unexpected finding from the meta-analysis showed that being White had a protective

effect from assault, which mirrors civilian data, but is at odds with research on the military population. The descriptive information we collected on age was also unexpected in that we saw variation in what age groups had the greatest concentration of assault. It should be noted that this data only on age only represented the age at which participants completed the study, rather than the age that the assault concerned. It would be beneficial to collect the age at the time of assault to get a more accurate picture of which age group is most vulnerable.

Limitations

Our literature searches were somewhat limited due to access barriers to certain internet databases. For example, in the second search, we could only search 7 databases versus the original 10, as the university did not have access to the same databases that CDC did for the original search. For this reason, we may not have captured some relevant articles that would have been useful to our meta-analysis. We also may have missed other relevant sources to refer to for our literature review. In general, there was simply not enough data on each of these risk factors due to a lack of studies measuring risk factors of sexual assault. Some of the studies that did meet our eligibility criteria displayed their data in ways where the actual counts could not be determined. We chose not to use count estimates to avoid skewing our findings, which again limited the amount of data we were able to analyze.

The studies we chose are also subject to a degree of bias, in that participants may have chosen to participate in the study based on the known purpose of the study. Participants who had experienced sexual assault may have been more willing to participate. Due to this potential bias, it is possible that our outcome, sexual assault, may have been overestimated.

There is also important demographic information regarding sexual orientation and gender identity that may have affected our findings. The Don't Ask Don't Tell policy, as well as bans on transgender persons serving in the military may have impacted some participants' willingness to identify

themselves as non-heterosexual or non-cisgender (Bell et al., 2018; Gurung et al., 2018). These persons also may not have been “out” during their time in service, which could have impacted whether or not they were victimized (Bell et al., 2018).

Future Research

The studies chosen for the meta-analysis were all published within the last ten years, which means our data is relatively current. However, openness with gender expression has significantly changed in recent years, with many adults feeling more comfortable with no longer defining themselves by the binary male and female genders. There are many who identify as transgender mxn and womxn, others who identify as neither male or female or identify as both. New research should take care to be more gender inclusive to capture data on these populations as they may reveal new and emerging patterns not shown in previous studies. Furthermore, with President Biden’s lifting of the transgender ban and enacting of policies that support and protect transgender service members (Wamsley, 2021), it is important to collect updated data for a more accurate picture of how non-cisgender and non-heterosexual persons are impacted by sexual assault.

There is also a need to collect more detailed information on the race of victims. A person’s race oftentimes affects their potential for victimization, as is continuously supported by years of research. Most epidemiological studies record information on the race of participants to study variations in distribution of a given variable or outcome. Oftentimes, the reference category used for such comparisons is ‘white, non-Hispanic,’ which makes sense to illustrate that non-white groups have higher or lower concentrations of an outcome of interest. Unfortunately, many studies oversimplify racial differences by categorizing participants by ‘white’ and ‘non-white,’ rather than expanding on those races that fall under ‘non-white.’ By reducing race to two groups, we miss out on getting a complete profile of how the burden of an outcome is distributed across races. Additional data on race could not only tell us

which races are more at risk, but also if certain races are more protected from sexual victimization, which may be beneficial for intervention programs.

More research is also needed to gain an accurate picture of which variables are most highly correlated with sexual assault among men. As shown in prior data and further reinforced by our meta-analysis, women in the military are consistently more likely to be victimized than their male counterparts, which explains why most of the existing literature focuses solely on women and leaves men out of the discussion. However, even though men are typically victimized at a lower rate, they still represent a significant number of victims as they comprise roughly 80-84% of the military population. Additional epidemiological studies focusing on males would be helpful to fill some of the existing gaps in the current literature.

More data is also needed on the relationship between deployment, branches of service and sexual assault, as indicated by the heterogeneity found among our studies. Even though we did not see a large effect for history of deployment, there was a significant level of heterogeneity among the studies. This may be explained by the way in which deployment was reported in the two studies we analyzed. In LeardMann et al., deployment was indicated if a participant was deployed between the baseline and follow-up of the study, whereas the Barth et al. study surveyed veterans and asked if they had ever been deployed (2016, 2013). More uniform data on the measurement of deployment is necessary to produce an accurate assessment of risk among the two groups. Additionally, the high level of heterogeneity among the Marine Corps, but not among the other branches of services may point to potential confounding. More research is needed to determine what the true difference in assault is among the four branches, as well as deployed and non-deployed service members.

Most importantly, although this meta-analysis focuses on identifying risk factors for victims of sexual assault, it must be noted that the responsibility for assault always lies with the perpetrator and not the victim. While we can create interventions to protect potential victims from assault, prevention

starts with the perpetrator and addressing the factors that lead them to commit these acts. Despite the knowledge that perpetrators are to blame for these acts, it can certainly be helpful to arm potential victims with tools that may help them to avoid these encounters. For example, we can consider the ecological model as a guide for developing interventions, which focuses attention on the situational and environmental factors that impact a victim's risk for assault (Nurius & Norris, 1996). In particular, the cognitive ecological model, "emphasizes the role of cognitive processes in governing perception and interpretation as individuals strive to establish meaning and predictability in their experiences and transactions" (Nurius & Norris, 1996). This model identifies layers of variables that influence behavior and how a victim interprets and responds to situations in which an assault may be likely. Researching the behavioral and cognitive elements that surround an assault would be beneficial to further understanding how to avoid such incidents.

Aside from equipping victims with the proper skills to navigate an unwelcome sexual situation, it is imperative that victims feel comfortable reporting assault. Over and over, surveys of victims indicate that many are afraid of reporting assault for fear that either their claim will not be taken seriously, that no punishment will be dealt to the perpetrator, that the information will not be kept confidential or worse, that they will be retaliated against (Bell et al., 2018). When assaults go unreported, it signifies to perpetrators that this behavior is tolerated and allows it to continue (Burns et al., 2014; Sadler et al., 2003).

Conclusion

To be a member of a minority group in the military, either being a woman, non-heterosexual or transgender, increases the risk of sexual assault while serving in the military. Having less educational attainment, being unmarried, enlisted or having a history of prior sexual stressors also elevates the chances of victimization. Interventions should target persons meeting any of these characteristics, as well as those who have already been victimized while in service, whether from sexual harassment or

stalking. There is a need to address the military-specific environmental factors that may foster perpetrator behavior in order to change the tide of sexual assault incidence.

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Appendix A

Specific Search Phrases for Each Database

For Medline, Embase, APA PsycInfo fka PsycInfo, Global Health, CINAHL and NTIS, the following phrase was entered into the search bar, “(Sexual assault* OR sexual abuse* OR sex abuse* OR sexual trauma OR rape* OR sexual offense* OR sex offense* OR sexual offender* OR sex offender* OR sexual violence OR sexual crime* AND Prevent* OR prevention.fx OR pc.fs AND Military OR Army OR Navy OR Air Force OR Armed Services OR Armed Forces OR Veteran* OR soldier* OR service member*)." For Scopus, the following phrase was entered into the search bar, "TITLE-ABS-KEY("Sexual assault*" OR "sexual abuse*" OR "sex abuse*" OR "sexual trauma" OR rape* OR "sexual offense*" OR "sex offense*" OR "sexual offender*" OR "sex offender*" OR "sexual violence" OR "sexual crime*") AND TITLE-ABS-KEY(Prevent*) AND TITLE-ABS-KEY(Military OR Army OR Navy OR "Air Force" OR "Armed Services" OR "Armed Forces" OR Veteran* OR soldier* OR "service member*")." Lastly, for Military Database, Criminal Justice Database and Sociological Abstracts, the following phrase was entered into the search bar, "TI,AB("Sexual assault*" OR "sexual abuse*" OR "sex abuse*" OR "sexual trauma" OR rape* OR "sexual offense*" OR "sex offense*" OR "sexual offender*" OR "sex offender*" OR "sexual violence" OR "sexual crime*") AND TI,AB(Prevent*) AND TI,AB(Military OR Army OR Navy OR "Air Force" OR "Armed Services" OR "Armed Forces" OR Veteran* OR soldier* OR "service member*")."

Appendix B

Sexual Assault Measurements per Study

Kintzle et al. 2019 - Items related to military sexual assault (MSA) were derived from recommendations within the Department of Justice Special Report on Rape and Sexual Assault Victimization among College Females and were also similar to those utilized in the 2014 RAND Military Workplace Study, the latter of which established MSA measures that have been used in subsequent iterations of the DOD's Workplace and Gender Relations Survey of Active Duty Members (WGRA). Questions included behaviorally- specific language assessing experiences of unwanted sexual contact, rather than utilizing terms such as "rape" or "sexual assault"; this approach has been described as a way of mitigating challenges with victims' self-definition of an experience as sexual assault, given variations in the legal definitions of sexual crimes. Participants were informed that these experiences could have occurred on or off-base and on- or off-duty. A positive screen for MSA was indicated if a participant reported at least one of the following types of unwanted sexual contact during their military service: (1) "forced touching of a sexual nature (i.e. forced kissing, touching of private parts, groping, fondling"; (2) "oral sex (i.e. someone's mouth or tongue making contact with your genitals, or your mouth or tongue making contact with someone else's genitals"; (3) "Vaginal intercourse (i.e. someone's penis being put in your vagina"; (4) "Anal intercourse (i.e. someone's penis being put in your anus"; (5) "Sexual penetration with a finger or object (i.e. someone putting their finger or an object into your mouth, vagina, or anus"; (5) "Participation in sexual activities because you were threatened with bodily harm".

LeardMann et al. 2019 - At the 2004–2006 follow-up assessment, participants were asked if they "suffered forced sexual relations or sexual assault" or "experienced sexual harassment" in the past 3 years. Based on their responses, participants were classified into one of four possible categories: a) Sexual assault and sexual harassment, b) sexual assault only, c) sexual harassment only, or d) no sexual stressor.

Schuyler et al. 2020 - Six items adapted from a U.S. Department of Justice special report on sexual victimization and the Uniform Code of Military Justice (2006). Binary response (yes or no) items assessed different types of nonconsensual or unwanted sexual contact experienced during service involving a military member or civilian, someone known to the participant, or a stranger.

Barth et al. 2016- Sexual assault: Did anyone ever use force or the threat of force to have sex with you against your will?

Walsh et al. 2014 - Items from the Deployment Risk and Resilience Inventory were used to assess assault (e.g., leaders/unit members “forced you to have sex”) during their most recent deployment. Response options ranged from never (0) to once or twice (1) to many times (4). Any response of one or greater to three sexual assault items was coded as “any sexual assault.”

Beckman et al. 2018 - Three items adapted from the Sexual Experiences Survey about specific types of sexual assault (oral, vaginal, anal) that occurred during active military service (e.g., “How many times during your military service has someone had oral sex with you or made you have oral sex with them without your consent?”). Any occurrence of any type of sexual assault was classified as “yes.”

Appendix C

Reference List for Meta-Analysis Studies

- Barth, S. K., Kimerling, R. E., Pavao, J., McCutcheon, S. J., Batten, S. V., Dursa, E., ... & Schneiderman, A. I. (2016). Military sexual trauma among recent veterans: Correlates of sexual assault and sexual harassment. *American journal of preventive medicine*, 50(1), 77-86.
- Beckman, K., Shipherd, J., Simpson, T., & Lehavot, K. (2018). Military sexual assault in transgender veterans: Results from a nationwide survey. *Journal of traumatic stress*, 31(2), 181-190.
- Kintzle, S., Schuyler, A. C., Alday-Mejia, E., & Castro, C. A. (2019). The continuum of sexual trauma: An examination of stalking and sexual assault in former US service members. *Military Psychology*, 31(6), 474-480.
- LeardMann, C. A., Pietrucha, A., Magruder, K. M., Smith, B., Murdoch, M., Jacobson, I. G., ... & Millennium Cohort Study Team. (2013). Combat deployment is associated with sexual harassment or sexual assault in a large, female military cohort. *Women's Health Issues*, 23(4), e215-e223.
- Schuyler, A. C., Klemmer, C., Mamey, M. R., Schrage, S. M., Goldbach, J. T., Holloway, I. W., & Castro, C. A. (2020). Experiences of Sexual Harassment, Stalking, and Sexual Assault During Military Service Among LGBT and Non-LGBT Service Members. *Journal of traumatic stress*, 33(3), 257-266.
- Walsh, K., Galea, S., Cerda, M., Richards, C., Liberzon, I., Tamburrino, M. B., ... & Koenen, K. C. (2014). Unit support protects against sexual harassment and assault among National Guard soldiers. *Women's health issues*, 24(6), 600-604.

Appendix D

Forest Plots

Figure 2. Forest plot for Cisgender Gender Identity

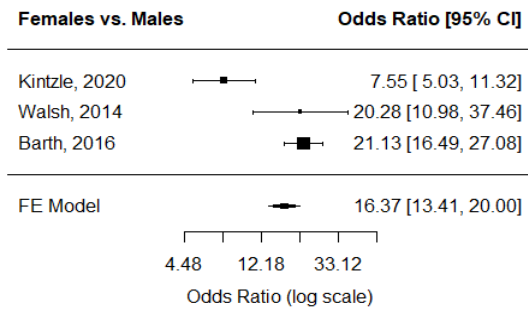


Figure 3. Forest plot for Race

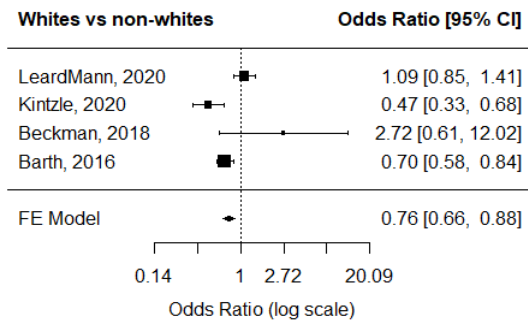


Figure 4. Forest plot for Rank

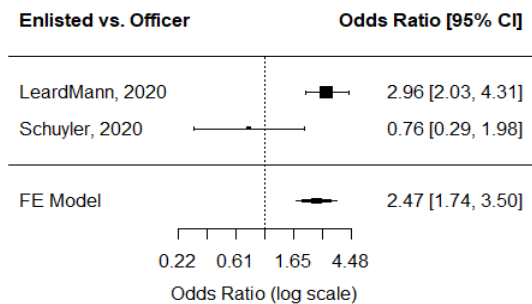


Figure 5. Forest plot for History of Deployment

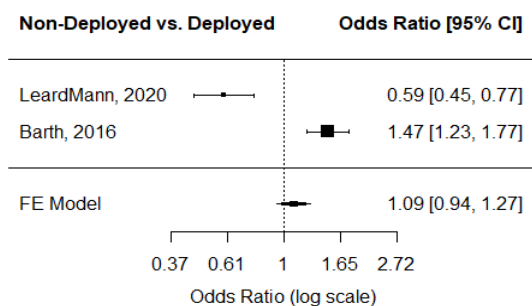


Figure 6. Forest plot for Unit Component

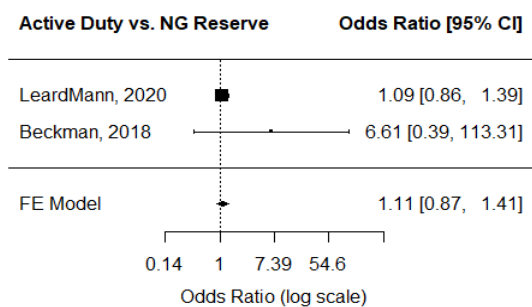


Figure 7. Forest plot for Branch of Service: Army

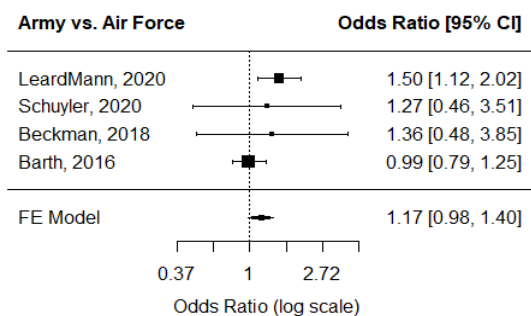


Figure 8. Forest plot for Branch of Service: Marine Corps

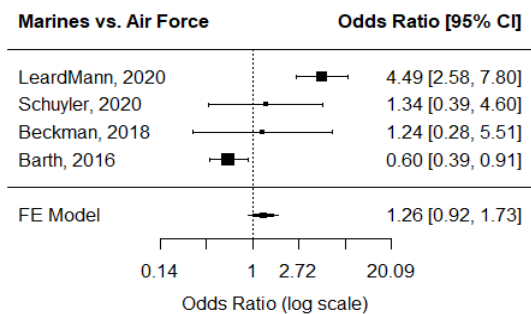


Figure 9. Forest plot for Branch of Service: Navy

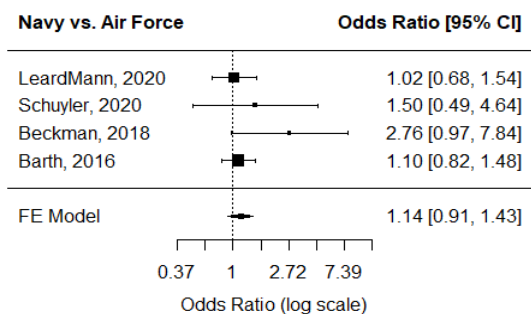


Figure 10. Forest plot for Education

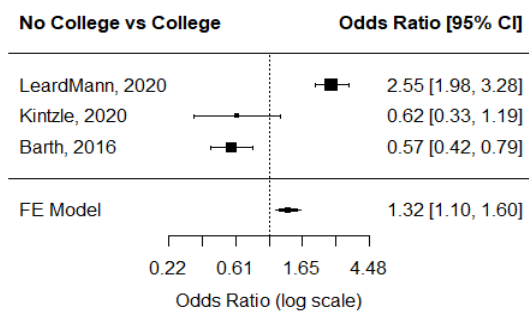


Figure 11. Forest plot for Prior Sexual Stressors

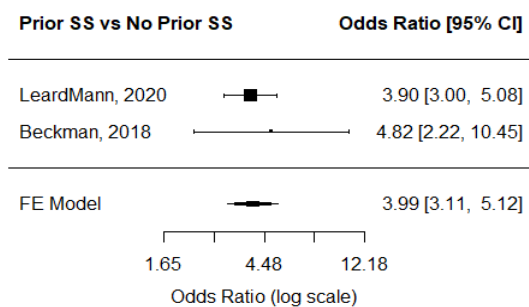


Figure 12. Forest plot for Sexual Harassment

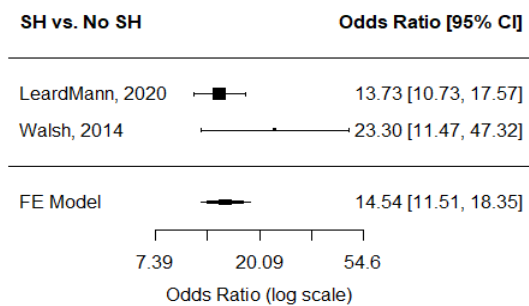


Figure 13. Forest plot for Marital Status

