Increasing Provider Awareness To Detect, Treat, And Reduce Sexually Transmitted Infections In Male Service Members

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Abstract

The incidence of sexually transmitted infections within the military continues to rise at rates higher than that of the civilian population. The project was developed to improve provider perception related to the male patient's sexual history, practices, and attitudes and focus on adherence to the recommended guidelines related to screening for sexually transmitted infections (STIs), specifically *Chlamydia trachomatis* and *Neisseria gonorrhoeae*. Education was provided regarding recommended screening criteria, screening protocols, interview techniques, screening options available, and statistical data. The goal was to increase provider awareness and laboratory diagnosis of STI screenings among the male population, reducing chlamydia and gonorrhea infections among male and female services members. The project was implemented at Naval Hospital Jacksonville at Naval Air Station Jacksonville, Jacksonville, Florida, and included five associated clinics in Florida and Georgia. Overall provider perception of STIs in male service members was assessed through a questionnaire prior to implementation and 45 days post-implementation. Statistical analysis of the questionnaires did not indicate a significant change in practice or change in provider perception and knowledge of the STIs in the Navy. All participants did feel that STIs are a problem in the Navy and that STI screening for males should be performed as frequently for males is recommended for females. Additionally, half of the participants felt that male service members were more likely to have an STI when compared to their female counterparts. Due to the COVID-19 pandemic, there was a significant reduction in patient visits and no asymptomatic screening tests were performed at the clinics during the timeframe of the project implementation.

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Introduction

Sexually transmitted infections (STIs) continue to rise among the United States population in both females and males. In 2018 the national rate for chlamydia infections was 539.9 per 100,000 people, up 2.9% from 2017 (Centers for Disease Control [CDC], 2019). Gonorrhea infections were up 5%, with a rate of 179.1 per 100,000 people from 2017 to 2018 (CDC, 2019). Infection rates within the population of the U.S. military have historically exceeded rates of the civilian population (Sánchez et al., 2013; Stidham, Garges & Knapp, 2015). Untreated STIs can lead to problematic sequelae such as pelvic inflammatory disease (PID), infertility, epididymitis, increased susceptibility of human immunodeficiency virus, as well as many other negative outcomes (Picket & Goyal, 2019). Due to their increased frequency and their potential for poor patient outcomes, it is imperative for providers to keep chlamydia and gonorrhea within the differential diagnosis when assessing the military population (Gaydos, McKee, & Faix, 2015). The provider should be capable of taking a thorough sexual history, be knowledgeable of symptomatic and asymptomatic presentations, and aware of the latest diagnostics and best evidence treatment options. Laboratory testing for the purpose of diagnosing STIs, as opposed to relying on the clinical judgment of the health care provider to make a STI diagnosis, is more precise and will allow for proper treatment, follow up, and accurate surveillance.

Background of the Problem

Sexually transmitted infections continue to be problematic among males and females in the U.S military. Of the reportable illnesses and injuries within the Department of Defense

(DoD), chlamydia and gonorrhea are the two most commonly reported (Bautista, Hollingsworth, & Sanchez, 2018; Rossi & Nowak, 2109). A query of the *Defense Medical Epidemiology Database* (https://www.afhsc.mil/dmed) for the year 2018 lists "other sexually transmitted chlamydial diseases" as the most diagnosed illness and "gonococcal infection" as the second most diagnosed illness, with rates of 2048.39 and 285.58 per 100,000 persons respectively. The third most diagnosed condition is heat related injuries at a rate of 90.26 per 100,000 persons. From 2012 to 2018 there was a collective increase of 56.6% of chlamydia cases in males and females and a 55.3% increase in the number of gonorrhea cases among male U.S. service members (Stahlman, & Oetting, 2019). Of the 212,405 reported cases of chlamydia in the U.S military between 2010 and 2018, over 60% were reported in males (Stahlman, & Oetting, 2019). Female service members report their most recent STI was acquired from another service member, twice as often as reported by male service members (Harbertson et al., 2015), Although there is an increased prevalence of STIs within the U.S. military, the U.S. Preventive Task Force guidelines are still followed and asymptomatic males are not screened, as opposed to asymptomatic females (LeFevre, 2014).

In addition to the effects on individual personnel, STIs impact the overall readiness of the fighting force. The cost of treatment for preventable diseases places a strain on the already scrutinized financial resources allocated for health care delivery in the DoD. It has been reported that in 2012 the United States Navy (Navy) spent more $5 million in STI related medical expenditures (Military Health System [MHS], 2019). In one study over 5% of personnel aged 20 to 24 tested positive for chlamydia as they in-processed into a military facility in Korea. Of the nearly 200,000 cases of chlamydia and gonorrhea reported in service members between 2007 and 2015, almost 2% were identified during deployment (Rossi & Nowak, 2019). It is probable that

the number of cases during deployment was much higher, as there was limited access to laboratory testing, inaccurate disease identification due to clinical diagnoses, and theater specific health records.

STI data for 2018 was queried out of the Defense Medical Epidemiology Database from the Armed Forces Health Surveillance Branch for Naval Air Station Jacksonville. Male service members had a chlamydial infection rate of 1236.95 per 100,000 persons, with male service members aged 20-24 at a rate of 2875.05 per 100,000 persons. Gonococcal infections for male service members in 2018 had a rate of 272.86 per 100,000 persons. These rates exceed, local, national and U.S. Navy rates.

Purpose of the Project

The purpose of the project was to increase provider awareness for the need to identify and treat male service members infected with chlamydia and/or gonorrhea. With an increase in detection long-term sequela can be reduced, resulting in improved medical readiness of the warfighter, decreased treatment costs, and a reduction on the disease burden on the female population of service members and beneficiaries (Aldous et al., 2011; Anschuetz et al., 2012; Bautista, Hollingsworth, & Sanchez, 2018; MHS, 2109; Rossi & Nowak, 2019). The goal of this project was to increase the identification of chlamydia and gonorrhea infections in the male service member population at Naval Air Station Jacksonville through provider education related to STI infections in the male population.

Significance of the Project

Early detection and intervention of STIs in the military will increase service member and family readiness. The project was significant in that the male dominated population of the U.S. military is not routinely screened for STIs. Males represent 84% of the military population and

account for over half of the five most common STIs reported in the military (MHS, 2019; Stahlman & Oetting, 2019).

Problem Statement

Service members are required to obtain an annual physical evaluation, known as the periodic health assessment or PHA, to determine medical readiness and identify any abnormal health conditions through preventive screening. The current policy in place for the PHA does not include routine screening for chlamydia and gonorrhea in the male population, contrasted with females who are screened yearly. The military population consists of younger adults and subsequently, they are at higher risk for acquiring STIs (Stahlman et al., 2014; Watkins & Lee, 2014). Further compounding the issue is high risk behavior that is persistent in the military population, with males displaying a higher rate of such behavior (Stahlman et al., 2014; Watkins & Lee, 2014). It has been noted locally by the project stakeholders that there is an increase in the number of requests for STI screening in the male population, although these requests are not currently tracked. This developing practice pattern demonstrates the need for more aggressive screening tactics with this population. While evidence-based practice supports screening for chlamydia and gonorrhea to reduce sequela in the female population, there is a knowledge gap in how the routine screening of asymptomatic males may affect the incidence and prevalence of these STIs in the military population overall.

Project Objectives

The project consisted of two main objectives:

The first objective was to educate healthcare providers on addressing sexual health within the male population to increase STI screenings. This was achieved by delivering provider

education as it relates to patient interaction regarding sexual history and sexual health in the male population as well as the screening criteria for STIs in the male population.

The second objective was to increase the detection of chlamydia and gonorrhea infections through an enhanced awareness of the need for taking a proper sexual history. It was proposed a 10% increase of chlamydia and gonorrhea infections would be identified at the project site over 10 weeks.

The long-term goals of the project are to reduce the overall incidence rates of chlamydia and gonorrhea within the military population at Naval Air Station Jacksonville while decreasing the rate of negative sequela related to chlamydia and gonorrhea. Rigorous sexual history taking and sexual health education for at risk populations needs will be reinforced through provider education. A proper sexual history and thorough risk assessment will assist the provider in delivering a positive outcome (Barrow, Ahmed, Bolan, & Workowski, 2020). In meeting this objective, the provider will be prepared to address sexual health concerns with the patients during the office visits through discussion of safe sexual attitudes and practices.

Key Terms

Clinical judgment: A health care provider's assessment based practice, experience, knowledge and continuous critical analysis extending into all medical areas to include diagnosis, therapy, communication, and decision making (Kienle & Kiene, 2011).

Medical readiness: Service members are in good health without any deployment-limiting medical conditions.

Periodic Health Assessment or *PHA*: An assessment of the overall health and medical readiness status of each service member and an opportunity to initiate preventive services as warranted.

Risky sexual behavior: Engaging in activities that increase the chance for exposure to STIs.

Sequela: A condition which is the consequence of a previous disease or injury.

Sexually Transmitted Infection or *STI*: An infectious disease that spreads from person to person during sexual contact.

Review of Literature

The search and subsequent review of literature led to multiple overlapping themes. Expected themes included the prevalence of STIs in the military, screening males for STIs, provider education, patient education and health promotion, the potential sequela of STIs, the benefits of STI screening, and provider perception with STI screening. Two themes that developed that were not expected included high-risk behaviors and the consideration for more complete screening for men who have sexual relations with other men (MSM).

Literature Search Criteria and Strategies

The literature search was conducted for peer-reviewed, English language articles for the past ten years (2009-2019). The databases for the search consisted of the Cumulative Index to Nursing and Allied Health Literature database (CINAHL), ProQuest Nursing & Allied Health Source, PubMed, and the Army Medical Department (AMEDD) Virtual Library (AVL). The Google search engine was also used to identify articles that did not populate during searches due to variations of the keywords, with articles then queried from the aforementioned databases. Keywords used for the literature search included: *civilian*, *military*, *sexually transmitted infections*, *STI*, *screening*, *chlamydia*, *gonorrhea*, *behavior*, *provider*, *education*, *perception*, and *health promotion*. The websites for the Military Health System and the Armed Forces Health Surveillance Branch (restricted) were also utilized for clarification and a better understanding of the literature.

The Johns Hopkins Nursing Evidence-Based Practice Evidence Level and Quality Guide was used for this review of literature. Following this guide, the 37 referenced materials were evidence level "III" quality "A. Two referenced materials that were evidence level "V" quality "A" included and expert opinion and narrative review.

Prevalence of STIs in the Military

Within the U.S. military, the rates of STIs exceed those of the civilian population and have historically always done so (Stahlman et al., 2014). Contributing factors to a higher rate include a younger and sexually active population, an increased likelihood of the military population to partake in risky behaviors, and a high school education with little to no higher education (Deiss et al., 2016). The five most common STIs within the military in decreasing order from 2010 to 2018 are chlamydia, HPV, gonorrhea, HSV, and syphilis. The incidence of chlamydia and gonorrhea have recently increased among male and female service members with HPV and HSV on the decline. Syphilis rates among male service members has abruptly increased over the past decade (Stahlman & Oetting, 2019). Chlamydia (212,405 cases) and gonorrhea (25,852 cases) are the two most common bacterial STIs with chlamydia having an incidence rate three times that of the next most common infection, HPV (Bautista, Hollingsworth, & Sanchez, 2018; Deiss et al., 2016; Duron et al., 2016; Stahlman & Oetting, 2019).

Service members 24 years of age and younger had higher incidence rates of chlamydia and gonorrhea than other age groups, with the mean female age of an initial chlamydia diagnosis at 21.9 years of age (Bautista, Hollingsworth, & Sanchez, 2018). Females in general had three to five times higher rates of STIs than males, with the exception of syphilis (Stahlman & Oetting, 2019). Service members in the enlisted ranks and those without higher education had higher

rates of STIs than officers and service members with advanced education (Diess et al., 2016; (Stahlman & Oetting, 2019). Married service members had the lowest incidence rates of the most common STIs reported (Stahlman & Oetting, 2019).

Deiss et al. (2016) discussed the association between STIs and the length of time the service member was in the military. The study included over 100,000 service members during a 15-year span. It was demonstrated that an increased length of service had a positive correlation with the number of STIs experienced. At 15 years of service, 41% of women had at least one occurrence of an STI, while only 6% of men had at least one occurrence of an STI. HPV followed by chlamydia was the most common in females, with chlamydia the most common in males followed by gonorrhea and HSV. It was also noted that service members with a history of deployments had higher incidence rates of STIs. This higher rate may be related to a longer time in the military, established areas of deployment with extended deployment times, and deployed personnel engaging in risky sexual behavior while deployed (Aldous et al., 2011). Risky sexual behavior can be defined as engaging in activities that increase the chance for exposure to STIs and includes sexual activities at a young age, having multiple partners, high-risk partners (MSM), unprotected sex, and substance abuse. (Chawla & Sarkar, 2019; Ritchwood, Ford, DeCoster, Sutton, & Lochman, 2015; Watkins & Lee, 2014). Although sexual activity and cohabitation is usually restricted by general order, changing ratios in gender in those deployed, deployment to areas with antibiotic resistant gonorrhea, and brief exposure to foreign culture in foreign ports keep the risk of STIs during deployment pertinent (Rossi & Nowak, 2019).

Screening Males for STIs

Females are more likely than males to be routinely screened for STIs. The U.S. Preventive Task Force (USPTF) suggests the screening of females for chlamydia and gonorrhea

with a grade ‘B’ recommendation, indicating there is a high chance there is a net benefit. The USPTF does not presently endorse the screening of males, indicating with a grade ‘I’ statement that there is insufficient evidence to support this practice (LeFevre, 2014). This guideline may contribute to higher incidence rates of these infections in the female population (Deiss et al., 2016; LeFevre, 2014; Watkins & Lee, 2014). It should also be noted that the CDC does recommend the screening of males based on geographical locations, type of population, and risk factors (Myers, McCaskill, & Van Ravenstein, 2017). There was a general consensus throughout the literature that males should be screened regularly for STIs in a similar fashion as the females (Anschuetz et al., 2012; Deiss et al., 2016; Rondeau et al., 2019; Watkins & Lee, 2014). Diagnosed STI rates are up to four times higher than those that are self-reported (4.7 to 1.1) (Duron et al., 2018). This can be accomplished through less invasive urine-based STI screening which is effectively able to detect chlamydia and gonorrhea (LeFevre, 2014; Goyal et al., 2016; Rondeau, Valin, Decre, Griard, Lacombe, & Surgers, 2019; Watkins & Lee, 2014).

A study was conducted of 14 to 21-year-old male and female patients who presented to an urban emergency department for non-STI complaints to demonstrate the willingness and effectiveness of STI screening in patients who were asymptomatic for an STI. The study showed that 59% of the 553 enrolled patients agreed to the screening. Sexually active patients were more willing to accept STI screening, with 4.9% (n=16) of the participants who were screened having an asymptomatic STI. Fifteen tested positive for chlamydia and one for chlamydia and gonorrhea. Two participants who denied sexual activity screened positive for STIs, with one retested by their primary care provider and found to be negative. The study determined participants who were sexually active were more likely to agree to STI screening and that risky sexual behaviors correlated with a higher risk for STI. Half of those who tested positive for an

asymptomatic STI had been previously diagnosed with a STI in the past six months, indicating annual screening may not be frequent enough. The study determined gender was statistically insignificant and did not report male versus female infection rates (Goyal, Teach, Badolato, Trent, & Chamberlain, 2016).

Provider Education

Education and health promotion are two overlapping themes pertaining to both the patient and the provider. The provider needs to develop the skills required to properly assess the patient and relevant sexual history, as well as be able to provide appropriate guidance on maintaining a sense of well-being. The provider should be aware of new diagnostics, best treatment options, and advances in preventive measures. There should also be an in-depth awareness of the population being treated and any special circumstances specific to that population, such as risk taking and substance abuse (Gaydos, McKee, & Faix, 2015; Watkins & Lee, 2014). Increasing provider awareness as it relates to an identified health problem with relatable guidelines and evidence-based practices has shown to increase disease detection and improve patient outcomes (Cabana et al., 2014; Myers, McCaskill, & Van Ravenstein, 2017; Yoo & Vangrafeiland, 2018).

In a quality improvement (QI) project conducted a university campus health clinic, increased chlamydia and gonorrhea detection was realized through the implementation of guideline directed provider education. Guidance was given on techniques to discuss and take a sexual history to include the number of partners, protection methods, and previous STIs. CDC screening recommendations for chlamydia and gonorrhea were also discussed. This QI project resulted in an increase of screenings from 3% to 65% with the testing more than doubling from 8% to over 17%. Chlamydia cases decreased by 3% with four asymptomatic cases detected. Gonorrhea cases decreased from 3.1% to zero. An added benefit to the improved screening was

the increased opportunities for discussion with the patients about their sexual health (Myers, McCaskill, & Van Ravenstein, 2017).

Yoo and Vangrafeiland (2018) implemented a QI project in a larger, suburban emergency department following a pre/post-test design aimed at increasing STI screenings in young adults presenting with urinary symptoms. Evidence based STI guidance was delivered to providers with additional discussion on testing availability and ordering methods. Diagnosis for STIs was then made based on laboratory diagnostics of the cultured samples. STI screenings based on urinary symptoms increased by 10%. Compared with data retrospectively collected from the same timeframe of the previous year, it was determined providers were twice as likely to assess STI risks and screen for STIs after the QI project implementation. Positive STI results had a statistically significant increase of 1.4% to 2.4%.

Cabana et al. (2014) further demonstrates the impact of provider education. In a multi-region, randomized trial education was provided on asthma care through standardized, interactive seminars. Guidelines were reviewed and techniques to improve patient communication were discussed. This resulted in providers exhibiting an increase in interest in relation to their patient's asthma concerns and symptom relief, a decrease in the patient days limited by asthma exacerbation, and a decrease in emergency department utilization. Furthermore, this increased awareness allowed the provider to be more engaged with the patient by having more direct communications without extending the length of the office visit.

Patient Education and Health Promotion

With a more aggressive stance in the discussion of sexual behaviors, STI awareness, and methods of prevention the provider will be able to focus patient education to increase awareness of STIs. Lack of awareness of the harmful sequelae will also decrease the importance of

screening for STIs (Watkins & Lee, 2014). It is important to recognize that education of STI prevention needs to be more health care provider driven and not to rely solely on non-medical instruction, such as briefings from organizational leadership. This type of instruction lacks the personalization and is more likely considered to be meeting minimum requirements (Gaydos, McKee, & Faix, 2015). Those who see STI screening as part of their overall health are more likely to be screened, whereas those unaware of the long-term effects are less likely to seek screening (Watkins & Lee, 2014).

Secondary prevention not only includes the treatment and care but should also include screenings and additional education on risky behavior (Watkins & Lee, 2014). Duron et al. (2016) found that males were more likely to have been counseled on STIs than females (74.1% vs 39.4%), yet women are screened more frequently. Through secondary prevention the provider is able to encourage health promotion to include the patient obtaining and maintaining control of their health and health improvement (McCutcheon, Schaar, & Parker, 2016).

According to Pender's Health Promotion Model, the individual becomes the center of focus with a change in behavior that needs to originate from within the individual (Pender, 2011). The provider needs to understand that health is more than a lack of illness and requires professional intervention before illness develops. The individual's concept of health may differ from any other definition and understanding this concept is most important to influence change. Pender's model encourages the empowerment of the individual participation in non-risky behavior through collaboration within the community and available resources (McCutcheon, Schaar, & Parker, 2016).

Making the Diagnosis

When taking the history of the patient there needs to be an inquiry by the provider into

sexual history, sexual practices, and sexual attitude. Providers need to know their population to make appropriate decisions on diagnostic techniques (Gaydos et al., 2013; Watkins, 2010). Symptoms and history will guide the direction of laboratory exams to challenge the differential diagnosis of both chlamydia and gonorrhea. Some aspects of the history (odor, the appearance of discharge, pruritus) are indicative of certain disease processes that can differentiate between infections. However, there may be co-infection with non-STIs. An odor is typical of bacterial vaginosis and clumped discharge is more indicative of vaginal candidiasis. Prostatitis may cause discharge or dysuria.

Testing will offer the most definitive answer for accurate treatment. The nucleic acid amplification test (NAAT) is recommended by the CDC as the initial test for chlamydia and gonorrhea detection in both genders (Pickett & Goyal, 2019). NAAT testing has a sensitivity of 90-99% and specificity of 97-100% with comparable characteristics to cultures (Mayor, Roett, & Uduhiri, 2012; Pickett & Goyal, 2019). This provides for timely and cost-effective diagnosis in the adult population(Kent, 2017). The use of the NAAT can greatly limit the sequelae of STIs, especially when follow up may not occur (Picket & Goyal, 2019; Wasik & Kachlic, 2009).

A vaginal swab performed by a medical professional or independently by the patient for females and first-catch urine for men are the optimal specimen collection techniques. First catch urine for women is also considered an acceptable collection technique, however, there is a 10% miss rate of detecting chlamydia and gonorrhea (Picket & Goyal, 2019). When screening asymptomatic patients in the emergency department, first-catch urine is appropriate for both genders. Self-administered rectal swabs are as effective as clinician performed swabs and should be offered if a rectal infection is of concern based on history (Picket & Goyal, 2019). Typical screening practices may not be adequate for STI detection in the MSM population, and the use of

three site screening (genitourinary, oral, and anal) is recommended (Campbell et al., 2017; Carpenter et al., 2013; Rondeau et al., 2019).

Behavior of Military Servicemen

The military population consist primarily of younger adults and subsequently placed at higher risk for acquiring STIs (Meadows et al., 2018) Further compounding the issue is high risk behavior that is persistent in the military population, with males displaying a higher rate of such behavior (Stahlman et al., 2014; Watkins & Lee, 2014). One tool the DoD uses to monitor such behavior is the Survey of Health Related Behaviors (HRBS), a questionnaire completed anonymously online, with service members randomly selected every two to four years. Querying 10,250 service members from the 2008 HRBS, Stahlman et al. (2014) demonstrated the use of illicit substances, mental health concerns, and unwanted sexual contact had a significant association with self-reported STIs in male service members. These reasons were not significant among the 3,428 female service members in the study. However, females reported higher rates than males of STIs, unprotected sex, mental health concerns, and unwanted sexual contact. Reporting five or more sexual partners increased the number of self-reported STIs five to six times over the service members who reported only one partner. Men were more likely to engage in substance and alcohol abuse, use condoms (43% vs 32.1%), and have more than five partners in the past 12 months (25.2% vs 9.3%). The study also highlighted that women working in a largely male workforce are having to deal with unique stressors and may feel stigmatized for asking for condom use during sexual relations.

In a cross-sectional analysis by Harbertson et al. (2015), 1,938 male and 515 female service members were anonymously surveyed on their sexual behaviors, substance use, mental health, and lifestyle risk factors. Sixty-seven percent reported that their last sexual encounter

was with their spouse (n=931) or non-spouse service member (n=331). Twenty-five percent of males reported their last sexual encounter was with another service member and 78.9% of females reported their last sexual encounter was with a spouse or non-spouse service member. Sixteen percent reported their last sexual encounter was not a service member or beneficiary (dependent or spouse of a service member.) It was reported that 87% had no history of ever having an STI, and 26.3% reported they used condoms during their last sexual encounter. Among females, 50% of those with an STI history reported being infected from another service member. As reported by Stahlman et al. (2014), 25% of military males reported five or more sexual partners over 12 months and over 50% reported multiple new sexual partners over 12 months, with 82% of the women reporting their last sexual encounter over 12 months with a consistent partner.

MSM

The repeal of the "Don't Ask, Don't Tell" and changes to the Defense of Marriage Act has opened communication between providers and lesbian, gay, and bisexual service members. From the 2015 HRBS, it is estimated that men who have sex with men (MSM) make up 3.3% of the military population, with a chlamydia and gonorrhea infection rate was twice that of non-military MSM (Campbell, Jahan, Bavaro, & Carpenter, 2017; Carpenter et al., 2013; Meadows et al., 2018). The CDC and USPTF both recommend yearly chlamydia and gonorrhea screening for the MSM population. However, the stigma behind such disclosing sexual orientation may limit those seeking screening (Campbell et al., 2017; LeFevre, 2014).

It is recommended chlamydia and gonorrhea screening takes into account anatomical site specific exposure (Campbell et al., 2017; Carpenter et al., 2013). Urine screening may present with a low prevalence of infection in the MSM population. Asymptomatic infections had a

higher prevalence in other sites such as the pharynx and rectum, with one study finding 24% of those sampled through urine, pharynx, and rectal testing had infection in only one site. Rectal swabs had the highest prevalence (18.4%) followed by the pharynx swabs (9.2%) and the urine (1%), thus rectal swabs are recommended for the MSM service member (Campbell et al., 2017; Carpenter et al., 2013; Rondeau et al., 2019).

Sequela of STIs and Benefits of Screening

STIs continue to have a negative effect within the U.S. military due to high incidence rates, impact on medical readiness of service members, and harmful sequelae for both males and females (Stahlman & Oetting, 2019). The retrospective cohort analysis by Bautisat, Hollingsworth, and Sanchez (2018) included a study population of 33,176 female service members diagnosed with chlamydia from 2006 to 2012. Seventy-five percent had one diagnosis, 19% had two diagnoses, 4% had three diagnoses, and 1% had four diagnoses of chlamydia. Among that same study population, 1,533 had a pelvic inflammatory disease diagnosis. The incidence rate of a pelvic inflammatory disease diagnosis increased with the number of diagnoses of chlamydia, with 6.54% with a single occurrence, 9.35% with one repeat diagnosis, 10.38% with two repeat diagnoses, and 11.05% with three repeat diagnoses.

In another study in a large U.S. city, increased screening for chlamydia and gonorrhea led to decreased occurrences of hospitalization for PID, ectopic pregnancies, and ED diagnosed cases of chlamydia and gonorrhea. Screening males for these STIs resulted in a 10.4% decrease in the incidence rate in the male population. After the addition of routinely screening males and females for STIs, there was a decrease in hospitalizations for pelvic inflammatory disease and ectopic pregnancies (36% and 38% respectively) as well as a decrease in emergency department

STI diagnoses (39%). The authors demonstrated that screening males for STIs has an impact on the adverse effects of STIs and disease burden on the female population (Anschuetz et al., 2012).

Results

Sexually transmitted infections have a prevalence in the U.S. military greater than that of the civilian population (Stahlman et al, 2014). Chlamydia and gonorrhea are two of the top five STIs with which service members are diagnosed. These diagnoses are most frequently noted in the younger service members (less than 24 years of age), lower enlisted ranks, and less educated (Stahlman & Oetting, 2019). Females have an incidence rate up to five times greater than males, while only making up 15% of the population. Among both genders, married service members have the lowest incidence rates of STIs. Longevity in the military and the number of deployments increased the risk for of an STI, with chlamydia being the most common STI in males (Diess et al., 2016; Duron et al., 2016; Stahlman & Oetting, 2019; Bautista, Hollingsworth, & Sanchez, 2018)

The current recommendation set forth by the USPTF does not include the routine screening of males for chlamydia and gonorrhea. The lack of routine screening in males results in a lower incidence rate, as diagnosed rates can be up to four times higher than self-reported rates (Duron et al., 2016). STI screening by urine sample is available and less invasive to the male population. Risky sexual behavior increases the risk for an STI. Sexually active males who partake in risky sexual behavior are more likely to accept STI screening. The literature supports the screening of males for chlamydia and gonorrhea for the reduction of chlamydia and gonorrhea in both the female and male populations (Anschuetz et al., 2012; Deiss et al., 2016; LeFevre, 2014; Goyal et al., 2016; Rondeau et al., 2019; Watkins & Lee, 2014).

As sexually transmitted infections rates continue to increase, health care providers need to take a more aggressive approach towards prevention. Accurate sexual histories and knowledge of the patient population will help give direction in the approach to educating the population. Addressing health promotion by recognizing the individual's perception of health will help empower them in their decisions for less risky behaviors and encourage the utilization of available resources. A suggested model for health promotion with regard to STIs in younger males is Pender's Health Promotion Model (Gaydos, McKee, & Faix, 2015; McCutcheon, Schaar, & Parker, 2016; Watkins & Lee, 2014).

Risk taking behavior is commonplace in the military setting, confounded by a population that consists largely of younger males. Due to this elevated rate of risky behavior the DoD has initiated the HRBS. Risky behavior is associated with substance abuse and mental health concerns led to increases in the incidences of STIs in males (Watkins & Lee, 2014). Lackadaisical condom use and numerous sexual partners have also been reported to increase STI prevalence (Stahlman et al., 2014). There is a significant percentage of sexual relations taking place within the military circle, with only 16% seeking relations outside of the military or from beneficiaries within the military (Harbertson et al., 2015). Men who have sexual relations with other men need to be screened annually as they are at increased risk for contracting an STI. This concept is fairly new to the military due to recent changes in the law and how lesbians, gays, and bisexuals are to be accepted.

In addition to the immediate effects on readiness, STIs can have other lasting impacts on service members. It is reported that there is an increased risk for pelvic inflammatory disease and ectopic pregnancies when there is a history of STIs. For males, there is an increased risk for infidelity and for the MSM anal scarring and fissures. Increased incidence of chlamydia and

gonorrhea has been associated with facilitating the transmission of HIV as well (Anschuetz et al., 2012; Bautisat, Hollingsworth, and Sanchez, 2018; Carpenter et al., 2013; Stahlman & Oetting, 2019).

Summarization

Sexually transmitted infections have impacted medical readiness, and thus operational readiness, within the U.S. military for quite some time (Deiss et al., 2016). STI rates continue to rise in the military as they do in the civilian population, but with increased velocity. With a population largely composed of young adult males with a disposition for risky behavior, one can see how this is concerning to the wellbeing of the fighting force, not to mention the economic impact on the DoD.

Although routine screening for chlamydia and gonorrhea is encouraged for the female population, there are currently no national recommendations for the routine screening of males. Females are recommended to be screened due to the increased risk of sequela related to chlamydia and gonorrhea. It is believed that males with STIs will be adequately identified and treated through the screening of the female population (LeFevre, 2014). However, with males making up 85% of the military population and accounting for 50% of the top five most common STI diagnoses, it would seem prudent to actively screen the male population as well. This change has the potential to reduce STIs in the female military population as well.

In addition to screenings, there needs to be a more proactive approach in the prevention of and spread of STIs. It is routine for non-medical personnel to give instruction on STI prevention, usually coming from a requirement of leadership trickled down to the lowest ranks. A lack of personal interest in the topic may be relayed and not taken seriously by those who need this direction the most (Watkins & Lee, 2014). Proper education by health care providers would

be beneficial to help service members take STIs more seriously (Gaydos, McKee, & Faix, 2015). Having a vested interest in the well-being of the individual and an understanding of the individual's concept of health will allow for empowerment and behavioral change.

The literature illustrated several overlapping themes that may help reduce the prevalence of the more common STIs in the military. Addressing risky behaviors and health promotion with increased screening has the potential to reduce the incidence rates of chlamydia and gonorrhea within the ranks. The literature shows support for the screening of at-risk male service members to curtail the increasing STI rates, decrease the disease burden, and make for a healthier military force (Anschuetz et al., 2012; Deiss et al., 2016; Rondeau et al., 2019; Watkins & Lee, 2014).

Theoretical Framework

The quality improvement (QI) model selected for the project is the Plan-Do-Check-Act cycle, or PDCA (American Society for Quality, 2020). This simple four step model is frequently used when initiating improvement projects in the health-related fields. Applying the model to the project can be summarized in the four parts of plan, do, check, and act. "Plan" is to recognize an opportunity for change, which was accomplished when meeting with providers and discussing the lack of STI screening on males as opposed to the routine screening of females. "Do" is the implementation of this small scale QI project in an attempt to encourage a change in behavior through increased provider awareness. "Check" will be the analysis of collected data in response to the QI project and "Act" will be the dissemination of the results to key stakeholders (American Society for Quality, 2020).

Nola Pender's Health Promotion Model (HPM) is the guiding theoretical framework supporting this project. Designed to complement health protection models, the HPM takes the approach that health is a fluid state and not merely the absence of disease. As such, the HPM is

focused on enhancing the well-being of patients through interaction with their environment. This includes experiences and characteristics of the patient, knowledge of specific behaviors, and a willingness to commit to a change in such behavior. Pender's HPM assumes that individuals will seek to actively regulate their own behavior and that health care providers can be a critical influence on persons throughout their lifespan.

The project created an avenue for the health care provider to become involved in the sexual health of the patient and encourage self-initiated evaluation of personal and environmental interaction that is required to induce behavior change. Through self-reflection, the provider can initiate and standardize behaviors as they relate to addressing the sensitive topic of sexual histories, behaviors, and practices with their patients. A secondary benefit is the application of the HPM to the patient. The provider/patient interaction will empower the patient to reevaluate their own perception of health and how to maintain healthy behaviors. For both provider and patient, the desire and initiation of change will come from the individual.

Project Design and Implementation

Alterations to Original Proposal

Prior to the implementation of the project the Coronavirus Disease 2019 (COVID-19) pandemic had begun to impact the southeastern United States. This resulted in the protocol changes for Naval Hospital Jacksonville and associated clinics. Preventive health and wellness visits were not conducted in the outpatient clinics. Telehealth platforms were utilized with patients requesting care placed in a queue with the first available provider regardless of clinic assignment making contact. Medical providers and Preventive Medicine staff at the Naval Hospital Jacksonville were also deployed to assist with the national response to COVID-19 and unavailable to participate with the project. Additionally, the graduate nursing student's access to

the health care facilities was restricted by Jacksonville University and the clinical site. Changes to the proposal include:

1. Project implementation was preformed via a voice over PowerPoint presentation distributed through provider email list servers.
2. Pre and post questionnaires were delivered via an online platform.
3. The project was delivered to nearly 300 staff members of all disciplines across all of the Naval Hospital Jacksonville clinics. The proposal initially was to utilize the 30 providers at the active duty only clinic.
4. There were no asymptomatic screening performed during the implementation period. As such laboratory data was not collected.

Goals and Objectives

The objectives of the project were to increase provider knowledge regarding STIs in the male population and increase STI detection in the male military population. Specifically, the project attempted to meet these objectives by:

1) educating the providers on addressing sexual health within the male military population to increase STI screenings
2) increasing the identification of chlamydia and gonorrhea infections by 10% over 10 weeks.

The goal of this project was to increase the identification of chlamydia and gonorrhea infections in the male service member population at Naval Air Station Jacksonville through provider education related to STI infections in the male population. The long term goals of the project were to reduce the overall incidence rates of chlamydia and gonorrhea at Naval Air Station Jacksonville and reduce adverse outcomes related to chlamydia and gonorrhea.

Setting

The project was implemented at Naval Hospital Jacksonville and included the staff at clinics in Albany, GA, Kings Bay, GA, Key West FL, Mayport, FL, and the Branch Health Clinic (BHC) at Naval Air Station Jacksonville. The hospital and clinics provide care to active duty and beneficiaries within the DoD. During the implementation period primary care services were provided largely by telehealth platforms to reduce exposure and limit transmission of COVID-19.

During normal operations the clinics would follow the patient centered care model and serve as the "Medical Home Port," providing care to the service member and beneficiaries for same day "sick call" appointments as well as routine primary care appointments and medical readiness physicals (PHA, flight physicals). During the project implementation period patients requesting care called the appointment line and were placed in a queue. Available providers would then contact the patient regardless of clinic assignment or primary care manager. The PHA is completed annually, as well as before and after deployments, and is used by the military to perform preventive screening to increase the medical readiness of the warfighter. Physical and mental health is initiated by a self-reported, computer-based questionnaire with a final evaluation by a provider. This PHA questionnaire is part of DoD form DD 3024. During the PHA, vital signs to include height and weight are recorded, a vision screen is performed, and medical conditions are reviewed with the provider. Laboratory work is ordered depending on age and gender. The PHA is reviewed with a health care provider with recommendations for health improvement.

The PHA questionnaire consists of demographics, deployment and occupational questions, previous health conditions, behavioral health, family history, and individual readiness

such as allergies and prescription eyewear. Lifestyle questions are asked related to diet, tobacco, alcohol and sexual activity. Question 20 specifically asks the service member to identify themselves as "at risk" or "not at risk" based on listed risk factors. Question 21 follows asking if individuals identifying as "at risk" have had an STI screening since their last PHA.

Population

The targeted population was the health care providers performing their duties at Naval Hospital Jacksonville and associated clinics. The questionnaires, presentation, and supplemental information was distributed to 298 staff members. This included nurse practitioners, physicians (MD and DO), physician assistants, and medical officers in disciplines such as dentistry and pharmacy. The Independent Duty Corpsmen (IDC) were not part of the listserve and thus not included in the distribution of the questionnaires or learning material. The IDC can assist in the treatment and prevention of disease through collaboration with other medical providers. The IDC is trained to perform a variety of medical and administrative tasks such as assessing, diagnosing, and treating patients without direct oversite from supervising providers. The IDCs were performing PHAs via telehealth at least one clinic.

Timeline

The timeframe for implementation and data collection was over a 10-week period after the initial questionnaire and provider education had been distributed. The first questionnaire and provider education was distributed on April 20th and 21st, 2020 with a follow-up email on April 27th, 2020. The initial questionnaire was closed on April 28th, 2020. The second questionnaire was distributed on June 4th, 2020. On June 9th, 2020 notifications were received stating there was difficulty accessing the questionnaire via the provided link. Alternative methods for accessing the second questionnaire were distributed on June 9th, 2020. The second questionnaire

was closed on June 16th, 2020. The presentation was approximately 18 minutes in length. The initial questionnaire took an average of six minutes 30 seconds to complete, with the second questionnaire taking an average of five minutes and 30 seconds.

Procedures

Health care providers in the clinics consist of nurse practitioners, physicians, physician assistants, and IDCs. Access to the initial questionnaire, PowerPoint presentation with voiceover, and the CDC publication was distributed via an internal e-mail listserv to the health care providers within the clinics associated with Naval Hospital Jacksonville. The initial questionnaire was administered via an internet-based format utilizing QualtricsXM and was intended to be completed prior to viewing the provider education PowerPoint presentation. The questionnaire was designed to assess providers on their knowledge, perception, and willingness to screen males for STIs, STI statistics, screening criteria, and symptom recognition (see Appendix A). Upon completion of the questionnaire, providers were to view the PowerPoint presentation. A post-implementation questionnaire was distributed via the email listserv 45 days after the date of the initial distribution. The post-implementation questionnaire had identical content as the pre-implementation questionnaire and was administered via the same internet-based format utilizing QualtricsXM. Participation in both the pre and post questionnaire was voluntary and participants were able to consent before participating. A waiver for written consent was obtained from the Jacksonville University Institution Review Board as the QI project presents no more than minimal risk to the participant and does not involve a procedure for which a consent is normally required. Both online questionnaires were anonymous.

The questionnaire “Provider knowledge and perceptions of STIs” (Appendix A) was created for this quality improvement project to analyze provider perceptions concerning STIs and

to determine if a change in perception occurs after the in-service. Questions five through eight and 30 are from the MMC ED Provider STD Knowledge Survey used with permission from Dr. Binnara Yoo's QI project titled "Implementation of a Sexually Transmitted Disease-Screening Protocol in an Emergency Department: A Quality Improvement Project to Increase STD Screenings in Young Adults Aged 15–29 Years With Urinary Symptoms." Questions 16-20 reference the "Five Ps" in the CDC's "Guide to taking a sexual history." Questions on STI rates utilized data from the Navy and Marine Corps Public Health Center's "Reported Sexually Transmitted Infections in the Department of the Navy: Annual Report 2018" (NMCPHC-EDC-TR-120-2019) with local STI rate information collected from the Florida Department of Health. Content validity of the questionnaire was established by several Jacksonville University Graduate Nurse Practitioner faculty and the U.S. Navy Preventive Medicine Specialty Leader at Naval Hospital Jacksonville. Wording suggestions and additional relevant questions were incorporated into the questionnaire as recommended by the provided critiques.

The graduate nursing student provided the provider education through a PowerPoint presentation with voice over. Topics included USPTF guidelines, CDC recommendations, current statistical information, and history taking techniques. A copy of CDC publication 99-8445 "A guide to taking a sexual history" was distributed with the PowerPoint presentation for review. An outline for the presentation follows:

a. Introductions and brief overview of project
b. Administer provider questionnaire
c. Guideline review relating to chlamydia and gonorrhea
    i. USPTF recommended screening criteria
    ii. CDC recommended screening criteria

d. Current statistics relating to chlamydia and gonorrhea
    i. National rates
    ii. Local rates
e. Duval, St. John's, and Clay counties
    i. Military rates
        1. NAS JAX rates
f. History taking techniques
    i. "A guide to taking a sexual history"
g. 5 "Ps" Partners, Practices, Prevention of Pregnancy, Protection from **STIs**, and Past History of STI
h. Screening
    i. Available diagnostic test

It was originally proposed to have an in-service that would take place at the bimonthly BHC Providers Meeting with additional trainings to providers who are unable to attend the initial meeting at the providers' earliest convenience. Due to precautions established by the university and clinical site an in-person presentation was not feasible. Discussion with clinical site and hospital stakeholders led to the project having an implementation across a wider range, including nearly 300 providers. Hospital leadership assisted with the initial distribution to the email listserv, requesting voluntary participation on behalf of the graduate nursing student.

After the provider education was delivered, it was intended that the provider would use clinical judgment to determine if a screening for chlamydia and/or gonorrhea was warranted based on patient history and presentation. This screening may have taken place as part of the PHA as it relates to answers on the self-administered portion of the DoD DD 3024 form, due to a

specific genitourinary medical complaint, or due to an incidental finding discovered exploring the patient's history for the medical record. It is important to note that the ordering of any laboratory tests would have been done solely on the judgment of the provider and not at the request of the project.

It was proposed that the electronic health record would be queried 10 weeks before and after the project implementation to determine the number of chlamydia and gonorrhea screenings administered in the male population as well as the number of positive and negative results. Data collection was to include the tests ordered and results with limited demographical data to include age, ethnicity, marital status, and rank and no protected health information collected. Chlamydia and gonorrhea results for female patients who receive care at Naval Hospital Jacksonville facilities were to be collected for comparison. This data collection was no longer practical as there was no asymptomatic screening performed during the COVID-19 pandemic. The questionnaires and data were analyzed to determine the statistical significance of the implemented project on provider perception and practice.

Fiscal Considerations

Laboratory costs for this project would have been absorbed into the operating costs of the Naval Hospital Jacksonville. The additional specimen collection would not overburden the laboratory staff and supplies that were on hand. Per protocol, all STI testing would have been sent for processing to the U.S. Air Force School of Aerospace Medicine's Epidemiology Laboratory Service (EPI lab) at the 711th Human Performance Wing at Wright Patterson Air Force Base, Ohio. The laboratory manager was unable to provide exact costs for the chlamydia and gonorrhea urine test that is utilized by Naval Hospital Jacksonville.

Military service members are compensated based on rank and time in service and not by credential. Labor costs were estimated at $895.51 for one hour spent during the provider education and taking surveys. The publicly available Defense Finance and Accounting Service Monthly Rates of Basic Pay was used to determine an hourly rate based on a 40-hour work week. It was expected there would be seven participants of rank of O5 at 16 years of service ($54.57 per hour), six participants of rank of O4 at 12 years of service ($46.06 per hour), three participants of rank of O3 at eight years of service ($37.85), and seven participants of E5 at six years of service ($17.65 per hour).

Twenty-five copies of CDC publication 99-8445 “A guide to taking a sexual history” was requested and received free of charge from the CDC. A PDF version of the publication was downloaded and distributed free of charge. The online questionnaire was administered utilizing the web-based platform QualtricsXM which is provided by Jacksonville University.

Sustainability

Following a successful implementation of this QI project, similar provider education in-services could be employed routinely at the project site as well as other DoD facilities. There is minimal financial burden and time requirements required for the project. There is minimal to no risk for the participants as screening for STIs fall within the standard of care. Additional measured outcomes with regard to STI rates for both genders may influence policy change and provide evidence for alterations in applicable guidelines.

Ethical Considerations

The intervention is non-invasive and poses minimal to no risk to the participants. Risks may include discomfort in discussing sexual history and sexual practice with patients. The decision to screen male service members was based on the clinical judgment of the provider and

not directed by the project. Deidentified data collected during the quality improvement project will be maintained in accordance with the Health Insurance Portability and Accountability Act (HIPAA) on a HIPAA compliant cloud based server at Jacksonville University. There is no requirement for the purposes of the project to have or maintain protected personal information. The provider questionnaires had no personal identifiable information.

IRB Approval Plan

The graduate nurse student met with the Jacksonville University Research Compliance Coordinator who deferred IRB oversight to the Navy. An IRB Review Determination was submitted to the Navy on October 13th, 2019. A Letter of Waiver of IRB Review for Healthcare Delivery Improvement Project was received on October 19th, 2019, indicating this QI project does not require IRB review and that Navy policy states that these types of program evaluation projects are exempt from IRB review. These documents have been uploaded for review to IRBNet as requested by the Research Compliance Coordinator. IRB approval from Jacksonville University was obtained on April 7th, 2020, with the amendment for online delivery and site expansion approval obtained on April 10th, 2020.

Data Analysis Plan

The questionnaires given prior to and 45 days after project implementation were statistically analyzed using the Wilcoxon rank sum test and the Fisher's exact test. Provider responses on the repeat questionnaire indicating a willingness to assess a patient's sexual history as well as an increase in provider ordered screenings compared to the previous timeframe would indicate a positive influence of the intervention. The statistical software package used for statistical analysis was SAS and was completed with the assistance of a statistician provided by Jacksonville University.

Project Outcomes

Statistics

The initial (Q1) and second (Q2) questionnaires were distributed to 298 health care providers. The initial questionnaire had 11 responses (4%) and the second questionnaire had 10 responses (3%). Table 1 illustrates the demographics of the sample population. The average years of practice for both questionnaires was 14 years. Participation by gender was equal with Q1 (n=11) having six males and five females and Q2 (n=10) having even distribution. Participation by profession for Q1 (n=11) included four MDs (36%), two DOs (18%), four master's prepared NPs (36%), and one PA (9%). Participation in Q2 (n=10) consisted of one MD (10%), three DOs (30%), two doctorate prepared NPs (20%), two master's prepared NPs (20%), and two classified as other (20%). The area of practice for Q1 (n=11) was nine in primary care and two in flight medicine. Q2 (n=10) had seven responses to area of practice with six in primary care and one in flight medicine.

Table 1

Provider Demographics

		Questionnaire 1 (n=11)	Questionnaire 2 (n=10)
Gender	Male	6 (55%)	5 (50%)
	Female	5 (45%)	5 (50%)
Professional Credentials	MD	4 (36%)	1 (10%)
	DO	2 (18%)	3 (30%)
	NP-DNP	0 (0%)	2 (20%)
	NP-MSN	4 (36%)	2 (20%)
	PA	1 (9%)	0 (0%)
	Other	0 (0%)	2 (20%
Area of Practice	Primary Care	9 (82%)	6 (86%)
	Flight Medicine	2 (18%)	1 (14%)
Years of Practice	0-5	3 (27%)	2 (20%)
	6-10	2 (18%)	3 (30%)
	11-15	0 (0%)	2 (20%)
	16-20	2 (18%)	0 (0%)
	20 or more	4 (36%)	3 (30%)

The second questionnaire had three additional questions to determine the completion of the initial questionnaire and viewing of the educational material. Six (n=10) completed the initial questionnaire and eight (n=10) viewed the educational. Analysis of the questionnaires revealed no statistical significance that the project implementation had an impact on provider practice with regard to sexual history taking or knowledge of STI rates within the Navy or local community.

Project Objectives Not Met

The objectives of the project were to increase provider knowledge regarding STIs in the male population and increase STI detection in the male military population. Analysis of the results of the questionnaires (n=21) determined there was not a statistically significant change in knowledge or practice when the questionnaires from before and after project implementation were compared. An alpha level of .05 for all statistical tests. Answers to questions nine through 15 related to STI knowledge of the population and were true/false. Answers to questions 16 through 20 related to history taking were given a value of one through four with Never=1, Sometimes=2, Often=3, and Always= 4 (Table 2).

There was a non-significant increase in the knowledge of chlamydia rates in the Navy compared to the local population with a prevalence of 45% (5/11) in Q1 compared to 80% (8/10) in Q2 (p=0.1827). A non-significant decrease in knowledge was of asymptomatic male presentation was indicated with a prevalence of 100% (11/11) in Q1 compared to 80% (8/10) in Q2 (p=0.2143). When addressing the likelihood of risky behaviors in male service members compared to the general population, there was a non-significant increase in knowledge between Q1 with a prevalence of 55% (6/11) compared to 90% (9/10) in Q2 (p=0.1486).

Between both questionnaires (n=21), nurse practitioners (n=8) and physicians (n=10) on average answered “Sometimes” to questions related to aspects of taking a sexual history. Nurse practitioners (n=8) were more likely than physicians (n=10) on average to ask male patients about protective measures against STIs.

Table 2

Provider Sexual History Taking Practices

	Questionnaire 1		Questionnaire 2		
	Mean	SD	Mean	SD	P Value
On average how often do you ask your male patients about their sexual partners (active, number of partners, gender of partner)?	2.364	0.089	1.9	0.738	0.272
On average how often do you ask your male patients about their sexual practices (genital, anal, oral)?	2.182	0.603	1.8	0.632	0.302
On average how often do you ask your male patients about what protective measures against STIs they are using?	2.455	0.934	2.3	1.16	0.724
On average how often do you ask your male patients about any prior history of STIs (to include possible exposure)?	2.364	0.674	2.3	0.949	0.95
On average how often do you ask your male patients about their plans to father a child?	1.636	0.925	1.7	0.823	0.798

Note. Answers to the questions were ranked Never=1, Sometimes=2, Often=3, and Always= 4

It was unable to be undetermined if an increase in STI detection within the male military population would have been realized with this project. Alteration to the delivery of primary and preventive health care services reduced opportunities for in-depth history taking and asymptomatic screenings.

Discussion

Although the project did not produce the change in practice, additional information collected from the questionnaires indicated a change in protocol and additional training should

be further investigated. Providers felt that adolescents and young adults were unable to differentiate if they had an STI based on their own perceptions and over 60% of providers in Q1 (n=11) and felt that most young men will with a chlamydial or gonorrheal infection will be asymptomatic. Without taking a proper sexual history, patients may be misdiagnosed based on incomplete laboratory testing resulting in inappropriate treatment and damaging sequelae. With regard to infection rates, more than half of the participants in Q1 (n=11) stated the chlamydia rates in the Navy were lower than the local community, while the data shows that chlamydia rates in the Navy are more than double that of the local community. Eighty percent of the participants in Q2 (n=10) stated the Navy chlamydia rates exceed the local population. The literature supports that the MSM population may have infections in only one site. Only 72% of participants in Q1 (n=11) and 50% of participants in Q2 (n=10) stated this as true, indicating further education is required when addressing the MSM population. It has been demonstrated in the literature that male service members are engaged in risky behaviors to include alcohol abuse and sexual encounters with multiple partners. Nearly half of the participants in Q1 (n=11) did not feel that male service members are more likely to have risky behaviors than the general public. This again would indicate a need for further education of the health care providers in the population they serve. All participants did agree that risky behaviors increase the risk of acquiring a sexually transmitted infection.

The majority of the participants “sometimes” (never, sometimes, often, always) inquired into the male patient sexual history. Questions related to alcohol, tobacco, and illicit drug use were asked more routinely by participants in both questionnaires. Over 60% of the participants answered “never” to ordering diagnostic testing in males for STIs regardless of the visit, with over 30% answering “sometimes.” Participants in Q1 (n=11) and Q2 (n=10) felt that the comfort

level of the provider discussion sexual history and practices (36% and 20%) and time limitations (54% and 40%) were barriers to screening males for STIs. Several participants (40%) in Q2 (n=10) felt their type of practice did not warrant STI screening. Q1 participants (n=11) felt that a concern for social stigma (54%) was a barrier for patient honesty during the taking of the sexual history as well as concerns for a negative impact on their career (27%). Eighteen percent felt there were no patient barriers to an honest history. Q2 participants (n=10) felt that a concern for social stigma (50%) was a barrier for patient honesty during the taking of the sexual history as however concerns for a negative impact on their career were only perceived by 27%. Thirty percent felt there were no patient barriers to an honest history.

A common perception across both questionnaires was that STIs are a problem in the Navy, with 100% of the participants stating yes. It was also stated by 100% of the participants that men should be screened for STIs following the same USPSTF guidelines. This would require the screening of sexually active males age 24 years and younger as well as older men who are at an increased risk for infection. When asked how likely the participant thought a male service member was to have an STI compared to females, 54% of Q1 participants (n=11) felt the likelihood was the same and 45% felt males were more likely. Participants in Q2 (n=10) were evenly split between the same likelihood and more likely.

Participants were asked to list important characteristics they considered when deciding to screen young patients for chlamydia and gonorrhea. The participants offered several aspects that influenced their decisions. The patient's chief complaint should be key with testing based on the patient or patient's partner's symptoms and clinical presentation. Age, maturity, and social history to include the patient's sexual history were also characteristics that impacted the decision

to screen. Risky behaviors obtained from the social history such as drug and alcohol abuse were also stated to be a concern to pursue testing.

Limitations of Project

The project was largely impacted by the COVID-19 pandemic. Alterations were implemented to accommodate changes that developed due to the Navy's response. The deployment of health care providers and the decreased activity of the active duty clinic led to a larger disbursement of the project across all of Naval Hospital Jacksonville's clinics. Not all clinics treat active duty service members or male patients. Initial planning had the stakeholders of the original clinic invested in the project full support and knowledge of the project. This buy-in was in the larger disbursement. The transition from an in-person education delivery to an e-mailed PowerPoint also decreased provider involvement as was evident by less than 5% participation.

The anonymous nature of the project with a vast target population draws in to question the accuracy of the second questionnaire. With only 60% of those taking Q2 having participated in the initial questionnaire, it is difficult to gauge if the project had an influence provider practice. The decrease in patient visits with limited or no face-to-face exams further impeded the project. Office visits were streamlined and limited to the chief complaint. Communication with the original clinic did not reveal that PHAs would continue in a virtual format and would be performed by the IDCs. This exclusion of the IDCs from the listserv removed part of the target population performing health assessments. As STI testing was not being performed for asymptomatic patients there was no practicality in a statistical comparison of retrospective data.

Recommendations for Further Research

The project requires available providers, wellness visits, and testing capabilities to be successful. Implementation of the project during a pandemic would not be recommended as the project will be competing with a more pertinent health care crisis. Introducing the project on a smaller scale as initially designed with a means to track responses (versus anonymous responses) may lead to more accurate results. Site selection should include facilities that treat male service members and have providers that are available for in-person education delivery. Provider selection should be limited to providers with direct patient contact in the primary care setting. A comparison of retrospective and prospective data would further support if the project objectives can be met.

The lack of a statistically significant change between the questionnaires points out additional issues to be addressed with future research. Additional education related to the prevalence of STIs with the male service member, as compared to the local and national population, may further influence provider perception and practice. Emphasis should be placed on the need for the sexual history during the patient interview, with equal importance as questions related to the use of alcohol, tobacco, illicit drugs, or other risky behaviors. Lastly, the providers need to be familiar with their population with regard to age, social habits, and behaviors typically seen with younger male service members.

Implications for Practice

With a successful implementation of the project and realization of predicted outcomes, the project has the potential to influence the STI screening protocol. The continued identification of male service members can then be used to determine the statistical significance of STI rates between the male and female population, and any correlation should female

prevalence decrease. The screening process can be implemented system wide with additional screenings added for other disease processes, such as human papillomavirus, that may have long term negative outcomes and increased disease burden in the female population.

Plans for Dissemination of Results

Upon completion details and results of the study will be presented in manuscript form to key stakeholders to include leadership at Naval Hospital Jacksonville and the Family Nurse Practitioner Consultant to The Surgeon General of the Army for review. The manuscript will be submitted for peer-reviewed publication in applicable journals such as *Military Medicine* for review. A podium and poster presentation will be created for use as directed by military leadership for demonstration of project findings.

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Appendix A

Provider Knowledge and Perceptions of STIs

Q1 How many years have you been practicing as a health care provider?_____

Q2 Gender

- ○ Male
- ○ Female

Q3 Professional Credential

- ○ MD
- ○ DO
- ○ NP-DNP
- ○ NP-MSN
- ○ PA
- ○ IDC
- ○ Other

Q4 Area of practice

- ○ PCD
- ○ Flight Medicine

Q5 Adolescents and young adults can tell by the way they feel if they have Gonorrhea or Chlamydia.

- ○ Agree
- ○ Disagree
- ○ Do not know

Q6 Which of the following best describes the clinical signs/symptoms of Chlamydia/Gonorrheal infection in young men?

- ○ Yellow discharge from penis
- ○ Dysuria
- ○ Scrotal Pain
- ○ Most men are asymptomatic

Q7 Which of the following best describes the clinical signs/symptoms of a Chlamydia/Gonorrhea infection in young women?

- ○ Most women complain of discharge
- ○ Most women complain of urinary symptoms
- ○ Clinical signs/symptoms depend on the duration of the the infection
- ○ Most women are asymptomatic

Q8 Which of the following statements is true about Chlamydia/Gonorrhea in young women?

- ○ The majority of young women are symptomatic
- ○ The majority of young women with infection can be identified by clinical examination
- ○ The most frequent sequelae of untreated disease is having a life-threatening ectopic pregnancy
- ○ Chlamydia-associated PID is sometimes sub-acute or silent

Q9 Chlamydia rates in the Navy are higher than Duval County/City of Jacksonville.

- ○ True
- ○ False

Q10 Gonorrhea rates in the U.S. are lower in males than females.

- ○ True
- ○ False

Q11 In the Navy rates of gonorrhea are substantially higher than that of chlamydia.

- ○ True
- ○ False

Q12 Males may be asymptomatic with gonorrhea or chlamydia infections.

- ○ True
- ○ False

Q13 Men who have sex with men that have chlamydia or gonorrhea may be positive in only one site (urine, pharynx, or rectal).

- ○ True
- ○ False

Q14 Male service members are more prone to risky behaviors than the general population.

- ○ True
- ○ False

Q15 Risky behaviors increase the risk for acquiring a sexually transmitted infection.

- ○ True
- ○ False

Q16 On average how often do you ask your male patients about their sexual partners (active, number of partners, gender of partner)?

- ○ Never
- ○ Sometimes
- ○ Often
- ○ Always

Q17 On average how often do you ask your male patients about their sexual practices (genital, anal, oral)?

- ○ Never
- ○ Sometimes
- ○ Often
- ○ Always

Q18 On average how often do you ask your male patients about what protective measures against STIs they are using?

- ○ Never
- ○ Sometimes
- ○ Often
- ○ Always

Q19 On average how often do you ask your male patients about any prior history of STIs (to include possible exposure)?

- ○ Never
- ○ Sometimes
- ○ Often
- ○ Always

Q20 On average how often do you ask your male patients about their plans to father a child?

- ○ Never
- ○ Sometimes
- ○ Often
- ○ Always

Q21 On average how often do you ask your male patients about their alcohol intake?

- ○ Never
- ○ Sometimes
- ○ Often
- ○ Always

Q22 On average how often do you ask your male patients about their tobacco use (to include vaping)?

- ○ Never
- ○ Sometimes
- ○ Often
- ○ Always

Q23 On average how often do you ask your male patients about their illicit drug use?

- ○ Never
- ○ Sometimes
- ○ Often
- ○ Always

Q24 On average how often do you order diagnostic testing in males for STIs regardless of the reason for the visit?

- ○ Never
- ○ Sometimes
- ○ Often
- ○ Always

Q25 What barriers do you feel exist for providers when screening males for STIs?

- ○ None
- ○ Comfort level of provider discussing sexual history and practices with pateints
- ○ Time limitations do not allow for discussion other that the chief complaint
- ○ Other (please specify) _____

Q26 What barriers for male patients do you feel exist regarding patient honesty while taking a sexual history?

- ○ None
- ○ Concern for impact on career
- ○ Concern for social stigma
- ○ Other (please specify) _____

Q27 Do you feel STIs are a problem in the U.S. Navy?

- ○ Yes
- ○ No

Q28 Do you feel men should be screened for STIs as routinely suggested as females per the USPSTF guidelines?

- ○ Yes
- ○ No

Q29 How likely do you think male service members are to have a sexually transmitted infection compared to females?

- ○ Less likely
- ○ Same
- ○ More likely

Q30 Please list the important characteristics that you consider when deciding to screen sexually active young patients for Chlamydia and Gonorrhea.

_____

_____

_____

_____

_____