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# Evaluating Breastfeeding Knowledge and Attitudes of Outpatient Military Health System Nurses Caring for the Breastfeeding Dyad

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**Evaluating Breastfeeding Knowledge and Attitudes of Outpatient Military Health System Nurses Caring for the Breastfeeding Dyad**

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In partial fulfillment of the requirements for the Doctor of Nursing Practice Degree

# Abstract

United States breastfeeding rates fall short of Healthy People 2030 goals. Mother-baby dyads encounter barriers to breastfeeding, resulting in early weaning. Military families experience additional difficulties, including frequent relocations. Breastfeeding rates increase with lactation support from trained nurses with adequate knowledge. Existing research on breastfeeding knowledge focuses on inpatient settings, with little research on outpatient nurses or the military health system. This study evaluates breastfeeding knowledge, attitudes, and intentions of outpatient military health system nurses. Nurses were recruited primarily through social media. Participants completed the Comprehensive Breastfeeding Knowledge Scale and the Nurses' Support for Breastfeeding Questionnaire attitude and intention subscales. Nonparametric statistical analysis was conducted due to violated assumptions of normalcy. Knowledge, attitude, and intention scores were high, with medians of 77 (9), 19 (7.5), and 16 (6), respectively. Nurses' knowledge scores were only higher than mothers' scores at four weeks postpartum, $t(46) = 2.3$, $p = 0.26$. Attitude and intention were positively correlated, $\tau_b = .43$, $p = .042$. Registered nurses demonstrated higher knowledge than licensed practical nurses, $z = -2.14$, $p = .032$, $r = -.57$. Nurses reporting neutral personal breastfeeding experience had lower knowledge scores than nurses reporting positive personal breastfeeding experience, $z = -2.26$, $p = .024$, $r = -.80$, or no personal breastfeeding experience, $z = -1.994$, $p$ .046, $r = -.66$. Outpatient military health system nurses demonstrate knowledge, attitudes, and intentions consistent with an ability to support the breastfeeding dyad at four weeks postpartum but may not provide effective lactation support at other time points. Stakeholders should be aware that nurses' personal breastfeeding experience may affect ability to provide high-quality support.

*Keywords:* outpatient nurse, military health system, breastfeeding knowledge, nurse attitude, nurse intention

**Evaluating Breastfeeding Knowledge and Attitudes of Outpatient Military Health System**

**Nurses Caring for the Breastfeeding Dyad**

Breastfeeding is a natural process with multiple benefits for mother and child (Spatz, 2017). Together, the lactating mother and breastfeeding child are termed the *breastfeeding dyad*. The World Health Organization (WHO) and United Nations Children's Fund (UNICEF) recommend exclusive breastfeeding for the first six months of a child's life (World Health Organization, 2015). *Exclusive breastfeeding* is defined as receiving nutrition only from human breast milk (WHO, 2015). Prior to six months of age, children can receive all their fluid and nutrient needs from their mother's breast milk and require no solid foods or water (WHO, 2015). Exclusive breastfeeding does not preclude taking necessary medications or supplements (Division of Nutrition, Physical Activity, and Obesity [DNPAO], n.d.). *Any breastfeeding* refers to a diet including human breast milk but which may also include other foods, such as commercial breast milk substitutes or solid foods (DNPAO, 2022a). In this paper, breastfeeding according to WHO and UNICEF recommendations is termed evidence-based breastfeeding.

This project aims to determine if the levels of knowledge, attitudes, and intentions of outpatient military health system (MHS) nurses indicate the ability to provide quality lactation support. Specific project objectives are to: 1): assess the level of breastfeeding knowledge, 2) determine if the level of knowledge is adequate, 3) assess attitudes toward provision of lactation support, 4) assess intentions to provide lactation support, and 5) assess interactions or correlations between breastfeeding knowledge, attitudes, and intentions.

**Background and Significance**

*Health Benefits of Breastfeeding*

Breastfeeding is viewed as a natural act and a nutritional source, which can undermine its role in preventive health (National Association of County and City Health Officials [NACCHO] & United States Breastfeeding Committee [USBC], 2021; Watkins et al., 2017). However, evidence-based breastfeeding has been shown to improve maternal and child health (Nguyen et al., 2019; Spatz, 2017; Victora et al., 2016). Health protections provided by breastfeeding is dose-dependent; the amount and duration of breastfeeding inversely correlates with morbidity and mortality (Green et al., 2019).

Worldwide, almost 600,000 deaths in children under the age of five could be prevented annually by evidence-based breastfeeding (Walters et al., 2019). Childhood mortality was noted primarily in Sub-Saharan Africa and lower-income countries, with North America being the least affected (Walters et al., 2019). Young children most frequently die from diarrheal illnesses and respiratory infections (Nguyen et al., 2019). In children, breastfeeding lowers the risk of diarrheal illness, respiratory infections, and pediatric hospitalization when compared with formula feeding (Nguyen et al., 2019). Evidence-based breastfeeding also decreases pediatric risk for sudden infant death syndrome, otitis media, atopic dermatitis, asthma, childhood diabetes and obesity, and overall mortality (McFadden et al., 2017; Victora et al., 2016; Walters et al., 2019). Breastfed babies are more likely to live to six months of age, and initiation of breastfeeding within 24 hours of birth can decrease a neonate's risk of death by 43% (Greenslade, 2018). Breastfeeding correlates with reduced infant mortality; implementation of any intervention to promote breastfeeding would assist the United States in achieving the 2030 Healthy People goal of reducing infant mortality rates by 14% (Li et al., 2022; Office of Disease Prevention and Health Promotion, n.d.)

Women who breastfeed are at a lower risk for hypertension, postpartum bleeding, breast and ovarian cancers, and type 2 diabetes (Rameez et al., 2019; Victora et al., 2016). Due to the protective factor of breastfeeding against a mother's breast cancer, ovarian cancer, and type 2 diabetes risk, evidence-based breastfeeding could prevent an estimated 98,943 maternal deaths – 20,000 of which relate to breast cancer – each year around the globe (Victora et al., 2016; Walters et al., 2019). Over half of these preventable maternal deaths occurred in upper middle-income countries (Walters et al., 2019).

### *Economic Advantages of Evidence-based Breastfeeding*

Failure to practice evidence-based breastfeeding creates significant global economic burden and increases mortality worldwide (McFadden et al., 2017). Not breastfeeding leads to an estimated loss of 694,322 lives and $3.4 trillion globally every year (Walters et al., 2019). By reducing maternal and child morbidity and mortality, breastfeeding lowers healthcare costs to the community (Green et al., 2019). Not breastfeeding results in USD 14 billion in premature death costs, USD 1.3 billion in nonmedical costs, and USD 3 billion in medical costs globally each year (Walters et al., 2019). Almost 80% of these medical costs stem from maternal healthcare issues (Bartick et al., 2017).

Globally, an estimated $1.1 billion annually, spent on the treatment of childhood diarrhea and pneumonia and mother's type 2 diabetes, could be saved by adherence to breastfeeding recommendations (Walters et al., 2019). The economic burden of not breastfeeding equates to 0.49% of global gross domestic product; this estimation included acute and chronic disease healthcare costs (Rollins et al., 2016).

Breastfeeding can also save money at the economic level of the individual family unit (Green et al., 2019). Calculations using the global average price of economy brand formula estimated formula costs to be at least 6% of a household's annual wages (Walters et al., 2019).

### The Military Health System and TRICARE

The MHS is comprised of over 400 military-run health facilities around the globe (*Defense Health Agency*, 2022). The MHS is administered by the Defense Health Agency (DHA), which began to assume leadership of the MHS in 2018 (*Defense Health Agency*, 2022). The DHA employs almost 30,000 nurses (Aker, 2021).

TRICARE is the health care program for military members, retirees, and their beneficiaries (*About Us*, n.d.). Almost five million beneficiaries are enrolled in TRICARE Prime, the subset of TRICARE which mimics health maintenance organization (HMO) insurance plans (DHA, 2022). 3.3 million beneficiaries receive care at a military treatment facility (MTF); over 900,000 of TRICARE Prime beneficiaries receiving care at an MTF are dependents of active-duty military members, and over 725,000 are minor children (DHA, 2022).

Breastfeeding interventions can improve the health of many MHS clients and TRICARE beneficiaries. Seventeen percent of active-duty military members are female (Office of the Deputy Assistant Secretary of Defense for Military Community and Family Policy, n.d.). Over 90% of active-duty military spouses are female, and almost 48% are under the age of 30 (Office of the Deputy Assistant Secretary of Defense for Military Community and Family Policy, n.d.). Approximately 36% of active-duty military members have minor dependents; most active-duty military members with minor dependents have children under the age of five (Office of the Deputy Assistant Secretary of Defense for Military Community and Family Policy, n.d.).  In

fiscal year 2021, 105,448 children were born and enrolled into TRICARE, 31.2% of whom were born at an MTF (DHA, 2022).

Fifty-one percent of infants born between April 2019 and March 2020 were non-White (DHA, 2021). Based on this information, the MHS has the potential to effect great change in breastfeeding rates, which are lower among non-White, non-Asian populations in the United States; the lowest rates in 2019 were among non-Hispanic Black individuals (DNPAO, 2022b).

In a show of support for breastfeeding, TRICARE coverage for lactation support was expanded through a provisional alteration in coverage on January 1, 2022, with an end date of December 31, 2026 (Establishing a TRICARE Childbirth and Breastfeeding Support Demonstration, 2021). This provisional alteration includes coverage for up to six sessions with certified lactation consultants and certified lactation counselors at no extra cost to the beneficiary (Establishing a TRICARE Childbirth and Breastfeeding Support Demonstration, 2021). Coverage also includes group lactation support (Establishing a TRICARE Childbirth and Breastfeeding Support Demonstration, 2021). Beneficiaries do not need a referral from their primary care manager to receive lactation support services (*TRICARE Childbirth and Breastfeeding Support Demonstration Toolkit*, n.d.). The extended lactation support coverage is estimated to cost TRICARE $7.5 million dollars over the five years (Establishing a TRICARE Childbirth and Breastfeeding Support Demonstration, 2021).

**Problem Statement**

Breastfeeding rates in the U.S. and in many countries around the globe fall short of goals and recommendations made by health organizations (see Table A1; DNPAO, 2022a; Dubik et al., 2021; WHO, 2015). Breastfeeding is not just an individual choice at the level of the mother or even the family unit but is a decision influenced by structural determinants of health including

policy, availability and quality of support, and social and cultural factors (Gavine et al., 2022). In spite of overwhelming evidence indicating breastfeeding promotion is a cost-effective intervention which produces statistically meaningful improvements in breastfeeding rates worldwide, many countries, including the United States, have failed to implement evidence-based policies in support of breastfeeding success (UNICEF & WHO, 2022).

Despite the belief breastfeeding will come naturally to the breastfeeding mother and infant, dyads often experience lactation difficulties (Abbass-Dick et al., 2020; Brodribb et al., 2020). Barriers to breastfeeding result in discouragement, breastfeeding cessation, and maternal emotional distress (Gavine et al., 2022; McFadden et al., 2017). Common barriers to breastfeeding include lactation problems, nipple pain, cluster feeding, perceived hypolactation, and lack of trained lactation support providers (AL-Nuaimi et al., 2019; Chang et al., 2019; Kaur et al., 2017; NACCHO & USBC, 2021). Despite the low prevalence of true hypolactation, or insufficient milk supply, over 40% of mothers who weaned within two months after delivery cited hypolactation as the primary reason (Chang et al., 2019; Demirci et al., 2020; Kaur et al., 2017). Military families experience additional breastfeeding barriers and life stressors, including relocation during the prenatal or postpartum periods and deployment of the military spouse (Corry et al., 2021; Ringo & Gephart, 2022).

Barriers can be prevented or addressed through breastfeeding education (AL-Nuaimi et al., 2019; McFadden et al., 2017; Spatz, 2017). Many breastfeeding dyads rely on healthcare professionals to provide evidence-based breastfeeding education throughout their breastfeeding journey (Ranch et al., 2019; Ringo & Gephart, 2022). The Global Breastfeeding Collective (n.d.) endorses seven policy actions to promote breastfeeding; one of these actions is to "improve access to skilled breastfeeding counselling in health facilities." Provision of breastfeeding

education to mothers by trained nurses improves the rate of breastfeeding initiation and the

overall length of the breastfeeding relationship (AL-Nuaimi et al., 2019; McFadden et al., 2017;

Spatz, 2017).

Barriers can also be addressed through lactation support, which includes the following

facets: informational, emotional, self-efficacy, skill-based, and social (Bernaix, 2000; McFadden

et al., 2017; NACCHO & USBC, 2021). Effective professional support was a recurring theme

among breastfeeding civilian military wives who met their breastfeeding goals (Ringo &

Gephart, 2022).

Ideal breastfeeding support is required, regular, repeated, and predictable (McFadden et

al., 2017; NACCHO & USBC, 2021). However, much of the attention given to improving

breastfeeding support is aimed at inpatient-directed interventions, such as educating neonatal

intensive care unit (NICU) and mother-baby staff. While inpatient interventions improve

breastfeeding initiation rates, the breastfeeding dyad continues to need support after discharge

from the mother-baby unit or NICU (Abbass-Dick et al., 2020; Cashin et al., 2021; Moraes et al.,

2021; Ramos et al., 2019). Gaps in continuity of care and lack of outpatient lactation support

may explain the downward trend of breastfeeding rates after hospital discharge (DNPAO, 2022a;

NACCHO & USBC, 2021). Breastfeeding mothers indicate lower levels of satisfaction with

breastfeeding support after discharge from the maternity ward (Blixt et al., 2019). One mother

expressed her dissatisfaction with pediatric outpatient breastfeeding support, stating volunteer

breastfeeding support groups often provide better breastfeeding support than the healthcare

professionals (Blixt et al., 2019).

Across healthcare settings, women encounter a substandard quality of breastfeeding

support (Gavine et al., 2022). Only breastfeeding knowledge and attitude accurately predict

provision of support to the breastfeeding dyad (Bernaix, 2000). Though healthcare workers'

attitudes towards breastfeeding improved over the last 20 years, breastfeeding education for

healthcare workers remained stagnant (Koslo, 2020). Despite the U.S. Surgeon General Call to

Action in 2011, which encouraged and provided a blueprint for increased breastfeeding support,

healthcare provider education is still lacking; this leaves healthcare providers ill-equipped to

support the breastfeeding dyad (Koslo, 2020).

Outpatient pediatric nurses are unprepared to assist the breastfeeding dyad with

breastfeeding questions and obstacles (Ranch et al., 2019). Breastfeeding mothers may choose to

stop breastfeeding if they feel their healthcare providers are not supportive or able to assist them

(Ranch et al., 2019). A lack of breastfeeding knowledge among healthcare providers has been

repeatedly demonstrated in scientific literature (Bernaix, 2000; Farrag et al., 2019; McFadden et

al., 2017; Vilar-Compte et al., 2020). Undereducated healthcare professionals often incorrectly

recommend initiation of solid foods prior to 6 months of age, cessation of nocturnal

breastfeeding, weaning after 6 months of age, or unnecessary weaning due to mother's medical

treatments (Blixt et al., 2019; Green et al., 2019; Kinshella et al., 2021). This lack of

breastfeeding knowledge is not only detrimental to support provided to the breastfeeding dyad

but also harms the patient-provider relationship (Vilar-Compte et al., 2020). Inadequate support

and the damaged patient-provider relationship lead to early weaning (Vilar-Compte et al., 2020).

Nurses are integral to the support of the breastfeeding dyad but must first possess adequate

knowledge of evidence-based breastfeeding (McFadden et al., 2017).

The current medical culture is aimed at treatment instead of prevention of disease

(Levine, 2019). Thus, breastfeeding education and support are often omitted from healthcare

provider training programs, which leads to a dearth of breastfeeding knowledge and self-efficacy

among healthcare providers (AL-Nuaimi et al., 2019; Farrag et al., 2019; Prokop et al., 2021; Yilmazbaş et al., 2020). Pediatric and family medicine nurses have a monumental impact on breastfeeding rates and are an integral part of the breastfeeding support team (DNPAO, 2013; Farrag et al., 2019; Spatz, 2017). Educating healthcare workers on lactation improves breastfeeding rates, breastfeeding outcomes, and the quality of healthcare provided to the breastfeeding dyad (DNPAO, 2013; Farrag et al., 2019; Rollins et al., 2016).

Despite TRICARE's coverage for lactation support, data indicate beneficiary uptake is very low; in fiscal year 2020, less than 5% of eligible TRICARE beneficiaries used this benefit (Establishing a TRICARE Childbirth and Breastfeeding Support Demonstration, 2021). TRICARE only covers in-network, certified support providers, which may decrease uptake of lactation support by beneficiaries – many lactation support providers are certified instead of licensed and cannot bill insurance (Establishing a TRICARE Childbirth and Breastfeeding Support Demonstration, 2021). Integrating lactation support into existing health care provision for TRICARE beneficiaries may overcome these limitations.

**Purpose of the Project**

Wallace et al. (2018) proposed allocation of breastfeeding education resources to the practitioners most in need and suggested conducting a needs assessment to identify which individuals have the largest gaps in breastfeeding knowledge. The purpose of this project is to assess breastfeeding knowledge, attitude towards provision of lactation support, and intention to support the breastfeeding dyad among pediatric and family medicine nurses working in outpatient military health care facilities. Results from this needs assessment will demonstrate if an educational intervention about evidence-based breastfeeding is indicated in the studied population.

**Clinical Practice Question**

Do the knowledge, attitudes, and intentions of pediatric and family medicine outpatient military health system nurses indicate a readiness to support the breastfeeding dyad?

**Systematic Review of the Literature**

To answer the defined clinical practice question, multiple sub-inquiries must be addressed. Therefore, the questions that guided the literature review were:

- Do breastfeeding dyads require lactation support?

- Do breastfeeding mothers desire lactation support?

- Is lactation support provided by nurses effective at improving breastfeeding outcomes?

- Do nurses have appropriate breastfeeding knowledge and attitudes to support the breastfeeding dyad?

- Do nursing attitudes about breastfeeding affect the amount or quality of the breastfeeding support they provide? and

- Are educational interventions effective at improving breastfeeding knowledge and attitudes among nurses?

**Literature Search Strategies**

Engines and databases searched were CINAHL, PubMed, and Google Scholar. Search terms chosen were related to breastfeeding education for nurses and varied according to engine and database searched. Overarching concepts used to designate search terms were breastfeeding, education, nurse, and outpatient pediatrics. Figure 1 depicts search term variations by concept. This search included articles published between the years of 2017 and 2021 with full text available. I excluded articles without full text available or which were published prior to 2017. I

also excluded studies pertaining only to advanced practice providers (nurse practitioners,

physician assistants, midwives, and medical doctors) and studies focusing only on preterm infant

feeding. Duplicate articles were removed. Figure 2 depicts the search strategy and resulting

articles using the PRISMA flow chart template.

**Figure 1**

*Search Terms by Concept*

**Figure 2**

*Literature Search Strategy*



Figure 2. PRISMA flow diagram showing the literature search strategy.
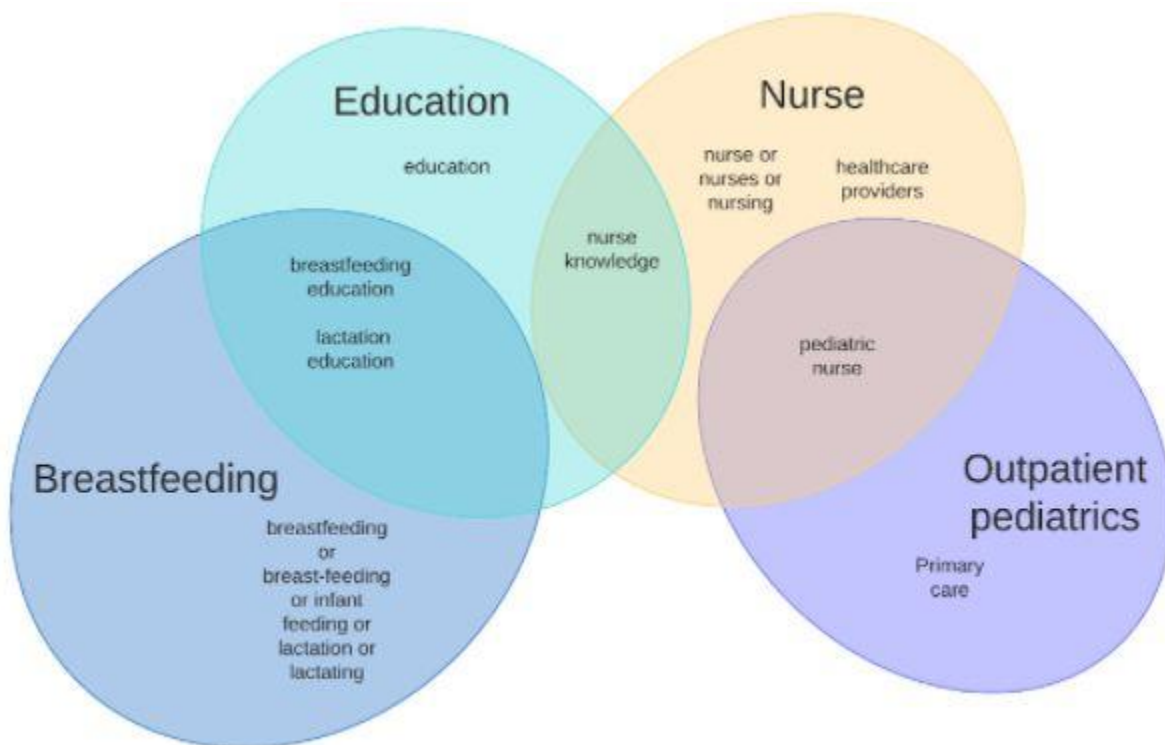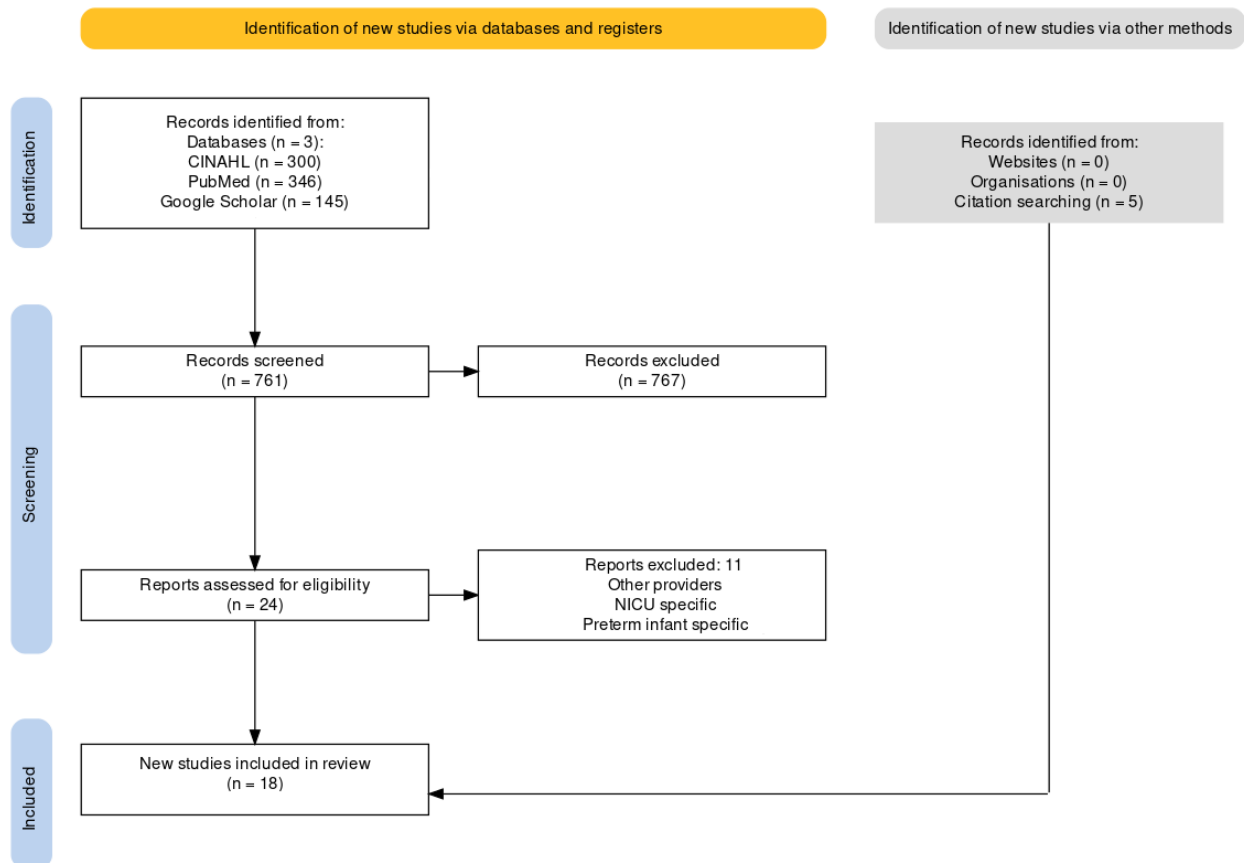
*Note.* Adapted from: Haddaway, N. R., Page, M. J., Pritchard, C. C., & McGuinness, L. A. (2022). PRISMA2020: An R package and Shiny app for producing PRISMA 2020-compliant flow diagrams, with interactivity for optimised digital transparency and Open Synthesis. *Campbell Systematic Reviews*, *18*(2), e1230. https://doi.org/10.1002/cl2.1230

## Literature Review

**Synthesis of Evidence by Themes**

Major themes arising from the literature review include:

- the role of healthcare providers in breastfeeding support and education,

- lack of healthcare provider breastfeeding knowledge,

- the success of educational interventions at increasing healthcare provider breastfeeding knowledge,

- healthcare provider attitudes towards breastfeeding impact intention and breastfeeding rates, and

- healthcare providers experience barriers to supporting the breastfeeding dyad.

### *Role of the Healthcare Provider in Breastfeeding Support and Education*

Both breastfeeding mothers and healthcare providers acknowledge the importance of healthcare provider involvement in a dyad's breastfeeding journey. Health facilities and community health workers are integral to maintaining continuity of care of the breastfeeding dyad (Hernández-Cordero & Pérez-Escamilla, 2022). Nurses believe providing breastfeeding education to mothers is an integral part of their scope of practice; 99.1% of participants surveyed indicated providing breastfeeding support to mothers falls within their responsibility (Dubik et al., 2021). Support from healthcare professionals was repeatedly cited by mothers as a protective factor for breastfeeding duration (Ringo & Gephart, 2022).

### *Healthcare Providers Lack Sufficient Breastfeeding Knowledge*

Additional breastfeeding education is needed to prepare the nurse to better support the breastfeeding journey (Prokop et al., 2021). Healthcare providers in general were undereducated

about evidence-based breastfeeding and were not prepared to assist the breastfeeding dyad with the prevention or treatment of common obstacles to breastfeeding (Farrag et al., 2019; McFadden et al., 2017; Vilar-Compte et al., 2020). One study specifically aimed at assessing breastfeeding knowledge of inpatient pediatric nurses found an average breastfeeding knowledge score of 26.8 (6.4) out of 50 total points (Farrag et al., 2019).

The lack of breastfeeding knowledge among pediatric nurses stemmed from both insufficient undergraduate breastfeeding education and a paucity of continuing education planning (Farrag et al., 2019). Many new-graduate nurses received little to no breastfeeding training as part of their pre-licensure education (AL-Nuaimi et al., 2019; Dubik et al., 2021; Farrag et al., 2019; Prokop et al., 2021; Yilmazbaş et al., 2020). Nurses were dissatisfied with the extent of breastfeeding education they received in nursing school, and many reported relying on personal breastfeeding experience when counseling the breastfeeding dyad (AL-Nuaimi et al., 2019; Dubik et al., 2021). New-graduate nurses attributed this gap in breastfeeding knowledge as the primary contributor to the distress they felt during situations in which they were expected to provide breastfeeding support to mothers (Prokop et al., 2021). However, even nurses with pre-licensure breastfeeding education may require continuing education to sustain adequate ability and knowledge to support the breastfeeding dyad (Farrag et al., 2019). Years of nursing experience did not correlate with breastfeeding knowledge, indicating continuing education as a necessary facet of improving breastfeeding support (Farrag et al., 2019). Approximately three quarters of nurses desired additional breastfeeding education to support their care of the breastfeeding dyad (AL-Nuaimi et al., 2019; Dubik et al., 2021; Yilmazbaş et al., 2020).

***Educational Interventions Produce Statistically Significant Knowledge Improvement***

Multiple studies (see Table A2) reported statistically significant improvement in breastfeeding knowledge after educational intervention, supporting the theory that breastfeeding education can improve nurses' knowledge about breastfeeding (AL-Nuaimi et al., 2019; Shackelford, 2021; Vilar-Compte et al., 2020; Wallace et al., 2018; Watkins et al., 2017). This is consistent with previous studies and a systematic review, which demonstrated a similar increase in breastfeeding knowledge after educational intervention (AL-Nuaimi et al., 2019; McFadden et al., 2017).

### Attitudes of Healthcare Providers Towards Breastfeeding

Breastfeeding outcomes directly correlated with healthcare provider knowledge and attitudes about evidence-based breastfeeding (Kinshella et al., 2021). Increased breastfeeding knowledge alone was not sufficient to change healthcare providers' behavior; participants' attitudes towards breastfeeding and intent to provide evidence-based breastfeeding support must also be evaluated (Watkins et al., 2017).

Attitudes toward breastfeeding can be affected by societal and cultural constructs and personal breastfeeding experiences (Prokop et al., 2021). Positive attitudes toward breastfeeding correlated with a higher likelihood the nurse will support the breastfeeding dyad (Kinshella et al., 2021; Prokop et al., 2021).

Breastfeeding education improved nurses' attitudes toward breastfeeding if attitudes were not already sufficiently high (Prokop et al., 2021; Watkins et al., 2017). In another study, however, data analysis did not demonstrate a statistically significant difference in attitude towards breastfeeding between the intervention group and the control group (AL-Nuaimi et al., 2019).

### Barriers to Breastfeeding Support by Healthcare Professionals

Healthcare providers' insufficient breastfeeding knowledge and lack of breastfeeding-related skills present a barrier to the support of the breastfeeding dyad (AL-Nuaimi et al., 2019; Watkins et al., 2017). This lack of support contributes to early weaning (Watkins et al., 2017). Undereducated healthcare providers did not provide evidence-based education to breastfeeding mothers and instead relied on their own experiential evidence instead of empirical evidence (AL-Nuaimi et al., 2019). Healthcare providers were not confident in their ability to support the breastfeeding dyad (AL-Nuaimi et al., 2019). This lack of confidence presented a barrier to effective breastfeeding support (AL-Nuaimi et al., 2019). The breastfeeding self-efficacy of nurses positively correlated with their scores on a breastfeeding knowledge assessment (Farrag et al., 2019).

Other barriers healthcare providers face when providing breastfeeding education to mothers include time constraints, heavy workloads, staffing shortages, unclear breastfeeding policies, inadequate dissemination of policies and procedures, lack of leadership support, and lack of resources (Dubik et al., 2021; Kinshella et al., 2021; Prokop et al., 2021). Over half of nurses surveyed identified time constraints as a barrier to provision of breastfeeding education during their shift (Kaur et al., 2017). Adequate staffing, clear policies and procedures, and good dissemination of information were identified as facilitators of improved breastfeeding outcomes (Kinshella et al., 2021).

**Discussion of the Literature**

While nurses believe supporting the breastfeeding dyad is within their scope of practice, most lack the adequate evidence-based breastfeeding knowledge to effectively provide breastfeeding support (AL-Nuaimi et al., 2019; Dubik et al., 2021; Farrag et al., 2019; Prokop et al., 2021; Yilmazbaş et al., 2020). This lack of knowledge is reflected in the research, which

indicates nurses are not adequately prepared to educate and support the breastfeeding dyad (Prokop et al., 2021). To facilitate breastfeeding support, healthcare providers must be educated on evidence-based breastfeeding (McFadden et al., 2017).

Positive attitudes towards breastfeeding at the level of the individual healthcare provider and at the system level positively impact breastfeeding outcomes (Kinshella et al., 2021; Prokop et al., 2021). These data indicate improvement of breastfeeding knowledge alone cannot induce a significant change in healthcare practice; facilities providing care to the breastfeeding dyad must follow breastfeeding-friendly principles (Watkins et al., 2017). On a systems level, adequate staffing and clear evidence-based breastfeeding policies facilitate provision of breastfeeding support by healthcare providers (Dubik et al., 2021; Kinshella et al., 2021; Prokop et al., 2021).

Breastfeeding outcomes must be improved for local and global financial and health reasons. Annual global financial burden due to low breastfeeding rates is estimated to be over USD $3 trillion (Walters et al., 2019).

### *Implications for Practice*

The global nature of the problem, demonstrated by the diverse settings of literature reviewed, calls for a worldwide change in the approach to supporting the breastfeeding dyad. The amount and quality of evidence support a recommendation to implement breastfeeding education for healthcare professionals, including nurses, to improve knowledge about and attitudes toward breastfeeding. Additional evidence suggests breastfeeding promotion interventions can be implemented at a relatively low cost with a high financial and social reward, resulting in a good return on investment (Pramono et al., 2021; Quesada et al., 2020).

Because the MHS experiences a high staff turnover rate, education efforts should be frequent and regular (Koslo, 2020; McFadden et al., 2017). Koslo (2020) proposed a MHS-

specific Evidence-Based Practice Guideline for breastfeeding education, which recommends MTF staff undergo yearly breastfeeding education.

To effect evidence-based change within a healthcare system, interventions must change policies, be supported in every layer of the organization, and include incentives for practice change (Watkins et al., 2017). Assessment of the breastfeeding education needs of pediatric and family medicine outpatient nurses working in military health care facilities is only the first step to developing an effective evidence-based change project to improve breastfeeding outcomes among families served by the MHS.

### *Limitations of the Evidence*

While much of the research on breastfeeding education and support is centered around inpatient care settings, all pediatric nurses play an integral role in supporting the breastfeeding dyad (Spatz, 2017). Many articles returned by the initial search strategy were specific to the education of NICU staff. Only one article reviewed was specific to the outpatient healthcare setting, despite the fact most of the breastfeeding journey for a healthy term infant occurs outside of an inpatient facility. This demonstrates a gap in the current research and scholarly knowledge. The breastfeeding dyad requires continued support after discharge from the inpatient setting, and further research should be conducted to determine the effect of breastfeeding education for outpatient healthcare providers on breastfeeding outcomes of their patients (Hernández-Cordero & Pérez-Escamilla, 2022). This project seeks to add to the body of research on outpatient nurses' breastfeeding knowledge, attitudes, and intentions.

## Conceptual and Theoretical Framework

The DNP-prepared nurse must employ evidence-based theories and concepts from both nursing and other disciplines, such as a conceptual framework, to establish and assess

approaches to healthcare (American Association of Colleges of Nursing, 2006). Prior to developing and executing an intervention to effect change in an organization, the DNP-prepared nurse should identify a conceptual framework to assist in planning an efficacious intervention. A conceptual framework is a methodically organized set of concepts intended to aid in the assimilation and explanation of information (Moran et al., 2016). One such conceptual framework is the Donabedian model, which assists the DNP-prepared nurse or student nurse in the determination of all the concepts which influence a project's structure, process, and outcome (Moran et al., 2016). The Donabedian model seeks to measure healthcare quality (Donabedian, 1988b).

**The Donabedian Model**

Health care quality is frequently discussed but can be difficult to define (Donabedian, 1988a). Quality in health care is the ability to meet health status goals and relates to how well services improve health outcomes (Donabedian, 1988a; Moran et al., 2016). The DNP-prepared nurse is obligated to develop and execute quality improvement interventions on both local and more widespread organizational levels (American Association of Colleges of Nursing, 2006).

The Donabedian framework applies the rigor of objective science to standards of healthcare quality, separating the quality of healthcare from political, religious, or social ideologies (Berwick & Fox, 2016, p. 238). Healthcare quality information can be inferred through structure, process, and outcome (Donabedian, 1988b). Quality assessment can be conducted by indirectly appraising how care is provided (process) via examination of the attributes of the healthcare environment (structure) and the measurable consequences of healthcare on the patient or population (outcome; Donabedian, 1988b).

**Application to Project**

As this project involves evaluation of the need for an educational intervention to improve the quality of breastfeeding education given by nurses in military outpatient clinics, the Donabedian model (see Figure A1) is an appropriate choice. The Donabedian model has been previously applied to the development of an interprofessional education program in a health science faculty based on the model's simplicity and flexibility (Botma & Labuschagne, 2019).

### *Structure*

The structure aspect of the Donabedian model refers to the availability and allocation of healthcare resources (Munea et al., 2020). When considering project development, the structure encompasses the prerequisites for the project (Barrere et al., 2010). The structure of a project may include the research setting, stakeholders and other involved parties, needs assessments, educational tools, evaluation tools, timelines and schedules, and human knowledge (Barrere et al., 2010; Donabedian, 1988b).

Achievement of health outcomes requires good structure and process (Donabedian, 1988b). Analysis of existing structure is necessary to improve health care quality. No research exists on breastfeeding knowledge in the MHS nursing population. Thus, the first step of improving the quality of lactation support provided within the MHS involves conducting a needs assessment evaluating the preparedness of outpatient MHS nurses to support the breastfeeding dyad.

Evaluation of healthcare quality must involve precise, defined, evidence-based benchmarks, which can be classified as either implicit or explicit (Donabedian, 1988a, 1988b). This study relies on explicit criteria derived from validated tools used to evaluate the breastfeeding knowledge, attitude, and intention of military outpatient nurses caring for the breastfeeding dyad (Abbass-Dick et al., 2020; Bernaix, 2000).

*Process and Outcome*

Future scholarship may involve application of the process and outcome facets of the

Donabedian model to the issue of breastfeeding education for nurses. Work in support of

improving breastfeeding rates among TRICARE beneficiaries may include advocacy within the

MHS to encourage standardized lactation education for all outpatient nurses. Additionally, future

research should include more comprehensive data collection on breastfeeding rates of TRICARE

beneficiaries.

## Project Design

This project was a needs assessment conducted via an online survey.

## Methodology

The purpose of this project is to assess breastfeeding knowledge and attitudes among

pediatric and family medicine nurses working in outpatient military health system facilities.

Results from this needs assessment will demonstrate if an educational intervention on evidence-

based breastfeeding is indicated in the studied population.

### Population

The target population for my project was nurses working in outpatient MHS facilities

who provide care to the breastfeeding dyad. Inclusion criteria for participation in the survey

were:

- a registered nurse (RN) or licensed practical nurse (LPN);

- English-speaking;

- employed in a military outpatient pediatric or family medicine clinic within the

    last 12 months; and

- responsible for outpatient care of the breastfeeding dyad, which for the purpose of this project was breastfeeding mothers and breastfed infants or toddlers under 24 months of age.

## Sample Size

For my project, the goal for total number of subjects was 100 participants. Recruitment yielded only 26 survey responses, 14 of which were complete and appropriate for inclusion in data analysis based on inclusion criteria.

## Sampling Method

The sampling method for this project was snowball sampling (Kim et al., 2022). Participation was voluntary, and participants self-selected through the survey link. The target number of participants for this project was 100 with a maximum number of 150. The final sample size for data analysis was 14 individuals.

## Setting

The setting for this project was online with no direct contact with participants. I conducted the needs assessment via an anonymous Qualtrics survey. The MHS is comprised of over 400 military-run health facilities around the globe (*Defense Health Agency*, 2022). The online nature of this project was intended to reach a more diverse cross-section of nurses working in the MHS instead of limiting the sample to nurses from only one healthcare facility within the MHS.

## Recruitment

I conducted recruitment for this project online via snowball sampling, primarily through social media, through which my contacts and potential study participants were used to recruit eligible participants for the study.

I initially disseminated the survey in Facebook groups for military spouses and nurses working in military hospitals and clinics, asking members to share the survey link in other military-adjacent Facebook groups and with their personal contacts to increase the reach of the needs assessment.

The initial recruitment strategy yielded no valid responses. Considering this, I amended my recruitment strategy to include direct interaction with personal contacts who may qualify for participation or may know potential participants. The expanded recruitment strategy resulted in survey participants (see Figure A2). However, the number of participants remained significantly lower than expected. Due to the low number of survey respondents, I again amended my recruitment strategy to include direct contact with MHS facilities, requesting dissemination of survey information to their employees, and a flyer to replace or supplement the written recruitment script.

**Instrument**

To evaluate MHS outpatient nurses' readiness to support the breastfeeding dyad, I assessed their breastfeeding knowledge, attitude towards provision of lactation support, and intention to support the breastfeeding dyad. The instrument used for evaluation is composed of two separate tools, one measuring knowledge and the other measuring attitude and intention (Abbass-Dick et al., 2020; Bernaix, 2000). The combined final questionnaire consisted of 39 questions. This questionnaire was estimated to take participants approximately 10 minutes but no more than 15 minutes to complete.

*Knowledge*

I collected data on nurses' breastfeeding knowledge using the Comprehensive Breastfeeding Knowledge Scale (CBKS) tool developed by Abbass-Dick et al. (2020).

Permission to use the CBKS tool for my project was granted by Dr. Abbass-Dick (J. Abbass-Dick, personal communication, April 22, 2022). Per the CBKS use agreement, no alterations were made to the scale for use in this project aside from approved adjustment of regionally specific language referring to pacifiers (J. Abbass-Dick, personal communication, April 22, 2022).

The CBKS, consisting of 28 questions about breastfeeding, was originally developed for assessment of mothers' breastfeeding knowledge and has been validated in mothers. Although many breastfeeding knowledge assessment tools exist, few of these measures include a theoretical framework and predictive validity data or have their scientific basis in the Baby Friendly Hospital Initiative (Abbass-Dick et al., 2020). The CBKS was developed using previously validated breastfeeding knowledge tools and breastfeeding content domains recommended by the Baby Friendly Hospital Initiative in Step 3 and Step 5 (Abbass-Dick et al., 2020).

All CBKS questions are a three-point Likert scale format where the three options are *agree*, *unsure*, and *disagree* (Abbass-Dick et al., 2020). Scoring of the CBKS consists of assigning numerical values to the Likert scale options, with 3 = *agree*, 2 = *unsure*, and 1 = *disagree* (Abbass-Dick et al., 2020). The *unsure* option was included by Abbass-Dick et al. (2020) to reduce the likelihood of guessing the correct answer. Of the 28 scale questions, 7 are reverse scored, as the correct answer is *disagree*; for the remaining 21 questions, the correct answer is *agree* (Abbass-Dick et al., 2020). A higher CBKS score indicates more breastfeeding knowledge (Abbass-Dick et al., 2020).

The CBKS has a Cronbach's alpha of .83 for the tool in its entirety, indicating reasonable internal consistency (Abbass-Dick et al., 2020; Tavakol & Dennick, 2011). The CBKS contains

three subscales, each assessing a different construct (Abbass-Dick et al., 2020). The three

subscales are: managing milk supply, which consists of seven items (Cronbach's α = .63);

persisting through challenges, which consists of ten items (Cronbach's α = .68); and correcting

misconceptions, which consists of 11 items (Cronbach's α = .72; Abbass-Dick et al., 2020).

External validity for the CBKS is demonstrated by comparison with previously validated

breastfeeding knowledge assessment tools (Abbass-Dick et al., 2020).

### *Attitude and Intention*

I evaluated MHS nurses' attitudes towards breastfeeding and intention to support the

breastfeeding dyad using subscales from the Nurses' Support for Breastfeeding Questionnaire

(NSBQ) developed by Bernaix (2000). The NSBQ subscales have been individually validated in

nurses (Bernaix, 2000). Permission to use this tool was granted by Dr. Bernaix (L. Bernaix,

personal communication, February 3, 2022). For use in this project, the NSBQ subscales were

altered only to omit the qualifier "NICU" throughout the scale to adapt the subscales for use in

an outpatient nursing population.

According to the theory of reasoned action, used in the development of the NSBQ,

intention determines actions, and attitudes affect intention (Bernaix, 2000). The significance of

attitudes and intention in predicting the support a healthcare worker will provide to the

breastfeeding dyad necessitates inclusion of these variables in the assessment of readiness of

MHS nurses to support their patients' breastfeeding journeys.

The NSBQ intention subscale consists of three questions (Cronbach's α = .93), while the

attitude subscale consists of 8 items (Cronbach's α = .75; Bernaix, 2000). Prior to answering

intention questions, participants read a short paragraph defining breastfeeding support and the

acknowledgement that the ideal breastfeeding support definition is not feasible for all nurses in

all situations (Bernaix, 2000). All questions are answered on a seven-point Likert scale (Bernaix, 2000). The intention subscale is scored between 3 and 21, with lower scores indicating weaker intention to support the breastfeeding dyad (Bernaix, 2000). For the attitude subscale, each of the 8 items is scored from -3 to +3, yielding a range of -24 to +24, with negative scores indicating a negative attitude toward providing support to the breastfeeding dyad and positive scores indicating a positive attitude toward providing support to the breastfeeding dyad (Bernaix, 2000).

**Other Measures**

In addition to the combined tool assessing knowledge, attitude, and intentions, the survey included a demographic questionnaire (see Appendix B) assessing nursing experience, amount and quality of prior personal breastfeeding experience, primary clinical assignment and role, and education level and licensure. These data were collected to allow for evaluation of any correlations between demographics and level of breastfeeding knowledge.

**Data Collection**

Data was gathered and contained in Qualtrics, which is secure (*Security Statement*, 2022). Qualtrics employs firewalls, Transport Layer Security (TLS) encryption, and password-protection and is FedRamp authorized, meaning it complies with U.S. government security standards (*Security Statement*, 2022). As an additional measure, no identifying data was collected for this study. The compiled research tool was loaded into Qualtrics as an electronic survey, and dissemination of the survey occurred from August 2, 2022, to December 6, 2022.

**Data Cleaning**

A total of 26 responses were captured by the Qualtrics survey. However, not all 26 results were appropriate for data analysis.

***Incomplete Responses***

Six (23.1%) of the 26 respondents were deemed ineligible for participation due to incomplete surveys. Three of the respondents did not complete any items after the consent. Three of the respondents completed the demographics questionnaire but did not complete any of the knowledge, attitudes, or intentions assessment tool.

### Ineligible Participants

Five (19.2%) of the 26 respondents were deemed ineligible for participation after completion of the entire questionnaire. Three of these respondents indicated they do not provide care to the breastfeeding dyad. Another respondent indicated their primary work function was as a certified nurse midwife, and another indicated their primary role at work was as an emergency department provider. Because eligibility to participate included only nurses working in pediatric or family medicine outpatient clinics, these responses were not included in data analysis.

### Eligible Participants

After data cleaning, 14 (53.8%) of the 26 respondents were deemed appropriate for inclusion in data analysis (see Figure A3).

## Data Analysis

For data analysis, I enlisted the help of Dr. Farrell, a statistician, with whom I planned the data analysis. I also received support from my DNP committee, Dr. Marcus and Dr. Bates. Analysis focused on describing the sample then addressing the clinical question to determine if nurses working in military outpatient clinics had adequate breastfeeding knowledge, appropriate attitudes, and intention to provide support to the breastfeeding dyad as well as to assess for any significant correlations between demographic variables and knowledge, attitudes, and intentions.

Descriptive statistics including means and standard deviations, medians and interquartile ranges (IQR), frequencies, percentages, kurtosis, and skew for the sample data (see Table A3)

were conducted with IBM SPSS (Version 28). I recoded categorical demographic variables into

dichotomous variables. I categorized age according to decade and years of experience according

to Benner's Novice to Expert model as conceptualized by Ozdemir (2019). Total breastfeeding

knowledge reported is the sum of all 28 items of the CBKS scale. Scores reported for subscales

managing milk supply, persisting through challenges, and correcting misconceptions are the sum

of the items comprising said subscale.

### *Statistical Tests*

As most of the data distributions violated assumptions of normalcy, I analyzed the data

using nonparametric tests (Kim et al., 2022). I used the Mann-Whitney test to assess differences

in knowledge, attitudes, and intentions between two independent groups. To assess the

correlation between variables, I calculated Kendall's tau correlation coefficient. Finally, I

calculated Cronbach's alpha for each scale, including subscales.

## Results

The purpose of this project was to assess breastfeeding knowledge, attitudes, and

intention among pediatric and family medicine nurses working in outpatient military health care

facilities. Data gathered from this needs assessment determined the baseline level of

breastfeeding knowledge as well as attitudes and intentions on providing lactation support to the

breastfeeding dyad.

## Sample Characteristics

The sample included 14 nurses (see Table A4). The majority were licensed as registered

nurses. Most of the respondents had at least five years of experience as a nurse. Approximately

43% had obtained a graduate degree. Three of the nurses were advanced practice nurses; two of

these function as a prescribing provider in their clinics. One of the respondents was an

International Board-Certified Lactation Consultant (IBCLC). The sample was approximately

evenly distributed between pediatrics and family medicine nurses as well as whether the

respondent had personal breastfeeding experience. Of those indicating personal breastfeeding

experience, the majority viewed that experience as positive. Only 6 respondents (42.9%)

indicated age. Three of the four LPN respondents chose "other" for degree. All APRNs reported

concurrent RN and APRN licensure.

**Breastfeeding Knowledge**

I used the CBKS to measure breastfeeding knowledge. Total knowledge scores ranged

from 68 to 84, with a median of 77 and an IQR of 9.3 (See Table 1). Three nurses scored the

maximum of 84; one of these nurses was the IBCLC. Scores for the subscale maintaining milk

supply ranged from 16 to 21, with four nurses scoring the maximum of 21. Scores for the

subscale persisting through challenges ranged from 23 to 30, with five nurses scoring the

maximum of 30. Scores for the correcting misconceptions subscale ranged from 25 to 33, with

five nurses scoring the maximum of 33. CBKS items related to maternal health and infant

feeding timing and mechanics had the lowest numbers of correct answers (see Table A5).

**Table 1**

*Knowledge, Attitudes, and Intentions Scores of Outpatient MHS Nurses*

| Scale | Median (IQR) | Scale Range |
|---|---|---|
| Knowledge | 77 (9.3) | 28 to 84 |
| Subscale: Managing milk supply | 19 (2.0) | 7 to 21 |
| Subscale: Persisting through challenges | 27.5 (6.0) | 10 to 30 |
| Subscale: Correcting misconceptions | 32 (5.0) | 11 to 33 |
| Attitudes | 19 (7.5) | -24 to 24 |
| Intentions | 16 (6.0) | 3 to 21 |

**Attitudes and Intentions**

I used subscales of the NSBQ to measure attitudes and intentions. Attitude scores ranged from 6 to 24, with a median of 19 (7.5), indicating a positive attitude toward providing lactation support (see Figure A4). The items with the greatest variance were those asking the nurses to indicate whether providing lactation support was *necessary* or *unnecessary*, followed by the items asking the nurses to discriminate between *pleasant* and *unpleasant*, *over-emphasized* and *underemphasized*, and *energizing* or *tiring*.

Intention scores ranged from 7 to 21, with a median of 16 (6), indicating a moderately strong intention to support the breastfeeding dyad (see Figure A5). One participant's responses indicated a weak intention (score of 7) to support the breastfeeding dyad; this is an outlier. Of the three items on the intention subscale, intention to provide technical support had the lowest

median and highest variance, Mdn = 5, IQR = 3.3, $s^2$ = 3.3. Intention to provide emotional support had the lowest variance.

**Associations Between Variables**

Few significant associations exist between variables (see Table A6). All CBKS subscales positively correlated with the CBKS total scale and each other due to the recursive nature of the scoring for these scales. Attitude and intention are positively correlated ($\tau_b$ = .43, $p$ = .042). Neither attitude nor intention were significantly associated with nurses' breastfeeding knowledge.

Nurses holding an RN license demonstrated higher knowledge for the CBKS scale as a whole and for all three subscales than did nurses holding an LPN license. This difference in knowledge was only statistically significant for total knowledge and the correcting misconceptions subscale (see Table A7). No significant difference in knowledge, attitude, or intention exists between nurses with and without advanced licensure or certification (see Table A8). No significant association exists between primary clinic assignment and knowledge, attitude, or intention (see Table A9).

Nurses' level of personal breastfeeding experience was not associated with higher knowledge, attitude, or intention scores (see Table A10). However, the quality of nurses' personal breastfeeding experience was associated with knowledge scores (see Table A11). Of the nurses reporting personal breastfeeding experience, those who rated their breastfeeding experience as positive demonstrated higher scores on total knowledge and the managing milk supply subscale, $z$ = -2.26, $p$ = .024, $r$ = -.80 and $z$ = -2.15, $p$ = .031, $r$ = -.57, respectively. Additionally, nurses reporting no personal breastfeeding experience demonstrated higher scores

on the managing milk supply subscale than did nurses reporting neutral personal breastfeeding experiences, $z = -2.00$, $p = .046$, $r = -.67$ (see Table A12).

**Comparison with Mothers' Knowledge**

To assess adequacy of MHS nurses' knowledge, I compared results from this study with data reported in the psychometric validation study of the CBKS tool, which looked at breastfeeding knowledge of mothers at four and 12 weeks postpartum (Abbass-Dick et al., 2020). In comparison with mothers surveyed with the CBKS, MHS nurses' knowledge differs statistically only from mothers not exclusively breastfeeding at four weeks postpartum, $t(46) = 2.3$, $p = .026$ (Abbass-Dick et al., 2020). Nurses' knowledge was not significantly higher at 12 weeks postpartum or if the dyad was exclusively breastfeeding (Abbass-Dick et al., 2020).

**Psychometric Analysis of Scales**

The CBKS, persisting through challenges subscale, and intentions subscales demonstrated reasonable reliability when calculated for this sample (see Table A13).

<div align="center">

**Discussion**

</div>

This project aimed to evaluate the adequacy of outpatient military health system (MHS) nurses' knowledge, attitudes, and intentions regarding breastfeeding. To achieve this aim, the study assessed the nurses' level of breastfeeding knowledge and their attitudes and intentions toward provision of lactation support. Additionally, data analysis looked at interactions or correlations between breastfeeding knowledge, attitudes, and intentions. The study also sought to determine adequacy of the nurses' knowledge, attitudes, and intentions regarding breastfeeding.

The data suggest outpatient pediatric and family medicine MHS nurses have a strong understanding of breastfeeding, a positive attitude toward provision of lactation support, and a moderately strong intention to support the breastfeeding dyad. However, comparison of MHS

nurses' CBKS scores with mothers' knowledge indicates a need for additional breastfeeding education in this population. Data analysis identifies nurse licensure and personal breastfeeding experience as factors correlating with breastfeeding knowledge.

**Sample Representativeness**

Data on the demographic makeup of the MHS nursing workforce is scarce. As of May, 2021, the military employed approximately 30,000 nurses (Aker, 2021). Although demographic data on this population is not available on a larger scale, a recent study in one MHS facility found 89% of nurses sampled were registered nurses (House et al., 2022). Registered nurses made up the majority (71%) of the sample for this project as well, indicating the data may be representative for MHS nurse licensure. Other facets of representativeness cannot be addressed due to the lack of demographic data for the MHS nurse population.

**Levels of Knowledge, Attitudes, and Intentions of MHS Nurses**

Overall, MHS nurses' CBKS scores and NSBQ subscale scores were high. Although nurses demonstrated a generally positive attitude towards provision of lactation support to the breastfeeding dyad, substantial variance existed for four of the eight attitude subscale items. This is consistent with the psychometric validation study of the NSBQ instrument, which indicated the largest variance in the same items. Bernaix (2000) also noted large variance in the item asking nurses to indicate whether providing lactation support was embarrassing or not embarrassing; this was not seen in the sample of MHS nurses.

While the small sample size limits generalizability of the results, it is interesting to note the relative lack of knowledge nurses have regarding maternal breastfeeding concepts. Breastfeeding is generally considered to be the purview of pediatric medicine despite evidence of the impact lactation has on maternal health and health care costs in the United States (Bartick et

al., 2017). Nurses should be educated on breastfeeding topics relating to care of the infant as well as benefits for the lactating parent.

One of the CBKS items deals with use of artificial nipples and pacifiers and the belief that using these in a breastfed infant might alter the baby's latch and adversely affect breastfeeding rates. CBKS calls for the item to be scored as correct if participants agree with the claim artificial nipples may alter the infant's latch (Abbass-Dick et al., 2020). However, more recent research indicates pacifiers may not have a deleterious effect on breastfeeding rates as previously believed (Tolppola et al., 2022). Future research could involve requesting permission to perform psychometric testing on the CBKS tool without this item to evaluate its validity with updated medical knowledge.

**Significant Variable Correlations and Associations**

The factors associated with higher levels of knowledge include holding an RN license and having positive personal breastfeeding experience. Nurses reporting neutral feelings towards their own personal breastfeeding experience scored lower on knowledge scales than nurses reporting positive feelings about their personal breastfeeding experience. This association does not demonstrate causality and may indicate that higher levels of knowledge contribute to positive breastfeeding experiences or that positive breastfeeding experiences result in higher levels of knowledge. A surprising finding was the higher level of knowledge between nurses with no personal breastfeeding experience compared with nurses reporting neutral personal breastfeeding experience. As knowledge is a determinant of support quality, managers and nurses should be aware of this trend (Bernaix, 2000).

MHS nurses' attitudes toward provision of lactation support correlate with their intention to provide lactation support to the breastfeeding dyad. This is consistent with findings from other research studies (Bernaix, 2000).

**Adequacy of MHS Nurses' Knowledge, Attitudes, and Intentions**

The quality of lactation support provided by nurses is determined by knowledge and attitude (Bernaix, 2000). MHS nurses demonstrated positive attitudes toward provision of lactation support, and moderately strong intentions to support the breastfeeding dyad, indicating an ability to provide quality support.

MHS nurses also demonstrated high levels of breastfeeding knowledge. However, the CBKS instrument does not provide a cutoff for determination of adequate knowledge. Other studies offer cutoffs for categorizing levels of knowledge, but these rely on percentages (Weshahy et al., 2019). The CBKS is a Likert scale instrument and is not scored as a percentage. Thus, determination of adequacy of knowledge for the purpose of this project relies on comparison to the knowledge of mothers, to whom the support will be provided, and other nurses, to determine relative competency.

*Comparison with Mothers' Knowledge*

MHS nurses demonstrated higher levels of knowledge only in comparison with mothers not exclusively breastfeeding at four weeks postpartum. Thus, MHS nurses can likely provide adequate lactation support to the breastfeeding dyad at this time period if the dyad is not practicing exclusive breastfeeding. Research demonstrates nurses' breastfeeding knowledge predicts nurses' supportive behavior; thus, MHS nurses may not possess the knowledge necessary to provide effective lactation support to mothers of older breastfeeding children or to dyads practicing exclusive breastfeeding (Bernaix, 2000; Blixt et al., 2019).

*Comparison with Knowledge of Other Nurses*

To allow for comparison of data from different scales, all raw scores were converted into percentages based on the number of correct answers. Due to this, inferences based on this data must be made with caution. Figure A6 depicts percentages in relationship to CBKS responses. In comparison with data from other studies involving nurses, MHS nurses demonstrate a relatively high level of breastfeeding knowledge (See Table A14).

**Psychometric Analysis**

In this study, the CBKS tool demonstrated reasonable internal consistency. However, the managing milk supply subscale demonstrated poor internal consistency. This differs from findings in the original validation study for the CBKS tool, in which all Cronbach's alpha values were greater than 0.6 (Abbass-Dick et al., 2020). Like in the original validation study for the NSBQ tool, the attitude and intention subscales demonstrated reasonable internal consistency (Bernaix, 2000).

**Strengths of the Research**

One strength of this study is the scope was well-defined. The survey methodology used was cost-effective, reliable, and allowed for recruitment from more than one MHS facility (DeCarlo, 2018). Use of previously validated research instruments was also a strength of the project.

Retention of study participants was high. Seventy-five percent of consenting participants completed the entire Qualtrics survey. This is likely due to the brief nature of the survey, which was estimated to require approximately 10 minutes of participants' time for completion, along with clear communication in the recruitment script regarding expected time commitment and

requirements (Surdam et al., 2020). Due to the anonymous nature of the survey, no data is

available on reasons for incomplete surveys.

The contribution of this study to the research gap in the outpatient and military health

system populations is a strength of the research.

**Limitations of the Research**

Limitations of this study include lack of time, budget constraints, and recruitment

difficulties leading to a small, skewed sample. The short time frame of this thesis project made

sampling through official MHS channels prohibitive and may have reduced the sample size.

Budgetary constraints limited access to full-text articles for the literature review and precluded

incentives for research participation, which likely reduced the number of participants (Bethel et

al., 2021; Surdam et al., 2020).

The demographic survey did not ask source of breastfeeding knowledge, making it

difficult to provide recommendations for improvement of training within the MHS. Additionally,

the demographic data questionnaire did not ascertain factors which may have been important in

data analysis, including gender, active-duty status, and military branch of employment. Absence

of these data limits the ability to determine representativeness of the study sample. Recruitment

methods employed may also have presented a selection bias wherein individuals with stronger

opinions about breastfeeding were more likely to participate in the study.

*Barriers to Recruitment*

Recruitment barriers posed a significant limitation for this study. Study recruitment

yielded fewer survey participants than anticipated. The resulting small sample size limits

generalizability of the study results to the outpatient MHS nursing population.

The low survey response number may be partially due to survey fatigue, which has been documented in the target population (Bethel et al., 2021). Nurses are frequently asked to participate in surveys at work and thus may be less likely to take part in optional research surveys (Bethel et al., 2021). Factors correlated with improved recruitment of survey participants include perceived reward and salience to the individual (Bethel et al., 2021). Additionally, my target population of outpatient pediatric and family medicine nurses may not have perceived the survey as pertinent to nursing practice (Bethel et al., 2021).

Facebook group recruitment is the most effective social media recruitment modality (Bethel et al., 2021). However, response rates for research using Facebook recruitment can be as low as 2.5% or as high as 80% (Reagan et al., 2019). For this study, Facebook group recruitment posed several barriers to dissemination. Many Facebook groups have rules prohibiting soliciting, which can include research survey recruitment (Bethel et al., 2021). Many groups permitting study recruitment require permission from group administrators, which involves direct messaging administrators with information on the research being conducted (Bethel et al., 2021). Due to Facebook's messaging algorithms, messages received from individuals with whom you are not friends are sorted into a folder separate from the message inbox; these messages may not trigger a notification and thus may be overlooked by the group administrators (Meta, n.d.).

Another potential barrier to recruitment may be the length of the recruitment script. Long social media posts and posts with long sentences are less likely to get "likes" (Deng et al., 2021). For this reason, I developed a visual aid for survey dissemination after text-based recruitment strategies did not yield a satisfactory number of respondents. This visual aid was approved with the second IRB amendment (see Appendix C).

An investigator's passion for a research study positively affects recruitment strategy effectiveness (Raymond et al., 2018). While online dissemination techniques may cast a wider net for potential participants, these methods reduce the interpersonal qualities important for survey recruitment (Raymond et al., 2018). Due to the formality of the recruitment script, my enthusiasm for this project may not have been effectively communicated (Raymond et al., 2018). The formal verbiage of the IRB-approved Facebook post coupled with recruitment of people who do not know the study investigators may also have contributed to the small sample size.

Participation may have been increased by researching evidence-based social media recruitment techniques prior to IRB approval. Facebook recruitment posts should include: images or videos of the principal investigator; a description of salience to target population; information on rewards of participation, which may include benefits to the nursing profession; a call for viewers to interact with the post to keep it high in the group feed; frequent posting within groups; and analysis of the best time of day to post within the group (Bethel et al., 2021). My recruitment plan included none of these strategies, which may have contributed to the low yield.

Bethel et al. (2021) were unable to report time cost of social media recruitment due to lack of data. Recruitment for this study involved a significant time cost and multiple IRB amendments.

**Recommendations and Practice Implications**

***Recommendations for MHS Provision of Breastfeeding Support***

Breastfeeding is an important facet of military community health with benefits to the military and should be viewed as a way to improve the health of individual servicemembers, their families, and the military (Abbott et al., 2019). Although Abbott et al. (2019) discussed only breastfeeding practices of active-duty servicewomen, the concept of breastfeeding as a

component of military health can be extrapolated to all TRICARE beneficiaries, both in the

support of a medically ready force and in decreased cost of healthcare to the United States

Government. Research indicates family stressors can negatively impact readiness of the force,

and spouse perception of military service affects service member retention, further supporting

extensive provision of lactation support to all TRICARE beneficiaries (Kizer & Le Menestrel,

2019).

The MHS has a unique opportunity to provide seamless, coordinated lactation support to

beneficiaries. The integral principles of follow-up, accountability, and warm hand-offs

championed by NACCHO should be more feasible within a self-contained medical care system

such as the MHS (NACCHO & USBC, 2021). The MHS also has an advantage for continuity of

care in lactation support in that information continuity, or how patient information travels

throughout the health care system, is inherent within the MHS due to the current rollout of one

electronic medical record for all MHS facilities (*Genesis of MHS GENESIS*, n.d.; NACCHO &

USBC, 2021). As of September, 2022, MHS Genesis was live in 67% of MTF Commands

(*Genesis of MHS GENESIS*, n.d.).

According to the Evaluation of the TRICARE Program report for fiscal year 2021,

obstetric care patient satisfaction suffered due to a lack of lactation consultants (DHA, 2021).

Clients receiving evidence-based counseling regarding lactation are more likely to report

exclusive breastfeeding for the first six months (Epstein et al., 2019; McFadden et al., 2017).

Healthcare providers' provision of evidence-based counseling to clients correlates with the

providers' knowledge (Bernaix, 2000; Epstein et al., 2019). This emphasizes the need for

knowledgeable healthcare professionals for effective breastfeeding promotion interventions, as

simply offering emotional encouragement may not be sufficient to improve breastfeeding rates.

Nurses providing care to one or both members of the breastfeeding dyad should receive regular, ongoing breastfeeding education and training, at least yearly (Kaur et al., 2017). Breastfeeding rates, however, may not improve with education-only interventions, underscoring the need for breastfeeding support to provide both informational and emotional care (Brockway et al., 2017).

Breastfeeding support can be offered through multiple modalities and over different periods of time; however, the most efficacious method of improving breastfeeding rates is timely provision of skilled support (McFadden et al., 2017). Face-to-face support may be more effective than telephone-based support (McFadden et al., 2017). Support interventions with between four and eight points of contact may be more effective than interventions with fewer opportunities to provide support (McFadden et al., 2017). This is consistent with other research indicating breastfeeding promotion interventions with multiple contact points had a greater effect on maternal breastfeeding self-efficacy than did single-contact interventions (Brockway et al., 2017).

Effective lactation support for the breastfeeding dyad embodies the following characteristics (McFadden et al., 2017):

- Offered as standard care (antenatal or postnatal)

- Conducted by trained personnel

- Consists of multiple, ongoing points of contact that are scheduled and predictable

- Contacts are face-to-face visits

- Accounts for individual or group needs

Inclusion of breastfeeding support into routine medical care, such as standing primary care visits, is a potential method to improve breastfeeding outcomes and thus reduce breastfeeding-related health disparities (Prokop et al., 2021). One means of providing

predictable, scheduled, and proactive opportunities for breastfeeding support is to educate

pediatric nurses on evidence-based breastfeeding. In the first 24 months of life, the healthy U.S.

child should have nine well-child pediatric visits (Office of Disease Prevention and Health

Promotion, 2022a, 2022b). In fiscal year 2021, 77% of eligible TRICARE beneficiaries attended

six or more well-child visits within the first 15 months of life (DHA, 2022). Educating outpatient

pediatric and family medicine nurses about evidence-based breastfeeding would then yield

between six and nine opportunities for the breastfeeding dyad to receive evidence-based

breastfeeding support. NACCHO & USBC (2021) recommend the first post-discharge lactation

support appointment fall within the first 48 hours; this coincides with the American Academy of

Pediatrics preferred timing for a newborn follow-up outpatient pediatric appointment

(COMMITTEE ON FETUS AND NEWBORN, 2010).

　　　Support interventions in populations with high rates of breastfeeding initiation are more

effective (McFadden et al., 2017). The Evaluation of TRICARE Program report cites a perinatal

exclusive breastfeeding (defined in the report as exclusive breastfeeding throughout the natal

hospitalization) rate of 68.2%, which is higher than the national average of 51.1% cited within

the report but still falls short of breastfeeding goals (DHA, 2022; UNICEF & WHO, 2022). As

breastfeeding initiation rates among TRICARE beneficiaries are relatively high, implementation

of additional lactation support for this population is likely to have a positive effect on

breastfeeding rates and consequently the health of the TRICARE beneficiary population (DHA,

2022; McFadden et al., 2017; Nguyen et al., 2019; Rameez et al., 2019; Ringo & Gephart, 2022;

Spatz, 2017; Victora et al., 2016).

***Recommendations for MHS Training of Healthcare Professionals***

Research supports inclusion of lactation support provided by trained healthcare professionals into routine pediatric visits or into additional visits within the primary care health system. Although support provided by certified lactation consultants is preferred, training pediatric and family medicine outpatient primary care nurses caring for the breastfeeding dyad may be more feasible within the MHS based on cost effectiveness and the unique staffing challenges faced by the MHS, including frequent relocations of staff. With adequate staff training, lactation support can be offered as routine care in conjunction with regular well-child checkups. Optimal breastfeeding support would also include walk-in nurse visits for lactation assistance; however, this option may require additional staffing and physical space considerations that may be prohibitive for some MHS facilities (DNPAO, 2013).

The characteristics of the military community, such as the propensity for frequent moves, poses a unique problem for the education of staff at military health care facilities (Koslo, 2020). Koslo (2020) notes a prior study detailed the success of BFHI implementation in significantly raising breastfeeding rates at the MTF, but the implementation took almost double the amount of time (approximately five years) as implementation at a local civilian hospital due to military-related staffing complications such as turnover rates (presumably secondary to permanent changes of station for the staff or staff's active-duty spouses) and scheduling conflicts with active-duty training schedules.

Lactation support training for nurses should be regular and ongoing (Farrag et al., 2019). The Centers for Disease Control and Prevention recommend inclusion of breastfeeding topics in grand rounds, distribution of clinical protocols, education for health care workers on available evidence-based resources, and training for facility staff as methods of including breastfeeding education in regular practice for a health care system (DNPAO, 2013).

For optimal breastfeeding support, the MHS should implement a standardized system-wide breastfeeding training program for primary care nurses caring for the breastfeeding dyad. This would limit the cost of retraining, as staff relocating to another MTF or military clinic would already be trained. Implementation of a system-wide breastfeeding training program for primary care nurses would promote continuity and consistency of care when military families relocate to another duty station, as the breastfeeding promotion message would remain the same regardless of location. Another consideration in support of this training program is the variability of civilian lactation support availability across military duty stations; training MHS nurses could compensate in areas without adequate civilian support. Finally, such a system could ultimately reduce MHS expenditures by reducing referrals to lactation support providers, the need for formula supplementation, and emergency department visits and primary care sick visits due to breastfeeding-preventable illness.

**Opportunities for Provision of Breastfeeding Support.**

While ideal lactation support is offered in a face-to-face modality, other valid options for support include telephone, video, and chat modalities (DNPAO, 2013; McFadden et al., 2017). The MHS maintains a nurse advice line (NAL) available 24 hours a day (DHA, 2022). The MHS NAL fields around 2,200 calls daily (DHA, 2022). The MHS NAL is well-equipped to deal with the increase in call volume that would result from adding lactation support to the NAL services as evidenced by the NAL's streamlined process resulting from the COVID-19 related increase in daily call volume to over 10,000 calls (DHA, 2021). Additionally, MHS primary care management teams have access to NAL call information and could use that information to provide lactation services referrals or in-clinic follow-up as appropriate to further support the breastfeeding dyad (DHA, 2022). TRICARE also covers various telehealth visit types; virtual

support could be expanded to include video lactation support visits, which are effective at

increasing breastfeeding rates (DHA, 2022; Gavine et al., 2022).

The MHS should take a leadership role in promotion of breastfeeding in the United States

by agreeing to adhere to the International Code of Marketing of Breast-milk Substitutes (the

Code), which guides appropriate actions surrounding formula marketing and use (DNPAO,

2013; WHO, 1981). One key way the Code can be implemented in MHS facilities is to ban the

distribution of formula, with exception for true medical necessity, to families upon hospital

discharge (DNPAO, 2013; WHO, 1981).

**Plan for Dissemination of Information**

I plan to disseminate the findings of my research and the evidence-based

recommendations for improved lactation support within the MHS through publication in relevant

journals and presentation at military or lactation conferences. I will communicate with

individuals and organizations known for their work and advocacy in this sphere to help me

disseminate this information. I will disseminate my findings to stakeholders outside of the MHS

due to relevance with outpatient nurses in civilian facilities. Success of this dissemination plan

will be evaluated based on acceptance of publications and presentation opportunities and by

implementation of any recommendations by the MHS for improvement of lactation support and

breastfeeding rates.

**Future Research**

Future research should aim to collaborate directly with the MHS to survey a larger, more

representative sample of outpatient nurses. Future studies in this population should include

demographic questions to ascertain branch of the military for which the respondent works;

gender of the respondent; whether the respondent is active duty, reserves, or civilian; and the

source of the respondent's breastfeeding knowledge. Additionally, any research conducted on

breastfeeding rates among TRICARE beneficiaries should seek to standardize definitions of

breastfeeding and collect data on breastfeeding rates at different time points.

As Cronbach's alpha values for the CBKS tool were very different in nurses than in

mothers, additional psychometric validation studies may be necessary to validate CBKS use in

this population.

## Conclusion

Healthcare professionals' breastfeeding knowledge and attitudes towards breastfeeding

impact their patients' breastfeeding outcomes. MHS nurses' attitudes toward provision of

lactation support and knowledge of breastfeeding indicate these nurses can provide effective

lactation support to the breastfeeding dyad at some but not all time points during the postpartum

period. Personal breastfeeding experience quality is correlated with breastfeeding knowledge and

may affect the nurse's ability to provide effective lactation support. Awareness of these factors is

important for both individual nurses and nurse managers when planning educational

interventions and staffing assignments.

Despite high levels of knowledge in this population, regular and ongoing breastfeeding

education is recommended. Sufficient evidence exists to support the implementation of

breastfeeding education for nurses and other healthcare professionals. Current research on

breastfeeding educational interventions focuses mainly on inpatient healthcare settings. To

optimize support for the breastfeeding dyad, further research needs to be conducted on

breastfeeding education and support in the pediatric and family medicine outpatient settings.

Integration of lactation support within primary care visits in the first two years of life by

conducting regular training for all MHS nurses involved in the care of the breastfeeding dyad has

the potential to improve breastfeeding rates among TRICARE beneficiaries. This, in turn, would

reduce TRICARE expenditures for breastfeeding-preventable conditions and improve the overall

health of TRICARE beneficiaries. The military health system presents a unique challenge to

educational interventions; the recommendation to standardize breastfeeding education across

MHS facilities and to implement regular nursing staff training on provision of breastfeeding

information and support to the breastfeeding dyad seeks to mitigate the challenge posed by

frequent relocation of both TRICARE beneficiaries and MHS staff. Regular training on

evidence-based breastfeeding conducted in every MHS facility would address the operational

issues in MHS healthcare delivery due to the transient nature of military life, as all applicable

nursing staff would receive the same training regardless of duty station. This would improve

continuity of care between duty stations for both healthcare providers and TRICARE

beneficiaries.

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**Appendix A**

**Tables and Figures**

**Table A1**

*Breastfeeding Goals and Current Rates*

| | Recommendations | | Current Rates | | |
|---|---|---|---|---|---|
| | Global Breastfeeding Collective | Healthy People 2030 | Global | U.S. | TRICARE beneficiaries |
| Exclusive breastfeeding at birth | -- | -- | -- | 51% [a, b] | 68% [b] |
| Exclusive breastfeeding to 6 months | 70% | 42% | 48% | 30% [c] | -- |
| Continued breastfeeding to 12 months | 80% | 54% | 70% | 36% [c] | -- |
| Ever breastfed | -- | -- | -- | 81% [d, e] | 89% [d] |

*Note.* Data on breastfeeding rates in this table vary regarding the method and period of data collection as well as definitions of breastfeeding. Goal and global rates taken from Office of Disease Prevention and Health Promotion. (n.d.). *Increase the proportion of infants who are breastfed at 1 year* (Healthy People 2030). https://health.gov/healthypeople/objectives-and-data/browse-objectives/infants/increase-proportion-infants-who-are-breastfed-1-year-mich-16; Office of Disease Prevention and Health Promotion. (n.d.). *Increase the proportion of infants who are breastfed exclusively through age 6 months* (Healthy People 2030). https://health.gov/healthypeople/objectives-and-data/browse-objectives/infants/increase-proportion-infants-who-are-breastfed-exclusively-through-age-6-months-mich-15; World Health Organization. (2021). *Infant and young child feeding*. (https://www.who.int/news-room/fact-sheets/detail/infant-and-young-child-feeding); and United Nations Children's Fund & World Health Organization. (2022). *Global breastfeeding scorecard 2022*. https://www.globalbreastfeedingcollective.org/media/1921/file.

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**Table A2**

*Effect of Educational Intervention on Breastfeeding Knowledge*

| Authors | Sample Size and Design | Intervention | Outcomes |
| --- | --- | --- | --- |
| Al-Nuaimi, K., Ali, R., & Hatem Ali, F. (2019) | n = 82 Quasi-experimental pre-test/post-test Intervention/Control groups | 2-hour educational workshop (intervention group: breastfeeding, control group: growth and development) | Intervention group post-test improvement p<0.001 Control group post-test improvement p>0.05 |
| Shackelford, H. (2021) | n = 65* Quasi-experimental, non-randomized pre-test/post-test | Six-part breastfeeding education online series | Knowledge improvement significant in 9 of the 15 test questions p<0.005 |
| Vilar-Compte, M., Pérez-Escamilla, R., Moncada, M., & Flores, D. (2020) | n = 211** Cross-sectional pre-test/post-test | Semi-virtual breastfeeding course | Average treatment effect for registered nurses = 23.81 p<0.01 |

| Authors | Sample Size and Design | Intervention | Outcomes |
|---|---|---|---|
| Wallace, L. M., Ma, Y., Qiu, L. Q., & Dunn, O. M. (2018) | n = 117*** Randomized quasi-experimental trial in three phases | 15-minute breastfeeding education video | Total knowledge Phase 1: time effect = 19.902 p<0.001 Phase 2: pre-test mean = 8.04 / post-test mean = 8.37 p=0.14 Phase 3: pre-test mean 6.43 / post-test mean 8.98 p<0.0001 |
| Watkins, A. L., Dodgson, J. E., & McClain, D. B. (2017) | n = 71 Non-experimental pre-test/post-test self-report survey | 45-hour lactation course | Breastfeeding knowledge pre-test mean = 11.32 post-test mean = 12.45 p<0.001 |

*Note.* *Post-test data included three additional unsolicited responses which may have decreased the significance of results. **Sample included physicians, registered nurses (RNs), and nurse technicians. This table reports only the average treatment effect for RNs. ***Sample included midwives, health visitors, doctors, and support workers: % RN by phase: 36.8% of phase one, 59.3% of phase two, 81.7% of phase three.

**Figure A1**

*Donabedian Conceptual Framework Model*
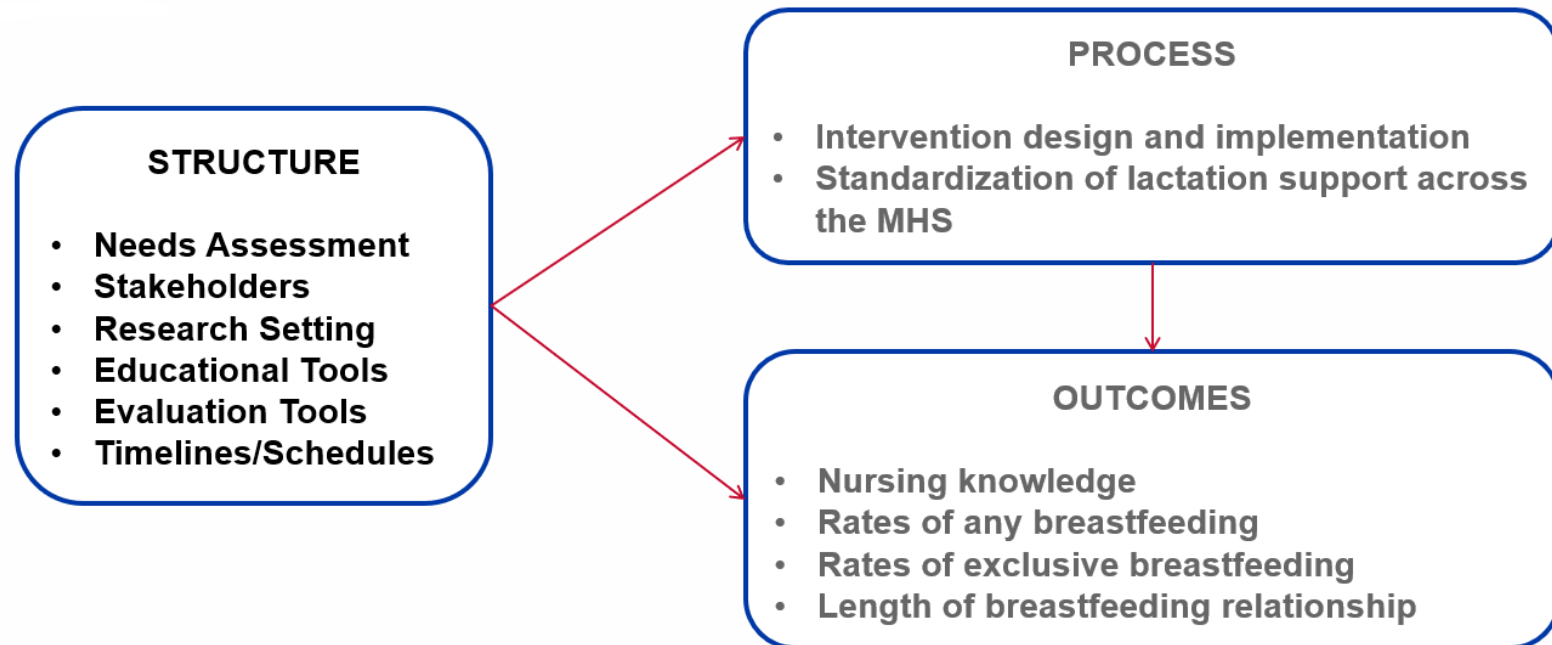


*Note.* This figure is based on implementation of the Donabedian model by Barrere et al., 2010.

**Figure A2**

*Cumulative number of survey participants over time*
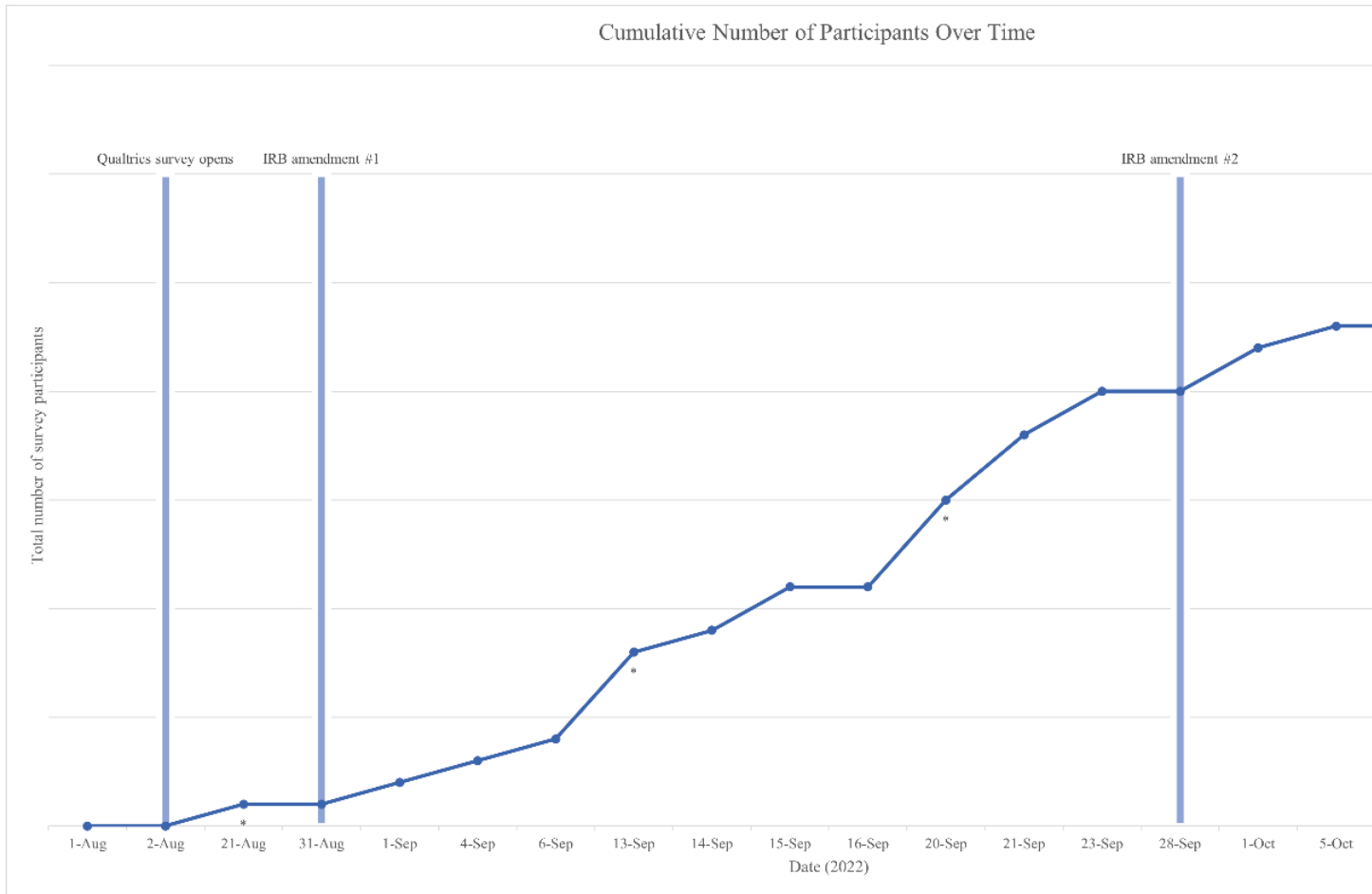


*Note.* * Denotes dates including at least one invalid survey response.

**Figure A3**
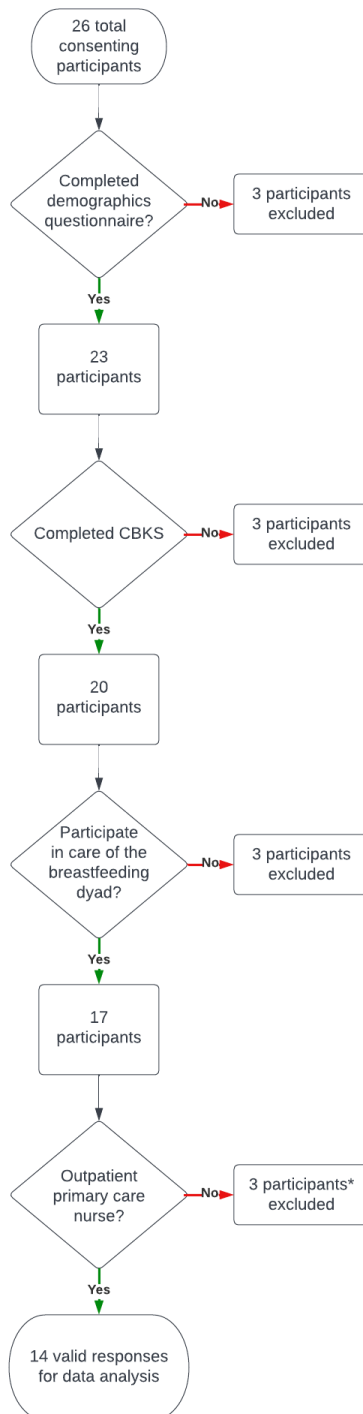


*Data Cleaning Flow Chart*

*Note.* *Excluded participants indicated they were a certified nurse midwife, lactation consultant

for the entire hospital, or emergency department provider.

**Table A3**

*Distribution of Scale Data*

| | Knowledge | | | | Attitudes | Intentions |
|---|---|---|---|---|---|---|
| | Total | Managing Milk Supply | Persisting through Challenges | Correcting Misconceptions | | |
| Mean (SD) | 77.1 (5.7) | 19.3 (1.5) | 27.1 (2.7) | 30.7 (2.8) | 18.3 (5.7) | 16.7 (3.9) |
| Median (IQR) | 77 (9.3) | 19 (2) | 27.5 (6) | 32 (5) | 19 (7.5) | 16 (6) |
| Percentiles 25 | 73.3 | 19 | 24 | 28 | 15.8 | 15 |
| 75 | 82.5 | 21 | 30 | 33 | 23.3 | 21 |
| Skewness | -.306 | -.734 | -.236 | -1.06 | -1.11 | -.983 |
| Kurtosis | -1.07 | .597 | -1.57 | -.290 | .647 | 1.65 |

**Table A4**

*Demographic Characteristics of Survey Respondents*

| | *n* | *%* |
|---|---|---|
| Total number of respondents | 14 | 100 |
| Age [a] | | |
| 20-29 | 2 | 14.3 |
| 30-39 | 2 | 14.3 |
| 40-49 | 1 | 7.1 |
| 50-59 | 1 | 7.1 |
| Degree | | |
| ADN/ASN | 4 | 28.8 |
| BSN | 4 | 28.8 |
| MSN | 1 | 7.1 |
| DNP/PhD | 2 | 14.3 |
| Other [b] | 3 | 21.4 |
| Licensure [c] | | |
| LPN | 4 | 28.5 |
| RN | 10 | 71.4 |
| APRN | 3 | 21.4 |
| Certification | | |
| IBCLC | 1 | 7.1 |
| Years of experience [d] | | |
| Advanced Beginner (0-6 months) | 0 | 0.0 |
| Competent (1-2 years) | 0 | 0.0 |
| Proficient (3-5 years) | 2 | 14.3 |
| Expert (5+ years) | 12 | 85.7 |
| Primary clinic assignment | | |
| Pediatrics | 8 | 57.1 |
| Family medicine | 6 | 42.9 |

| | n | % |
|---|---|---|
| Total number of respondents | 14 | 100 |
| Primary work function | | |
| Primary Care Manager | 2 | 14.3 |
| Team RN | 6 | 42.9 |
| RN/LPN assigned to a provider | 5 | 35.7 |
| Lactation consultant | 1 | 7.1 |
| Personal breastfeeding experience | | |
| My partner has breastfed one or more children | 0 | 0.0 |
| I have never breastfed | 6 | 42.9 |
| I have personally breastfed one or more children | 8 | 57.1 |
| Quality of personal breastfeeding experience [e] | | |
| Positive | 6 | 66.7 |
| Neutral | 3 | 33.3 |

[a] Only 6 respondents (42.9%) indicated age. [b] Three of the four LPN respondents chose "other" for degree. [c] All APRNs reported concurrent RN and APRN licensure. [d] This table excludes *novice* because all participants were practicing nurses. [e] Percentages reflect the percentage of respondents with personal breastfeeding experience (n = 9).

**Table A5**

*CBKS Items Missed Most Frequently*

| Item [a] | Agree | Unsure | Disagree |
|---|---|---|---|
| Maternal health | | | |
| A mother with mastitis can continue to breastfeed | 9 | - | 5 |
| Breastfeeding decreases maternal cancer risk | 9 | 4 | 1 |
| Infant feeding timing and mechanics | | | |
| Babies should be fed on cue | 9 | 1 | 4 |
| Artificial nipples may alter the infant's latch | 7 | 3 | 4 |

*Note.* Items are included in this table if more than 5 participants chose an incorrect answer.

[a] Due to restrictions on use of the CBKS tool, item content is summarized.

**Figure A4**

*Attitude Toward Providing Lactation Support*
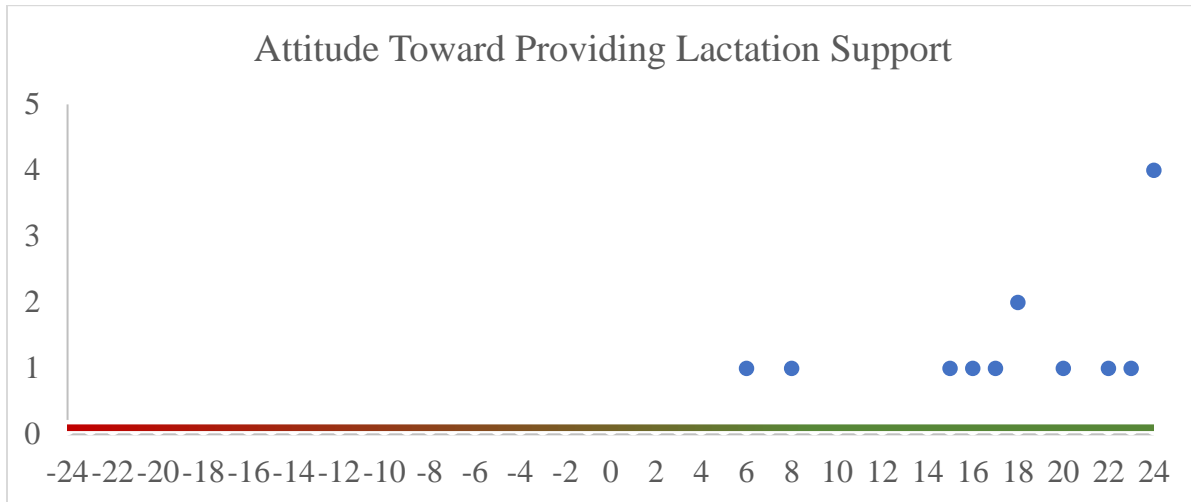


*Note.* Negative scoring indicating a negative attitude toward providing lactation support is indicated by red coloring. Positive scoring indicating a positive attitude toward providing lactation support is indicated by green.

**Figure A5**

*Intention to Provide Lactation Support*
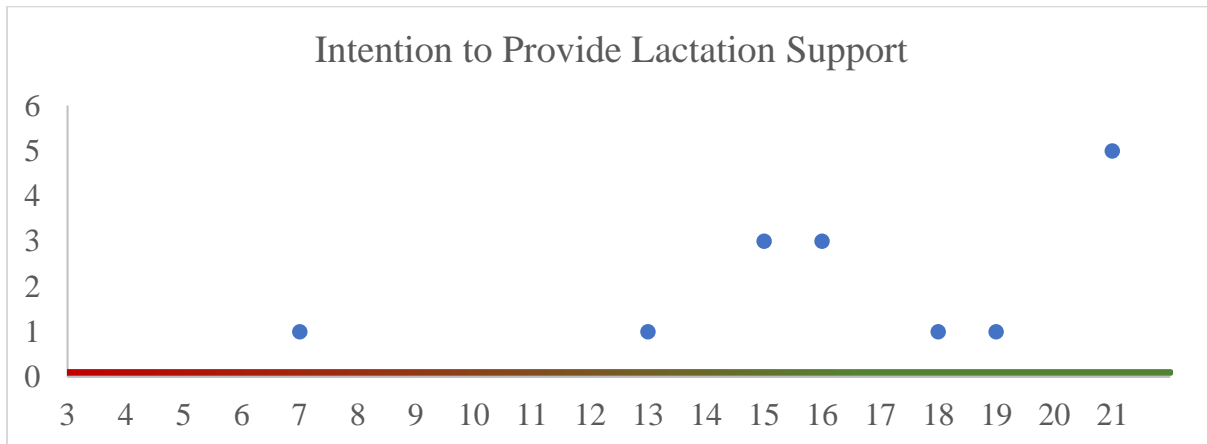


*Note.* Weaker intention to support the breastfeeding dyad is indicated by red coloring. Stronger intention to support the breastfeeding dyad is indicated by green.

**Table A6**

*Kendall's Tau Correlations of Study Variables*

| | Total Knowledge | Managing milk supply | Persisting through challenges | Correcting misconceptions | Attitude | Intention |
|---|---|---|---|---|---|---|
| Total Knowledge | -- | | | | | |
| Managing milk supply | .63* | -- | | | | |
| Persisting through challenges | .76** | .46* | -- | | | |
| Correcting misconceptions | .77** | .48* | .47* | -- | | |
| Attitude | .05 | -.03 | .25 | .08 | -- | |
| Intention | .10 | .03 | .14 | .05 | .43* | -- |
| Degree | .00 | -.12 | -.09 | .05 | -.09 | -.16 |
| Experience | .11 | -.20 | .23 | .02 | .19 | .20 |
| Age | .22 | .10 | .45 | .15 | .22 | .15 |
| Primary work function | -.15 | -.12 | .03 | -.20 | .32 | .34 |

*p < .05. **p < .01.

**Table A7**

*Comparison of Scores by Licensure Held*

| | LPN | | RN | | U | z | p | Effect size |
|---|---|---|---|---|---|---|---|---|
| | Mean Rank | Sum of Ranks | Mean Rank | Sum of Ranks | | | | |
| Knowledge | 3.8 | 15 | 9.0 | 90 | 5 | -2.14* | .032 | -.57 |
| Managing Milk Supply | 4.8 | 19 | 8.6 | 86 | 9 | -1.68 | .092 | -.45 |
| Persisting through Challenges | 6.3 | 25 | 8.0 | 80 | 15 | -0.73 | .466 | -.19 |
| Correcting Misconceptions | 3.3 | 13 | 9.2 | 92 | 3 | -2.49* | .013 | -.67 |
| Attitudes | 10 | 40 | 6.5 | 65 | 10 | -1.42 | .155 | -.38 |
| Intentions | 8.3 | 33 | 7.2 | 72 | 17 | -0.43 | .665 | -.12 |

*p < .05

**Table A8**

*Comparison of Scores by Possession of Advanced Licensure or Certification*

| | Holds Advanced Licensure or Certification (n = 4) | | Does Not Hold Advanced Licensure or Certification (n = 10) | | $U$ | $z$ | $p$ | Effect size |
|---|---|---|---|---|---|---|---|---|
| | Mean Rank | Sum of Ranks | Mean Rank | Sum of Ranks | | | | |
| Knowledge | 8.9 | 35.5 | 7.0 | 69.5 | 14.5 | -0.79 | .433 | -.21 |
| Managing Milk Supply | 7.6 | 30.5 | 7.5 | 74.5 | 19.5 | -0.08 | .939 | -.02 |
| Persisting through Challenges | 8.1 | 32.5 | 7.3 | 72.5 | 17.5 | -0.36 | .716 | -.10 |
| Correcting Misconceptions | 9.8 | 39.0 | 6.6 | 66.0 | 11.0 | -1.32 | .187 | -.35 |
| Attitudes | 6.0 | 24.0 | 8.1 | 81.0 | 14.0 | -0.85 | .394 | -.23 |
| Intentions | 7.1 | 28.5 | 7.7 | 76.5 | 18.5 | -0.22 | .829 | -.06 |

**Table A9**

*Comparison of Scores by Primary Clinic Assignment*

| | Pediatrics (n = 8) | | Family Medicine (n = 6) | | U | z | p | Effect size |
|---|---|---|---|---|---|---|---|---|
| | Mean Rank | Sum of Ranks | Mean Rank | Sum of Ranks | | | | |
| Knowledge | 6.7 | 53.5 | 8.6 | 51.5 | 17.5 | -0.85 | .397 | -.23 |
| Managing Milk Supply | 7.1 | 57.0 | 8.0 | 48.0 | 21.0 | -0.42 | .675 | -.11 |
| Persisting through Challenges | 6.1 | 48.5 | 9.4 | 56.5 | 12.5 | -1.53 | .126 | -.41 |
| Correcting Misconceptions | 7.5 | 60.0 | 7.5 | 45.0 | 24.0 | 0.00 | 1.00 | .00 |
| Attitudes | 6.8 | 54.5 | 8.4 | 50.5 | 18.5 | -0.71 | .475 | -.19 |
| Intentions | 6.8 | 54.0 | 8.5 | 51.0 | 18.0 | -0.79 | .429 | -.21 |

**Table A10**

*Comparison of Scores by Personal Breastfeeding Experience*

| | Personal Breastfeeding Experience (n = 8) | | No Personal Breastfeeding Experience (n = 6) | | $U$ | $z$ | $p$ | Effect size |
|---|---|---|---|---|---|---|---|---|
| | Mean Rank | Sum of Ranks | Mean Rank | Sum of Ranks | | | | |
| Knowledge | 8.3 | 66.5 | 6.4 | 38.5 | 17.5 | -0.85 | .397 | -.23 |
| Managing Milk Supply | 7.8 | 62.5 | 7.1 | 42.5 | 21.5 | -0.35 | .727 | -.09 |
| Persisting through Challenges | 8.3 | 66.0 | 6.5 | 39.0 | 18.0 | -0.80 | .425 | -.21 |
| Correcting Misconceptions | 8.8 | 70.0 | 5.8 | 35.0 | 14.0 | -1.34 | .181 | -.36 |
| Attitudes | 7.3 | 58.5 | 7.8 | 46.5 | 22.5 | -0.20 | .846 | -.05 |
| Intentions | 7.4 | 59.0 | 7.7 | 46.0 | 23.0 | -0.13 | .895 | -.03 |

**Table A11**

*Comparison of Scores by Quality of Personal Breastfeeding Experience*

| | Positive (n = 5) | | Neutral (n = 3) | | $U$ | $z$ | $p$ | Effect size |
|---|---|---|---|---|---|---|---|---|
| | Mean Rank | Sum of Ranks | Mean Rank | Sum of Ranks | | | | |
| Knowledge | 6.0 | 30.0 | 2.0 | 6.0 | 0.0 | -2.26* | .024 | -.80 |
| Managing Milk Supply | 5.9 | 29.5 | 2.2 | 6.5 | 0.5 | -2.15* | .031 | -.57 |
| Persisting through Challenges | 5.3 | 26.5 | 3.2 | 9.5 | 3.5 | -1.27 | .204 | -.34 |
| Correcting Misconceptions | 5.3 | 26.5 | 3.2 | 9.5 | 3.5 | -1.28 | .201 | -.34 |
| Attitudes | 4.5 | 22.5 | 4.5 | 13.5 | 7.5 | 0.00 | 1.00 | .00 |
| Intentions | 4.3 | 21.5 | 4.8 | 14.5 | 6.5 | -0.30 | .761 | -.08 |

*$p < .05$

**Table A12**

*Neutral Quality Personal Breastfeeding Experience Compared with No Personal Breastfeeding Experience*

| | Neutral (n = 3) | | None (n = 6) | | $U$ | $z$ | $p$ | Effect size |
|---|---|---|---|---|---|---|---|---|
| | Mean Rank | Sum of Ranks | Mean Rank | Sum of Ranks | | | | |
| Knowledge | 4.0 | 12.0 | 5.5 | 33.0 | 6.0 | -0.78 | .435 | -.26 |
|    Managing Milk Supply | 2.8 | 8.5 | 6.1 | 35.6 | 2.5 | -2.00* | .046 | -.67 |
|    Persisting through Challenges | 4.2 | 12.5 | 5.4 | 32.5 | 6.5 | -0.66 | .510 | -.22 |
|    Correcting Misconceptions | 5.2 | 15.5 | 4.9 | 29.5 | 8.5 | -0.13 | .896 | -.04 |
| Attitudes | 4.8 | 14.5 | 5.1 | 30.5 | 8.5 | -0.13 | .897 | -.04 |
| Intentions | 5.0 | 15.0 | 5.0 | 30.0 | 9.0 | 0.00 | 1.00 | .00 |

*$p < .05$

**Table A13**

*Psychometric Analysis of Scales*

| Scale | Cronbach's alpha | Number of Items Omitted Due to Lack of Variance |
|---|---|---|
| Comprehensive Breastfeeding Knowledge Scale | .747 | 7 |
| Managing Milk Supply | .024 | 1 |
| Persisting Through Challenges | .475 | 2 |
| Correcting Misconceptions | .726 | 4 |
| Attitudes (NSBQ) | .651 | 0 |
| Intentions (NSBQ) | .835 | 0 |

**Figure A6**

*Breastfeeding Knowledge of Outpatient MHS Nurses*
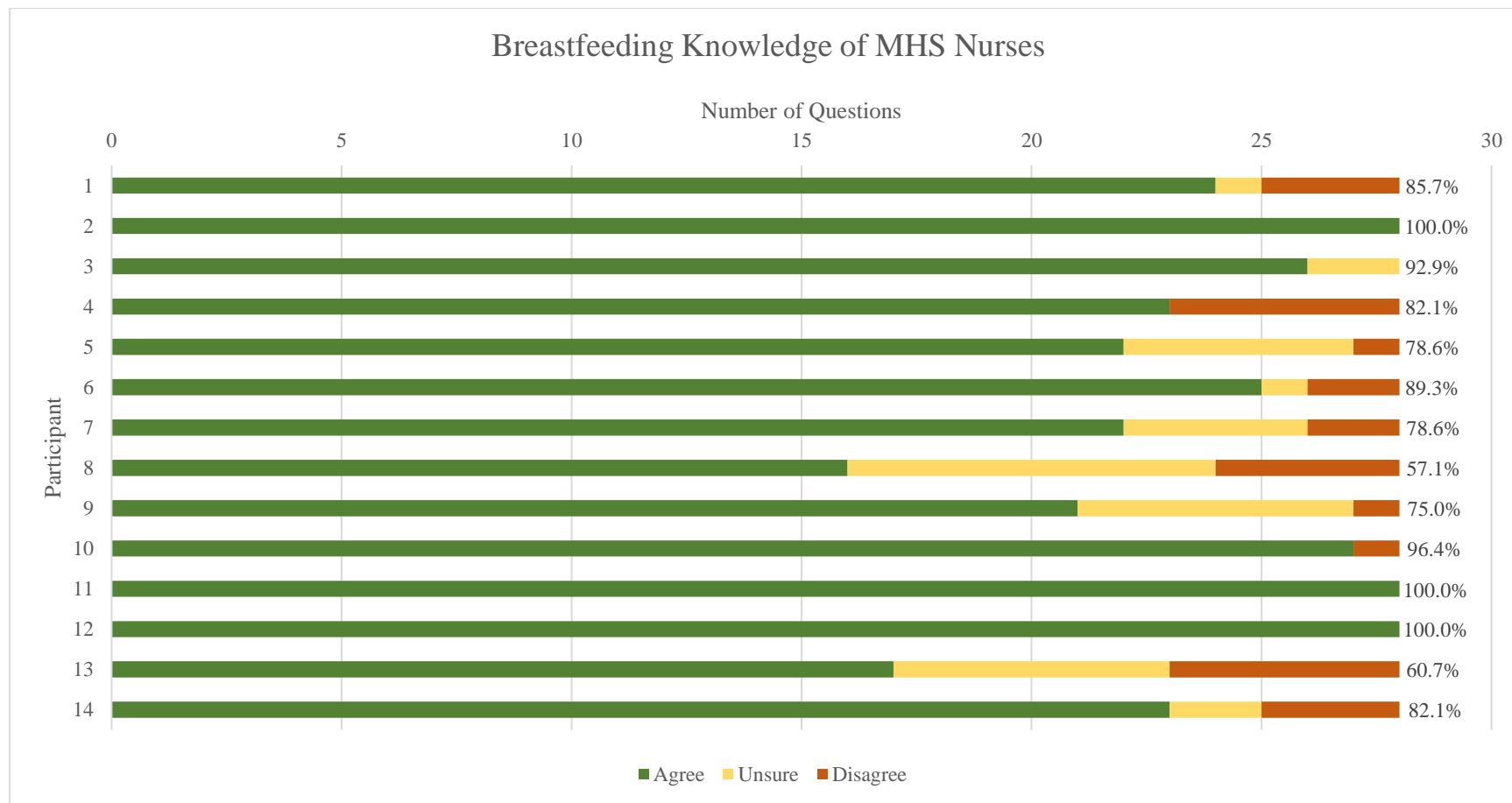


*Note.* The percentages shown to the right indicate the percentage of *agree* responses for each participant. This is synonymous with the percentage of correct answers on the knowledge assessment.

**Table A14**

*Comparison of Knowledge with Other Studies*

|  | Study Results | |
|---|---|---|
|  | Number of Correct Answers<br>M (SD) | Percent Correct<br>M (SD) |
| (Watkins et al., 2017) | 12.45 (1.44) [a] | 88.93 |
| Outpatient MHS nurses | 23.57 (3.84) | 85.4 (13.8) |
| (Weshahy et al., 2019) | 12.56 (4.03) | 62.8 |
| (AL-Nuaimi et al., 2019) | 11.73 (2.6) [a] | 58.65 |
| (Farrag et al., 2019) | 26.8 (6.4) | 53.6 |

*Note.* Standard deviation statistics are not available for other studies.

[a] For studies involving an educational intervention, post-test scoring data was used for this chart.

**Appendix B**

**Demographics Survey**

1. What is your age? _____
2. What is the highest nursing degree you have earned?
     o ADN/ASN
     o BSN
     o MSN
     o DNP/PhD
     o Other (please specify)
3. What licensure do you currently hold?
     o RN
     o LPN
     o Other (please specify)
4. How many years of nursing experience have you had? (Round to nearest 0.5 year)
     _____
5. Have you worked in a military healthcare outpatient clinic within the last 12 months?
     o Yes
     o No
6. What is your primary clinic assignment?
     o Pediatrics
     o Family medicine
     o Other
7. In your primary clinic assignment, do you provide care to the breastfeeding dyad (lactating mother and breastfeeding child under the age of 24 months)? Please mark "yes" even if you care only for the lactating mother or only for the breastfeeding child.
     o Yes
     o No
8. What is your primary function at work?
     o Primary Care Manager
     o Team RN
     o RN/LPN assigned to a provider
     o Other (please specify)
9. What is your level of personal breastfeeding experience?
     o I have never breastfed.
     o I have personally breastfed one or more children.
     o My partner has breastfed one or more children.
10. If your or your partner has breastfed, how would you describe your personal breastfeeding experience?
     o Positive
     o Negative
     o Neutral
     o N/A

**Appendix C**

**IRB-approved Visual Aid**