

**COLLABORATIVE PRACTICE TEAMS IN ONCOLOGY: EXAMINING THE
ROLE OF PSYCHOLOGICAL SAFETY AND ITS RELATIONSHIP WITH
CLINICIAN WELL-BEING AMONG ADVANCED PRACTICE PROVIDERS**

by
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Dedication

I dedicate this project to my mother, Diana Huang Wei, who was my biggest source of encouragement and support to pursue this advanced doctoral degree. For all my life, Diana cultivated a “safe” place for me to learn, grow, and pursue my passions and dreams. She modeled the importance of building healthy relationships, and she always encouraged me to be the best that I can be and to grow as a leader. She never placed any undue pressure or expectation to pursue any academic achievement or achieve lofty goals. Unfortunately, Diana passed away in July 2018 following a 7-year battle with cancer. One month later in August 2018, I started this doctoral program with the motivation to dedicate this thesis to my mother, in remembrance and thanksgiving to her.

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Abstract

Background: As health care continues to evolve in the United States, there has been a growing emphasis on providing high-quality, team-based care, especially in the care of cancer patients. Advanced practice providers (APPs), including physician assistants (PAs) and nurse practitioners (NPs), have helped to bridge the gap to meet the demand of patient oncology needs; however, APPs remain at a higher risk of developing clinician distress and burnout. To address a “system in crisis,” particularly during the COVID-19 pandemic, teamwork and effective team functioning may be a necessary solution. Psychological safety (PS) may be a contributing factor that affects team engagement in health care. Studies among PAs in oncology have demonstrated that high burnout rates could be associated with team leadership factors, such as the PA relationship with the collaborating physician (CP), as well as their leadership qualities. Among APPs in oncology care, the question remains whether PS correlates with clinician well-being (WB), including the risk of distress and adverse work-related outcomes. **Purpose:** This study aimed to examine the professional characteristics and team leadership factors that may contribute to PS among oncology APPs and determine whether PS was related to clinician well-being (WB). **Methods:** A national web-based, cross-sectional survey of oncology APPs from two leading oncology APP professional societies was completed during a 60-day study period in the setting of the COVID-19 pandemic in early 2021. Descriptive statistics were obtained, followed by a series of bivariate tests to identify which demographic, professional, and team-leadership variables were significantly related to the dependent variables, PS and clinician WB. All explanatory variables that demonstrated a statistically significant relationship with the dependent variables were

included in the third phase, multivariate analysis using multiple linear regression models. Lastly, since this study was conducted in the setting of the COVID-19 global pandemic, respondents provided context to their responses through two open-ended questions.

Results: The study consisted of 84 oncology APPs who completed the survey, and 28.6% (n = 24) reported WBI scores within the high-risk group of distress. On final multivariate analysis, high PS scores were associated with high leader inclusiveness and leader-member exchange (LMX) scores, and low PS scores were related to those within the high-risk group of distress. Study participants in hematology-oncology specialty were five times more likely to be within the high-risk group of distress compared with those in the medical oncology group. Participants with high PS scores had a reduced likelihood of being in the group with a high risk of distress. **Conclusion:** Among oncology collaborative practice teams, APPs play a crucial role in providing high-quality patient care, but they remain at increased risk of developing clinician distress. Team-leadership factors affecting APPs may contribute to low PS, which may also be associated with low clinician well-being. Efforts to optimize clinician well-being should also address effective team functioning, team engagement, and leadership development.

Keywords: psychological safety, well-being, collaborative practice, teams, oncology, advanced practice providers, leadership

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Chapter I

Introduction

The landscape of health care delivery in the United States has evolved considerably over the years. Pervading through the ever-changing and complex health care system is a growing emphasis to promote high-quality, team-based care. With the national shortage of physicians, and the system-wide shift to models of value-based reimbursement, the role of advanced practice providers (APPs), including physician assistants (PA) and nurse practitioners (NP), continues to expand. Furthermore, increased access to patient care triggered by the Affordable Care Act and the aging U.S. population has led to a higher demand for health care services, placing an enormous strain on the health care system and workforce.

Since the 1960s, APPs have delivered quality patient care in various medical disciplines and health care practice settings. APPs are non-physician health care providers that not only perform clinical and diagnostic functions but are also instrumental in providing education, research, mentorship, and advocacy for many different patient populations. Over the years, numerous reports have indicated that within their areas of competence, APPs provide quality patient care equivalent to that of physician providers (Johnson et al., 2019; Timmons, 2017; Yang et al., 2018). Also, patients generally report being satisfied with the quality of care provided by APPs, especially in the areas related to the interpersonal aspects of patient care (Kurtzman & Barnow, 2017). Furthermore, APPs provide cost-effective care and improve patient outcomes, such as fewer complications, reduced hospital readmission, emergency center visits, and shorter length of stay (Kurtzman & Barnow, 2017; Newhouse et al., 2011). The successful integration

of APPs into hospital and medical practices has been associated with overall improvements in health care team productivity, including increases in revenue and patient access. APPs offer a diverse skill set to assist, facilitate, and complement the work of physicians, as well as other health care professionals. In a U.S. health care system challenged by high costs, poor quality, lack of access, APPs can fill an essential gap in team-based practice for primary care and a wide variety of specialty settings.

One such medical specialty that has noticed significant growth and expansion of APP roles in collaborative practice settings is in the care of cancer patients, also known as the field of oncology. With the growing number of cancer diagnoses, the increased number of cancer survivors, along with the projected shortfall of oncology-trained providers, APPs have helped to address the overwhelming demand for oncology patient care needs (Erikson et al., 2007). Additionally, APPs deliver a broad range of services that allow them to practice effectively within all the various oncology disciplines and practice settings. According to the American Society of Clinical Oncology (ASCO) study of collaborative practice arrangements (Towle et al., 2011), the successful integration of APPs in oncology settings has been associated with high patient satisfaction and greater team productivity.

Statement of the Problem

Due to increased complexity in cancer care, there has been more emphasis on team-based care. The use of APPs in oncology practice is associated with increased work productivity and team efficiency. Additionally, APPs have been identified as a consistently reliable workforce to help offset the growing demand for oncologic services (Erikson et al., 2007). The APP role, however, has also expanded beyond traditional

collaborative practice models to include more indirect patient care (Tetzlaff et al., 2018). In a recent national study among PAs in oncology, Tetzlaff et al. (2018) reported that providers experience heightened burnout when they spend significant time on work efforts below their competency level, such as non-clinical administrative tasks. Recently, Bourdeanu et al. (2020) reported similarly high rates of burnout among oncology NPs, including more than 20% indicating intent to leave their oncology profession or job. Like other health care professionals, APPs are similarly subject to significant work-related stress. Therefore, they are run the risk of developing symptoms of burnout, fatigue, depression, anxiety, and other forms of distress (Shanafelt et al., 2014).

To address the workforce shortage and complexity of cancer care, the Institute of Medicine (IOM) suggested that health care teams and teamwork are essential solutions for a “system in crisis” (Levit et al., 2013). In team-based care, physicians, APPs, nurses, medical assistants, and other staff members work jointly to achieve a common patient-centric goal. Individual team members have clearly defined roles and responsibilities, but they must also interact dynamically and interdependently with each other on behalf of patients. However, as with many health care teams, the interpersonal climate and culture within teams may not always be associated with effective team communication and functioning. Team characteristics and workplace dynamics may affect team member behavior and their willingness to discuss and report problems. Among collaborative practice teams, the physician is often deemed the team leader, and therefore, garners a higher professional status than other health care team members (Hafferty & Light, 1995). Team leader behavior facilitates individual and organizational performance and plays a critical role in encouraging a safe and healthy workplace setting. Leader inclusiveness

(LI) refers to the words and actions of a team leader to invite collaboration among group members and facilitate team learning (Nembrand & Edmondson, 2006). As with many teams, and as described by the Leader-Member Exchange (LMX) theory, the quality of the team leader and follower “dyadic” relationships may vary over time and depend on the quality of social interactions (Graen & Uhl-Bien, 1995).

Psychological safety (PS) is a “shared belief among team members that the work environment is safe for interpersonal risk-taking (Edmondson, 1999).” For individual team members, such as APPs working alongside physicians, PS melds both trust and respect. It greatly affects personal engagement and disengagement at work. In the field of oncology, the PA’s opinion of their collaborating physician’s leadership qualities plays a significant role in the risk of PA burnout (Tetzlaff et al., 2018). Additionally, workplace factors, such as feeling valued and lacking rewards, are associated with intent to leave the profession (Bourdeanu et al., 2020). The question remains whether team PS can also play an integral role in predicting clinician well-being.

Coronavirus Pandemic

During the early spring of 2020, the global onset of the COVID-19 pandemic posed extraordinary challenges for health care teams, particularly in the United States, where the number of cases surged dramatically, and hospital systems were forced to adapt and reorganize care urgently. By August 2020, six months after the country’s first reported COVID-19 case, the U.S. reported over 5 million confirmed cases and more than 161,000 deaths (Centers for Disease Control and Prevention, 2020). Health care workers faced unprecedented challenges related to caring for patients amid unpredictable hospital surges while minimizing exposure risk with adherence to strict safety guidelines and the

utilization of personal protective equipment (PPE). Due to insufficient staffing or inadequate resources, many health care teams and roles were interrupted or even upended to accommodate rapid deployment to front-line service. In other hospitals and office-based clinics, highly trained providers experienced reduced work hours and even job furlough to minimize exposure risk and reduce practice expenses. For oncology health care workers, adherence to strict social distancing and safety precautions were essential to protect vulnerable, immunocompromised patients from the risk of COVID-19 exposure. Additionally, oncology providers, including APPs, were isolated by physical workspace restrictions, including the sudden need to provide patient care remotely via telemedicine services.

During times of crisis, team membership and roles may often become blurred, resulting in interruptions in team functioning and effectiveness. It is well documented that challenges in team collaboration across professional boundaries can often be exacerbated during times of stress and sudden workplace changes (Edmondson, 2012). Crisis moments have also generated inspiring examples of teams coalescing and adapting to a new environment over a renewed shared mission. During the unpredictable COVID-19 pandemic, some teams develop resiliency and continue to collaborate and innovate, while others lack proper leadership and clear direction. Furthermore, clinicians may encounter high levels of stress and workplace hardships that compound existing problems of burnout and distress (Dazu et al., 2020). As a result, supporting the psychosocial needs of clinicians remain critical for sustaining work and ensuring team-based learning (Shanafelt et al., 2020).

Purpose of the Study

The main purpose of this study was to examine the interdependent relationship that oncology APPs have with their collaborating physician and to describe the relationship between team psychological safety (PS) and clinician well-being (Figure 1). Participants in the study were asked to reflect upon their team working relationship during the global COVID-19 pandemic.

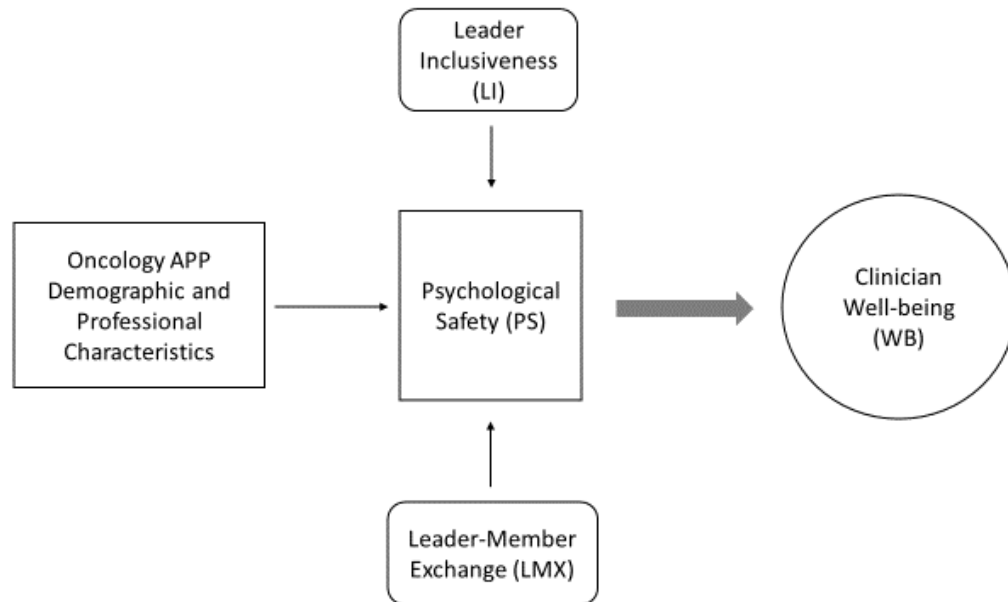
Research Questions

This study addressed the following research questions in the setting of the COVID-19 pandemic: What were factors that contribute to psychological safety (PS) among APPs in oncology? What was the relationship between psychological safety (PS) and clinician well-being (WB) among APPs in oncology?

Figure 1

Theoretical Model: Psychological Safety and Clinician Well-Being among Oncology

Advanced Practice Providers (APPs)



Context of the Study

This study was conducted in the setting of the global COVID-19 pandemic in the United States. The immediate context of the study was to examine the role of oncology APPs working in collaborative practice with physicians during the COVID-19 pandemic of 2020. A cross-sectional national survey among APPs from all oncology disciplines and practice settings was distributed from early February to early April 2021 utilizing the membership database of oncology APP professional societies. The study survey assessed the demographic and professional characteristics of APPs, including team characteristics such as leader inclusiveness and leader-member exchange relationships, and items that were evaluated for psychological safety and clinician well-being.

Significance of the Problem

In 2019, according to the American Cancer Society (2019), more than 1.7 million people in the United States were diagnosed with cancer. As of January 2019, approximately 17 million cancer survivors lived in the United States, with expectations to exceed 22.1 million by 2030. With the looming workforce shortage of oncologists and the aging US population, APPs are a group of qualified clinical providers to help meet the growing demands of cancer care (Towle et al., 2011).

However, according to recent national studies, 44.7% of US oncologists, 34.8% of oncology PAs, and 31.3% of oncology NPs experience burnout symptoms (Bourdeanu et al., 2020; Shanafelt et al., 2014; Tetzlaff et al., 2018). Burnout syndrome has profound implications for the quality of the oncology care delivery system, including increased provider turnover and decreased clinician well-being. Some of the key drivers associated with burnout risks include teamwork and organizational leadership deficiencies (Shanafelt, 2014; Welp & Manser, 2016). Furthermore, high levels of emotional distress related to the COVID-19 crisis may further exacerbate symptoms of burnout, including increased rates of anxiety, substance abuse, depression, and suicidality (Dzau et al., 2020). In a national study among PAs in oncology, high rates of burnout correlated among PAs that perceive negative leadership qualities from their collaborating physician (Tetzlaff et al., 2018). Oncology NPs often collaborate with physicians in a similar role as PAs in team-based practice settings. With the increasing number of APPs in oncology, it is important to recognize the characteristics of the APP/ collaborating physician workforce and the unique challenges of team dynamics that may affect clinician well-being.

Educational Value of the Study

As a follow-up to the national study performed by Tetzlaff et al. (2018) and Bourdeanu et al. (2020), this study examined further the APP perception of leadership qualities with their collaborating physician in oncology team-based practice. Participants of this study were asked to reflect upon their relationship with the collaborating physician in the setting of the global COVID-19 pandemic, which may further elucidate factors related to overall team effectiveness. Specifically, this study examined how leader inclusiveness may affect PS among APPs in health care teams. This study also explored the relationship between team PS and clinician well-being, including professional burnout among oncology APPs.

To my knowledge, this was the first study to examine health care team dynamics, specifically leader inclusiveness, leader-member exchange relationships, and psychological safety, among the population of APPs in oncology. This study also scrutinized the relationship between PS and clinician well-being in team-based practice during the COVID-19 pandemic. The results and insights gained from this study will further bridge the knowledge gap between teamwork and clinician well-being in oncology.

Definition of Terms

- **Physician Assistant (PA).** PA is a licensed medical professional who practices medicine in collaboration with a physician. PAs are nationally board-certified clinicians who “diagnose illness, develop and manage treatment plans, prescribe medications” (American Academy of Physician Assistants [AAPA], 2020).

- **Nurse Practitioner (NP).** NP is a licensed medical professional qualified to manage a patient's health conditions and prevent diseases without a physician's direct supervision (American Association of Nurse Practitioners [AANP], 2020). NPs often specialize by patient population, including adult medicine, gerontology, pediatric, mental health, and women's health, but they also sometimes subspecialize in areas of team-based care, such as oncology.
- **Advanced Practice Registered Nurse (APRN).** APRNs are registered nurses who have obtained a master's degree in nursing in a specific role or patient population (American Nurses Association [ANA], 2020). The four specific types of APRNs include nurse practitioners (NPs), clinical nurse specialists (CNS), certified registered nurse anesthetists (CRNA), and certified nurse-midwives (CNM). Most common APRN providers in oncology team-based practice include the NP and CNS roles.
- **Advanced Practice Providers (APP).** APP is a collective term that refers to physician assistants (PAs) and advanced practice registered nurses (APRNs), including the four specific nursing roles: NP, CNS, CRNA, and CNM. The term APP is often used in the hospital and academic settings for providers in collaborative practice in place of other commonly misused terms such as "mid-level" providers, "physician extenders," or non-physician practitioners (AANP, 2020).
- **Collaborating Physician (CP).** In team-based practice, the CP is a board certified, licensed physician who works in partnership with APP(s) and other

health care team members to care for patients. The CP and APP often have regulatory, collaborative practice agreements mandated by state law.

- **Oncology.** Oncology is a branch of medical sciences associated with the prevention, diagnosis, and treatment of cancer patients.
- **Psychological Safety (PS).** PS is a “shared belief among team members that the work environment is safe for interpersonal risk-taking” (Edmondson, 1999, p. 350).” PS is also characterized as a “belief that one will not be punished or humiliated for speaking up with ideas, questions, concerns, or mistakes” (Edmondson, 2018, p. 15).
- **COVID-19 Pandemic.** A global pandemic caused by the novel severe acute respiratory coronavirus 2 (SARS-CoV-2) was first identified in December 2019 in Wuhan, China. The World Health Organization initially declared the outbreak as a public health emergency of international concern. Then, on March 11, 2020, the outbreak was affirmed a global pandemic. The first confirmed case of the COVID-19 virus in the United States was reported on January 20, 2020. By March 26, 2020, the United States had the highest confirmed cases in the world. The COVID-19 virus is known to primarily spread between people in close proximity, and treatment for this novel virus is still under investigation (WHO, 2020).
- **Health Care Team.** A collection of health care professionals who work together to accomplish a shared, common goal.
- **Team Interdependence (TI).** TI refers to two or more people who mutually depend on one another to complete specific tasks and achieve common goals.

- **Leader Inclusiveness (LI).** For the team leader, LI can be characterized as “words and deeds by a leader that indicate an invitation and appreciation for others’ contributions” (Nembhard & Edmondson, 2006, p. 947).
- **Well-being (WB).** Well-being is the state of feeling well, characterized by being comfortable, healthy, or happy. Clinician well-being may also refer to a medical providers’ mental health and life satisfaction. Clinician WB is multi-factorial and includes six dimensions of distress specific to the Well-Being Index (WBI): the likelihood of burnout, severe fatigue, suicidal ideation, risk of medical error, meaning in work, and work-life integration (Dyrbre et al., 2019).
- **Burnout (BO).** Burnout syndrome is characterized by emotional, mental, and physical exhaustion caused by prolonged or excessive distress. Three main characteristics of professional burnout include emotional exhaustion, depersonalization, and a low sense of personal accomplishment (Shanafelt et al., 2014, Smith et al., 2018).

Limitations of the Study

Although the oncology collaborative practice team may consist of several intra-professional health care members, this study focused on the specific role that APPs, mostly PAs and NPs, play in collaborative practice with their physicians. Since this was a nationwide study consisting of APPs from various oncology disciplines and practice settings, the APP role in team-based oncology practice varied substantially. The study population consisted of APPs in non-clinical, administrative, or research roles with very little team collaboration. For this study, it was essential to clarify the APP’s team setting, structure, and clinical function, including the designation of team leader in collaborative

practice. Furthermore, this study clarified prior APP-specific studies related to team-based approach and clinician burnout.

Additionally, due to the complex patient population and the emphasis on team-based, patient-centric care, this study was limited to APPs working in the oncology specialty. Oncology represents a vast field of medicine that entails multiple disciplines, disease sites, and practice settings. The integration of APPs into oncology practice teams had been well supported and documented in the literature (Bruinooge et al., 2018).

This study also examined several factors contributing to healthcare team dynamics, including leader inclusiveness and team PS. This study did not evaluate the individual APP competencies or personal provider characteristics that might contribute to PS and clinician WB. This study was limited to a cross-sectional, national survey of a broad population of oncology APPs from multiple different institutions and practice settings. A more detailed, thorough review of a specific practice setting could be achieved with a longitudinal study within a single institution or similar practice settings. Furthermore, team-based analysis of multiple team members may provide additional insight into team dynamics and individual member contributions.

Lastly, this study took place during the global COVID-19 pandemic, which was a unique setting that included several unknown compounding factors affecting the health care team. The COVID-19 pandemic has dramatically reshaped health care in the U.S., and there remains great uncertainty on how team structure and effectiveness have been altered. Overall, the primary purpose of this study was to focus on the APP perspective of team-based care and how leader-member relationships, such as leader inclusiveness (LI) and leader-member exchange (LMX), impacted PS and clinician WB.

Summary

This study examined the existing collaborative practice models among APPs and physicians in oncology and then described the APP/ CP team structure and level of team interdependency (TI). This study also explained the role of the CP and determine how LI and LMX may affect the health care team. Next, the study examined the role of PS among APPs in oncology, including the relationship between PS with both LI and LMX. Lastly, this study assessed the relationship between PS and WB among APPs in oncology during the COVID-19 pandemic.

Figure 1 illustrates the conceptual framework of these constructs and variables. The following section contains a brief review of the relevant literature pertaining to this study's main constructs and variables.

Chapter II

Review of Literature

This chapter summarizes the current literature that pertains to oncology APPs in collaborative practice and the key factors that may influence psychological safety and clinician well-being. This review of literature will be divided into three main sections.

The first section will provide a background and description of APPs in team-based practice, including models for collaborative practice in oncology. The following section will give a detailed look at the construct of PS among health care teams, including a review of team interdependence and key collaborative leadership theories that involve leader-member relationships. The last section will include a brief review of clinician WB and factors that may contribute to distress and burnout among APPs in the setting of the COVID-19 global pandemic. In summary, this chapter will enhance the understanding of variables, constructs, and research topics and ground this study with evidence to support its educational value in team-based health care.

Advanced Practice Providers (APPs) in Collaborative Practice

Background and History of APPs

Advanced practice providers (APPs) are licensed caregivers who evaluate, manage, and treat patients under the supervision and/or in collaboration with a licensed physician in most health care disciplines and practice settings. APPs consist of a variety of providers, including physician assistants (PAs) and advanced practice registered nurse (APRN), which can be further defined into four specific roles: nurse practitioners (NPs), certified nurse-midwives (CNM), certified registered nurse anesthetists (CRNA), and clinical nurse specialists (CNS). In some settings, including governmental entities, APPs

have also been referred to as “non-physician providers,” “mid-level providers,” or “physician extenders.” However, the national professional societies of PAs and NPs have opposed using these terms that do not accurately reflect the current role and utilization of APPs (AANP, 2020; AAPA, 2018). APP is a collective term for provider groups consisting mainly of PAs and NPs in collaborative practice. However, each provider group or profession is unique in its background, education, licensure, and healthcare role. Despite having similar patient care duties and responsibilities in most collaborative settings, the PA and NP professions are not considered interchangeable. Although other APP professionals, such as CNS and CRNAs, may provide care for cancer patients, this literature review will focus on the two most prominent APP provider groups in oncology: PAs and NPs. The following section will describe the unique differences between PAs and NPs in the oncology provider setting and their benefits to address disparities in health care.

Physician Assistants

Since the PA profession began in the 1960s, it has laid its foundation on team-based care. As defined by the American Academy of Physician Assistants (AAPA), PAs are licensed medical professionals who “diagnose illness, develop and manage treatment plans, prescribe medications, and often serve as a patient’s principal healthcare provider” (AAPA, 2020). PAs are collaborative, versatile practitioners that work under the general “supervision” of a board-certified, licensed physician. The PA profession has consistently become one of the fastest-growing healthcare professions over the last several decades. Between 2011 and 2017, the PA profession grew by 44%, with an estimated 37% growth expected over the next decade.

PAs generally receive a master's degree level training under the traditional "medical" model, which emphasizes the study of disease pathology, including its diagnosis, management, and treatment. PA trainees attend an accredited PA program within a medical school or center of medicine and receive an accelerated (two to three years) education and training in generalized medicine. Before graduation, PAs typically complete a rigorous course load which includes over 1000 didactic hours and more than 2000 clinical hours. Despite their generalized medical training, PAs can also specialize and work in almost all medical disciplines and practice settings without the necessity of additional certification. According to a recent statistical profile of certified PAs (National Commission on Certification of Physician Assistants [NCCPA], 2019), only 25.0% of PAs work in primary care, with most PAs specializing in other fields, such as emergency medicine, surgery, or even oncology. Also, in 2019, 94.9% of certified PAs were practicing clinically, with the vast majority (79.7%) working in a hospital or office-based setting in collaboration with physicians. Currently, in the United States, there is over 140,000 practicing PAs working within health care teams across every medical and surgical specialty (AAPA, 2020).

The PA scope of practice laws vary from state to state, and they continue to be updated as the PA profession evolves and grows. Most states regulate PA practice with written supervisory and collaborative agreements that may include restrictions on PA/physician practice locations, limits to PAs-to-physician practice ratios, and the delegation of PA prescriptive authority (AAPA, 2016). Despite impending pressure for the PA profession to pursue "autonomous" or independent practice similar to NP colleagues, the AAPA approved a new policy in 2017 called "Optimal Team Practice," which reiterated

the PA profession's commitment to collaborative team-based care with physicians (AAPA, 2018). However, most state laws remain outdated, overly restrictive, and incompatible with effective collaborative practice team models. According to the AAPA (2016), these models work most effectively when PAs are appropriately treated as skilled and competent professionals; and when the PAs and physicians decide how to best practice together, not necessarily determined at the state level.

Nurse Practitioners

NPs are a type of APRN with advanced clinical education and training that allows them to perform high levels of patient care and tasks that registered nurses (RNs) are not licensed to do. According to the AANP (2020), NPs are nationally certified health care providers who “diagnose and manage acute and chronic illness while focusing on health promotion, disease prevention, and health education and counseling.” The role of advanced care nurses has been around since the late 1890s; however, it was not until 1965 when the first NP program was established that allowed nurses to expand their roles and work in a collaborative relationship with physicians (Keeling, 2015). Since then, the NP role has evolved as a response to various identified health care needs across populations. NPs are independently licensed and can specialize in serving different areas and patient populations, such as gerontology, adults, pediatric, family, women's health, and mental health. Like PAs, the role of NPs continues to expand and grow in all health care disciplines and settings. The NP profession is considered the fastest growing nurse profession, with a predicted job rate of 28% over the next ten years (U.S. Bureau of Labor Statistics, 2018).

One of the main differences between PAs and NPs is the clinical background and the education and training. While PAs receive training under a more traditional medical school model, NPs receive dual training first as registered nurses (RNs), then later in NP school under a “nursing” model that takes on a more holistic, patient-centered approach to care. The “nursing” model is a comprehensive approach that focuses on the patient’s physical, psychosocial, and spiritual needs. NPs receive training that addresses both the patient’s physical symptoms and disease state and health education and disease prevention (AANP, 2020). While in NP school, trainees choose a specialty area of focus based on a specific patient population or disease state, such as geriatrics, pediatrics, mental health, women’s health, or primary care. NPs can either seek a master’s degree or a Doctor in Nursing Practice (DNP) from a nursing program. NP programs typically require students to complete around 500 didactic hours and between 500-700 clinical hours (or 1000 for DNPs). Following graduation, NPs may choose to practice in any health care field within their specialty certification and even sub-specialize in areas such as cardiology, emergency medicine, or oncology. However, according to a 2019 national workforce NP survey (AANP, 2019), most NPs (89.7%) are certified in an area of primary care, with the majority (69%) of all NPs delivering primary care. Currently, there are over 290,000 certified NPs in the United States, with 89.0% practicing clinically and over 50% in a hospital or office-based setting (“More Than 290,000,” 2020).

Like PAs, NPs also receive their licensure at the state level, including laws and legislative bodies that regulate their scope of practice. However, as PAs are considered dependent APPs that work in collaboration with physicians, the NP profession has pushed for licensed independent practice to work to the full scope of their license. In

response to a growing shortage of physicians, the NP profession has advocated for “Full Practice Authority” (FPA), which is the authorization for NPs to provide quality health care at the top of their education to patients under the exclusive authority of the state board of nursing (AANP, 2019). However, in specific specialized fields of medicine, NPs continue to work closely with physicians and other health care professionals in an integrated, multi-disciplinary team-based practice setting. Within team-based care, both PAs and NPs can collaborate and coordinate quality health care centered on patient needs to accomplish shared goals and optimal outcomes. Table 2.1 summarizes a few of the differences and similarities between PAs and NPs.

Table 2.1

Comparison of Physician Assistants and Nurse Practitioners: Overview of Education, Licensure, Certification, and Scope of Practice

Advanced practice role	Education / Degree / Length of Training	Licensure / Certification	Prescriptive Authority	Surgery Assist
Physician assistant (PA)	Master's degree; ~1000 didactic hours 2000+ clinical hours	State Medical Board; NCCPA	Yes, require supervising or collaborating physician agreement	Yes
Nurse practitioner (NP)	Master's degree or Doctorate (DNP) (preferred by AACN) ~500 didactic hours ~500-700 clinical hours (1000 for DNPs) beyond RN training	State Board of Nursing; AANP NP specialization: adult, pediatric, geriatrics, acute care, women's health, mental health	Yes, scope regulated by the state board of nursing	Require RNFA certification

Note. DNP = Doctor of Nursing Practice; AANP = American Association of Nurse Practitioners; NCCPA = National Commission on Certification of Physician Assistants; RNFA = Registered Nurse First Assistant

Collaborative Practice Models

APPs are health care practitioners where a collaborative professional relationship with a physician is often required. Studies show that for teams to be effective, they must employ structural features, such as practice models, which consist of well-designed tasks, composition, and the sharing of resources (Hackman, 1987). APPs work with physician partners in various practice settings, including inpatient, outpatient, and procedure-based

or surgery assist roles. In the ambulatory setting, three main collaborative practice models exist for APPs: 1) shared care model, 2) independent care model and 3) the mixed care model (Buswell et al., 2009). In the shared care model, the physician and the APP see each patient together. Specific tasks are divided between the practitioners, but there is usually some overlap in their clinical responsibilities.

APPs may start the clinical documentation in most cases, but the physician will complete the note and bill for rendered co-managed services. In the independent care model, APPs will see patients and document independently, with or without the physician being present. Typically, depending on the complexity of service, patients are assigned to either the APP or the physician. APPs and physicians work together on treatment plans and critical decisions, such as end-of-life or palliative care. The independent model is the most commonly used model in oncology practice, and results from a recent national survey indicate that it yields the highest satisfaction among APPs (Bruinooge et al., 2018). Frequently, APPs may work in a mixed model of care, which incorporates at different times a mix of both shared and independent visits, with neither type of visit more predominant than the other. In the analysis performed by Buswell et al. (2009), physicians were highly in favor of either the shared care or independent care model, both generating high scores in the areas of patient satisfaction and productivity. A recent survey of PAs (Bruinooge et al., 2018) showed that the most prevalent factors that dictated their practice models included physician preference (82%), employer policy (52%), and patient complexity (33%). Moreover, more than 40% of the APPs report that physicians have to sign the APP notes and review their charts despite the collaborative arrangements.

For inpatient and procedure-based APPs in collaborative practice, their role is quite extensive and varied. Often, APPs integrate a medical staffing model that includes trainees, such as students, residents, and fellows. Hospitalist APPs work in a shared team model in most academic centers and function very similarly to a permanent physician resident in carrying out and placing staff physician orders. Additionally, unlike NPs, PAs receive core privileges following basic training to assist in surgery. PAs may also receive competency training to perform various other valuable hospital procedures. Studies have shown that the incorporation of APPs in inpatient care and surgical cases facilitates team communication and outcomes (Pezzi et al., 2009; Russell et al., 1999). Furthermore, a national survey of academic institutions reported that the use of APPs provides a perceived benefit on access to care, quality and safety, continuity of care, and decreased hospital stay (Moote et al., 2011). Team collaboration and effective communication are essential to ensure optimal patient care and outcomes. However, there is currently a lack of literature that compares both inpatient and procedure-based APP staffing models.

Psychological Safety (PS) in Healthcare

Regardless of the collaborative team model, APPs are integral health care team members, and as licensed clinicians, they have comparable functions and goals as their physician partners. According to the Institute of Medicine (Mitchell et al., 2012), the pillars of highly effective health care teams include:

- Shared and valued goals,
- Clear roles,
- Mutual trust,

- Effective communication, and
- Measurable processes and outcomes

A health care team aims to meet patient needs while encouraging all team members to perform to the full extent of their license, education, and experiences. Effective team-based care also relies on having a psychologically safe environment, a practice atmosphere that fosters open communication, shared ideas, and mutual trust. The concept of psychological safety (PS) was first introduced to organizational psychology over a half-century ago by Schein and Bennis (1965). At that time, PS was described as a critical component of the “unfreezing” process required for the organizational learning of individuals. They initially identified PS as a cognitive state necessary for learning and for change to occur (Schein & Bennis, 1965). For individual team members, PS was the ability “to show and employ oneself without fear of negative consequences to self-image, status, or career” (Kahn, 1990). Khan (1990) also remarked that PS was one of the contributing factors that affected personal engagement and disengagement in the workplace. Over the years, PS has evolved from an individual perception of interpersonal risk-taking (Kahn, 1990; Schein & Bennis, 1965) to a group or unit-based phenomenon that “facilitates the willing contributions of ideas and actions to a shared enterprise” (Edmondson & Lei, 2014). According to Edmondson (1999), PS is a shared belief that a work unit or team is safe to engage in team-learning behaviors that may lead to goal achievement and improved team performance.

In health care, PS is a critical element of effective teamwork and one of the nine key components of the Institute of Health Care’s “Framework for Safe, Reliable and Effective Teams” (Frankel et al., 2017). In a recent study performed by Google, PS was

“by far the most important of the five key dynamics” for successful, effective teams (Rosovsky, 2015). A psychologically safe environment facilitates open communication, team learning, and the sharing of team ideas and goals, irrespective of an individual member’s status or position. Among health care teams, PS allows members to express their concerns and be willing to learn from failures and admit mistakes (Carmeli & Gittell, 2008). PS also encourages team members to try a new skill without fear of retribution or embarrassment.

Specific to the APP and collaborating physician (CP) partnership, where the need to deliver quality patient care is of the utmost importance, the consequence of promoting a PS environment remains crucial. Both Kahn (1990) and Edmondson (1999) have identified that positive leader-member relationships can influence the perceptions of PS in the workplace. Also, the quality of social exchanges between leaders and followers can significantly impact both individual and team expectations regarding role clarity and the appropriateness of certain behaviors (Edmondson, 2014). Additionally, the specific leadership behavior and style, including change empowerment, truthfulness, and inclusion, may facilitate collaboration and increased PS among team members. Furthermore, specific work design characteristics, including team structure and interdependence, may significantly impact a team member’s psychological state by instilling autonomy and trust, thereby influencing PS (Edmondson 1999; Hackman, 1987).

However, in most healthcare institutions, a well-established hierarchy status often exists, making learning and collaboration between team members challenging. Within cross-disciplinary teams, Nemhard and Edmondson (2006) reported that those with

higher professional status (e.g., physicians) experience more PS than those with a lower status (e.g., nurses), and this trend extends to lower status providers (e.g., APPs) as well. For example, a nurse may feel intimidated to contact a physician regarding a questionable laboratory finding or decline in a patient's condition due to fear of being reprimanded or labeled incompetent or disruptive. Studies among health care teams have demonstrated that PS may affect patient safety, including event reporting (Tucker & Edmondson, 2003). However, the available literature that studies the impact of PS among APPs in collaborative practice is currently lacking. With the increase of APP collaboration and expanded emphasis on team-based care, it is essential to understand the factors that impact PS in cross-disciplinary teams.

The next section will examine two major factors noted in the literature that contribute to PS within the health care team, followed by an overview of two main leadership theories that may help describe the APP and CP relationship. The first factor is team interdependence related to team structure, culture, and cohesion between health care team members. Secondly, the concept of relational or collaborative leadership will be discussed, including two major themes identified in the literature that promote PS: leadership behavior and network ties (Aranzamendez et al., 2014). Specifically, different leadership behavior may serve as critical antecedents of PS. Additionally, the quality of team relationship between APP and CP may influence the development of a PS atmosphere.

Team Interdependence (TI)

Team interdependence (TI) occurs when two or more team entities work collectively towards a common goal. TI is an essential facet of team culture, and it considers both the team structure and how a team operates and relates. According to Barrick et al. (2007), TI determines the “degree to which members need to rely on each other to complete projects and fulfill member needs” (p. 546). The task interdependence level may vary among groups, ranging from pooled to sequential to reciprocal types of interdependence (Thompson, 1967). Teamwork refers to a collection of attitudes, skills, and knowledge that team members utilize to navigate these interdependent tasks (Taplin et al., 2015). Teams with high interdependence have boundaries that clearly distinguish their members from non-members (Wageman et al., 2005). Teams with low interdependence are not considered a “real team” and may be more commonly labeled as a “working group” (Hackman, 2002; Katzenback & Smith, 1993). Additionally, “real teams” have some level of stability and include members that work interdependently towards a common, shared goal.

In health care, PAs receive an accelerated, generalized medical training under a physician training model. PAs also have a defined regulatory legal agreement which is established at the state level and a collaborative practice agreement with physicians. NPs first receive training as nurses and then receive specialized medical training according to the patient population, such as pediatric, adult, gerontology, and women’s health. The NP scope of practice and responsibilities depend mainly on that individual’s specialization and the state in which they practice. Both PAs and NPs, collectively known as APPs, receive advanced clinical training to provide a broad range of services, including the

diagnosis, management, and treatment of various illnesses or diseases. In oncology, APPs often work in collaboration with other health care providers to form team units with a shared goal to deliver quality care for cancer patients.

According to Hackman (2002), team structure may also predict team performance, which may embody different professional disciplines and role functions. Although APPs may work with different physicians in various practice settings, the APP partners with a collaborating physician to set a basic provider team structure. In most medical practices, the physician adopts the role of the team leader. Despite having formal practice agreements, not all physicians and APPs work together as highly cohesive teams. When APP/ physician teams display high interdependence, there may be a significant need to effectively communicate and coordinate efforts to reach common goals (Barrick et al., 2007). Conversely, low-level interdependent teams do not require as much coordination and communication between members and perhaps necessitate less commitment to a team-based approach to care. Nemhard & Edmondson (2006) propose that a “unit team” consists of cross-disciplinary, interdependent team members. According to their study, “unit team” membership interacts with professional status to predict psychological safety.

Many hospital systems have an organizational team-based structure that supports member involvement at different levels. In modern medicine, a traditional hierarchy model still exists based on an individual’s rank, position, level of education, or even medical specialty. This “vertical” model has been a long-entrenched paradigm in the scientific community and medical practice. The preeminent rank of doctor or physician often assumes the leadership role in decision-making, including diagnosing, treating, and

managing patients. Other caregivers and providers, including nurses, APPs, and medical assistants, often assume a subordinate role to the physician team leader. This status hierarchy in medicine makes it difficult for individuals to speak across professional boundaries and collaborate for learning (Edmondson, 2003). One study from Denmark described how a flat, more lateral hierarchical gradient between medical and nursing staff enabled more effective team communication and better patient care (Rabøl et al., 2012). Since the Institute of Medicine's published report, *To Err is Human* (Kohn et al., 2000), there has been a growing emphasis on improving teamwork in health care. The shift from "vertical" decision-making to a more horizontal or fluid power shifting approach facilitates a shared or distributed leadership model that fosters open team collaboration and decision-making. Effective team leadership promotes a psychologically safe environment that encourages team members to speak up, ask questions, and point out concerns or possible errors.

Leader Inclusiveness (LI)

LI is defined as "words and deeds by a leader that indicate an invitation and appreciation for others' contributions" (Nembrand & Edmondson, 2006), and is considered a critical behavior that encourages PS. It has been well studied that team leader behaviors profoundly affect internal team dynamics, including team communication and overall team climate (Edmondson, 1999). Inclusive leaders seek to overcome status differences in cross-disciplinary teams such that members feel comfortable speaking up. Baer & Frese (2003) reported a meaningful correlation between PS and leadership climate. Leaders that exhibit accessibility, openness, and fallibility showed a lower threshold for fear of interpersonal risk-taking, thus promoting innovation and team engagement (Carmeli et al., 2010). In a large study encompassing

hospital workgroups in Israel, inclusive leadership was related to enhanced team performance (Hirak et al., 2012). The authors perceived that inclusive leadership allowed the work units to better learn from their failures, in turn, promoting PS. Nembrand and Edmondson (2006) also discovered that PS, along with LI, stimulates team engagement in quality improvement activities.

Within interdependent teams, members are keenly aware of leadership behaviors. If the team leader takes an authoritarian approach, members are less likely to communicate openly and express their thoughts, shared ideas, or concerns. Conversely, if a team leader takes a more democratic approach, members are more apt to share feedback; thus, creating a more PS environment. In a qualitative study among cardiac surgery teams, higher levels of PS were noted among groups with leaders who actively invited others' input, contrary to teams with leaders that were not as proactive (Edmondson, 2003). Inclusive leadership gains team leader qualities and coaching behaviors that facilitate group processes. As discussed earlier, within APP/ physician collaborative teams, the physician typically holds the higher professional status and is usually the team leader in the unit membership. Nembrand and Edmondson (2006) suggest that both appreciation and direct invitation are necessary for surmounting the hurdles of status boundaries, as seen in the APP/ physician relationship. LI describes the team leader behavior that intentionally consults with team members and invites them to share decision-making. In a clinical setting, a physician-inclusive leader may acknowledge and ask their APP to take on more decision-making authority in patient care, thus promoting a psychologically safe environment for collaborative practice.

Collaborative Leadership Theories

Among other leadership theories, the concept of teamwork and shared leadership helps describe the unique collaborative relationship between a physician and their APP in most medical practices. However, in describing the interactions between a physician leader and their APP follower, one must also consider additional forms of relational leadership to understand better the process that contributes to a PS team environment. Drawing from the social learning theory, the quality of human relational activities may contribute to a shared perception of safe interpersonal risk-taking (Carmeli & Gittell, 2009). The complex dyadic interplay between leaders and followers may alter each individual member's perception of the team environment. The leader-member exchange (LMX) and transformational leadership theories provide insight into how leaders may influence followers to accomplish certain goals or outcomes. Additionally, both leadership theories may help illuminate the perceived inequalities that distinguish teams with high or low levels of PS, as well as factors that might contribute to these differences.

Leader-Member Exchange (LMX) Theory

The Leader-Member Exchange (LMX) is a popular leadership theory that focuses on the dyadic relationship and interactions between a leader and each of their followers (Graen & Uhl-Bien, 1995). LMX asserts that a leader may have different relationships across followers based on the quality of the leader-member interactions over time. According to the LMX theory, two general vertical dyadic relationships may form: "in-group" and "out-group." The "in-group" is characterized by having followers with expanded role responsibilities, more opportunities, and closer interactions with the leader. In contrast, followers in the "out-group" have more formal, defined roles and responsibilities with standard benefits and fewer interactions with the leader (Yukl & Van

Fleet, 1992). The LMX theory suggests that followers may become part of the “in-group” or “out-group” within an organization or team, based on the quality of the social exchanges between the leader and each follower. Factors contributing to whether a follower becomes a part of the leader’s “in-group” are often subjective and variable; however, these high-quality relationships are characterized by mutual respect, high trust, more support, and liking with reciprocal influence. Additionally, Dansereau et al. (1975) distinguished followers in the “in-group” as being more dependable, more communicative, and more highly involved than “out-group” followers. The highly differentiated relationships between leader and followers can result in “out-group” members developing resentment and frustration, which may negatively impact team performance.

LMX research provides insight into why confident leaders may develop closer relationships with some followers compared with others. In health care, prior studies on LMX have focused on nursing staff relationships within team units. For example, Thompson et al. (2011) studied how leader-member relationships within nursing units affected the nurse perception of safety climate and how nursing units with high LMX scores reported better communication to report safety concerns or errors. Another nursing study looked at the role of LMX relationships and the transfer of personal knowledge (Davies et al., 2011). The literature on LMX theory among APPs in collaborative practice with physician leaders remains scarce. In a team-based practice setting, physician leaders may also have different relationships with APPs and other team members. The quality of these relationships may fluctuate over time based on the context or the circumstances. Additionally, because a leader may have different relationships

with followers, individual PS may vary between followers in the same group. The perception of leadership behaviors can change between the leader and followers, and there could also be variance in perceptions between followers of the same leader. LMX is a crucial leadership theory addressing the process centered on the interactions between leaders and followers. Transformational leadership is another approach that focuses on the process of how leaders can successfully foster positive relationships with followers.

Transformative Leadership

Like LMX, transformational leadership is another theory centered on the relationship process between leader and follower. However, as its name implies, transformational leadership focuses on the leadership behavior that transforms and inspires positive change among followers for the good of the team or organization (Avolio et al., 2009). The transformative leader is attentive to followers' needs, values, motives, and concerns and tries to help them reach their fullest potential (Northouse, 2019). The leader also creates and casts a clear vision and motivates followers to attain high standards and goals that benefit the group. Additionally, the transformative leader fosters goal attainment by providing resources, role modeling, and encouraging teamwork (Schaubroeck et al., 2007). By promoting a cooperative, social climate, leaders facilitate open communication and encourage desired follower behaviors that accomplish team goals (Morgeson et al., 2010). In a study by Raes et al. (2012), the processes of transformative leadership helped strengthen the relationship between leader and member, which encouraged members to engage in team-learning behaviors. They also found that PS mediates the relationship between transformative leadership and team-learning behaviors. Leaders help to cultivate a positive team climate by building trust and

fostering collaboration with others. According to Morgenson et al. (2010), a supportive social environment is key to effective leadership. In the health care setting, transformative leadership is one leadership style that can guide collaborating physicians to successfully engage APP team members in fostering positive relationships in a PS environment.

Clinician Well-Being (WB) among APPs

Studies have shown that team-based care is strongly associated with better patient outcomes (Welp & Manser, 2016). In addition to improving performance and effectiveness, teamwork must also contribute to its team members' "growth and personal well-being" (Bodenheimer & Willard Grace, 2016). Promoting clinician WB is critical to the delivery of efficient and effective health care. With optimal team-based care, the health care team can achieve the clinical goals for clinical providers and patients. Successful teams are capable of improving patient-care outcomes and enhancing the overall efficiency of health care. Highly effective teams can also improve clinicians' job satisfaction and general WB (Smith et al., 2018). Furthermore, high-functioning teams often share clearly articulated goals and roles that enable a tight team structure. This enabling social team structure promotes a PS environment that assures resources and coaching to promote the well-being of both the team and its members (Smith et al., 2018). Studies have also shown that effective team communication and a strong team climate promote clinician WB (Bodenheimer & Willard Grace, 2016; Cheng et al., 2013). As Welp & Manser (2016) described, however, the complexity of teams, including their inter-professional structure, makes it complicated to determine if a causal relationship exists between teamwork and WB. Additionally, there are multiple factors

associated with clinician WB, including both internal and external factors. Much of the WB literature recently has focused on the prevalence of burnout, a syndrome characterized by emotional, mental, and physical exhaustion. In addition to burnout, clinicians in the health care setting encounter multiple dimensions of distress that should also be clarified and addressed in the broader WB context.

Clinician Distress and Burnout

Recent studies have demonstrated high rates of distress and burnout among healthcare workers, including physicians and APPs (Dyrbye et al., 2019; Essary et al., 2018; Shanafelt et al., 2015). Distress is pervasive among many health care professionals and can manifest in various ways, including stress, depression, fatigue, and low job satisfaction (Shanafelt, 2012). Burnout is the most common manifestation of distress and is characterized by emotional exhaustion, depersonalization, and a negative sense of accomplishment. Burnout syndrome affects approximately 50% of physicians and 35% of nurses, with similar rates affecting PAs and NPs (Dyrbye et al., 2019; Essary et al., 2018). Distress and burnout can have severe personal and professional consequences, including adverse outcomes for patients and clinical providers. Some of these negative professional outcomes include increased medical error, decreased patient satisfaction, reduced clinical productivity, along with attrition from clinical practice, and increased cost of care (Dyrbye et al., 2017; Shanafelt et al., 2015; Welp & Manser, 2016). Some personal consequences of increased distress and burnout include higher risks of stress, anxiety, depression, alcohol and substance abuse, strained personal relationships, and suicidal ideations. In a study of 1,171 inpatient nurses, 18 percent had depression compared to a national prevalence of nine percent (Letvak et al., 2012). Physicians are

also at increased risk of suicide compared with the US general population (Center et al., 2003). In a recent large national study of PAs and NPs, 38.5% had at least one substantial symptom of burnout, and nearly one-third considered a job change (Dyrbye et al., 2019). Also, dissatisfaction with control of workload and work-life integration were independently associated with a higher risk of burnout among PAs (Dyrbye et al., 2020). For clinicians, there are multiple dimensions of distress with overlap affecting both personal and professional outcomes. However, many clinicians with distress are reluctant to seek help on their initiative, and they remain unidentified or untreated as providers (Shanafelt et al., 2015).

Distress During the COVID-19 Pandemic

Before the COVID-19 outbreak in early 2020, the U.S. clinical workforce was already experiencing a widespread burnout crisis (Shanafelt et al., 2020). As with other crisis moments in U.S. history, health care front-line workers are subject to increased risk of physical and emotional harm that could have immediate and long-lasting effects on hospitals and health care systems (Shanafelt et al., 2020). Not only are clinicians threatened by increased exposure to the deadly virus, but also sudden changes and strains affecting teams, including extra-long work hours, coverage for emergency unprepared roles, and social isolation from team members, co-workers, and patients. Additionally, amid the pandemic, clinicians may encounter severe emotional and mental distress, including self-stigmatization of being forced to choose between protecting themselves and their loved ones from exposure to the deadly virus or caring for sick patients during a national crisis (Dzau, 2020). In a recent national survey of PAs during the COVID-19 crisis, one in five (22.1%) PAs were furloughed, and 58.7% cited a reduction in workload

during the early months of the pandemic (AAPA, 2020). Additionally, over 70% of PAs reported being somewhat concerned with their health and the health of their families. In a recent NP COVID-19 survey (AANP, 2020), 17% of NPs were furloughed, and 53% of NPs reported being exposed to SARS-CoV-2 in their practice or elsewhere. As the COVID-19 crisis stretches on, clinicians remain exposed to unique long-term stressors and risks, which may further increase their high risk of distress and burnout.

Distress Among Oncology Providers

Oncology is a specialty field of medicine that cares for cancer patients, a vulnerable population with challenging physical and emotional needs. Oncology providers often work long hours, administer highly toxic and dangerous therapies, and are continuously exposed to death and suffering (Shanafelt et al., 2012). Oncology caregivers are often faced with challenging ethical dilemmas related to palliative or life-saving measures and end-of-life care. In a study among hematopoietic cell transplantation professionals, high levels of moral distress were found across health care disciplines, contributing to job dissatisfaction, burnout, and turnover (Neumann et al., 2017). Furthermore, a nationwide study of U.S. oncologists revealed that 44.7% of oncologists experienced symptoms of burnout (Shanafelt et al., 2014). Long work hours devoted to direct patient care and dissatisfaction with work-life balance were dominant professional factors associated with burnout.

Burnout Among Oncology APPs

In a recent national study of PAs in oncology, Tetzlaff et al. (2018, 2021) noted an increase in burnout among PAs from 34.8% (2015) to 48.7% (2019). Despite high levels of career satisfaction, some factors associated with higher rates of PA burnout include increased work hours, less time spent on direct patient care, and practicing below

their education and the full extent of training. Interestingly, higher PA burnout rates were more related to inadequate roles and responsibilities within the team-based practice, such as dissatisfaction with collaborating physician (CP) and perceptions of poor CP leadership rather than specialty or team practice settings. The PA perception of CP and their leadership qualities were independently associated with professional burnout. Burnout was high among PAs that “did not feel valued by CP,” or their “contributions to practice were not acknowledged” (Tetzlaff et al., 2018, p. e15). Burnout was also high among PAs who felt that their CP did not encourage them to achieve professional goals. This study by Tetzlaff et al suggests that the collaborative, interdependent relationship between a PA and physician may significantly impact clinician burnout.

In a study of 201 oncology NPs by Bourdeanu et al. (2020), 31.3% reported professional burnout as measured by the Maslach Burnout Inventory (Maslach & Leither, 2008), which is a common, well-validated scale that addresses all three burnout symptoms, including emotional exhaustion, depersonalization, and reduced personal accomplishment. Additionally, over 20% of oncology NPs reported intention to leave their oncology job or NP profession, including 43.5% of those with high emotional exhaustion. As described previously, low job satisfaction and turnover may be signs of clinician distress. Interestingly, Boureanu et al. (2020) also examined areas of work-related factors, such as community, value, control, reward, workload, and fairness, utilizing the Areas of Worklife Survey (AWS), and all subscales were significantly related to intent to leave for oncology NPs. However, the AWS study failed to identify the nature of specific subscales, such as value and fairness, which may also be related to health care team relationships.

Job Satisfaction

According to Hackman & Lawler (1971), the job enrichment theory asserts that certain job features, such as more task variety and task autonomy with more complex roles, may enhance job satisfaction and worker motivation. Internal rewards related to role opportunities and increased job recognition may lead to positive job enrichment and possibly to an empowering organizational environment. On the contrary, several studies on role expansion and increased job demands for APPs have yielded adverse outcomes, such as reduced perceived internal motivation and decreased job satisfaction.

Furthermore, work stress derived from increased job demands has caused turnover and increased burnout (Hoff et al., 2017). These differing outcomes and views regarding role expansion and increased job demands suggest the possibility of additional variables, such as perception of PS and teamwork, that may have an effect on clinician WB. Additional studies are needed to examine the collaborative APP/ physician working relationship and to establish which factors (e.g., external, internal, team-related, or individual) may have a substantial relationship with clinician WB.

Summary

Improving team-based care is one potential measure in solving the multi-faceted problem of decreased clinician WB. Due to the close interdependent relationship between APP and CP, LI, LMX, and PS may play critical roles in team effectiveness and functioning. The purpose of this study was to examine the potential relationship between PS and clinician WB among APPs in oncology. This study was conducted during the COVID-19 outbreak, which may have accentuated team-based practice and workforce

dynamics inadequacies. In addition, this examined the factors that influence PS in APP/CP working relationships, such as LI and LMX.

Chapter III

Methodology

The focus of this study was to examine factors contributing to PS among oncology APPs and explore the relationship between PS and clinician WB. The study was conducted during the global COVID-19 pandemic, and participants were asked to complete survey questions while reflecting on the team environment and interactions with CP that occurred during the current 2020 pandemic. This study employed a non-experimental, cross-sectional, correlational survey design.

Several studies have explored PS and clinician WB in the United States. Nemhard et al. (2006) studied PS among over a hundred quality improvement project teams in neonatal intensive care units (NICUs) in 23 North American hospitals. They used descriptive analyses with intercorrelation to identify characteristics that might contribute to PS. Additionally, Edmondson et al. (2016) explored PS in two large survey-based data sets, one in education and another in health care. They demonstrated the utilization of validated PS scales for cross-sectional, correlational research. Furthermore, several studies have employed correlational web-based surveys and descriptive statistics to measure burnout and clinician WB (Dyrbye 2019; Hoff, 2017; Shanafelt, 2015). This study helped to determine whether PS positively correlates with clinician WB among APPs in oncology team-based practice.

This chapter begins with reviewing the research question and variables of interest, including a brief description of measures and scales used in this study. Then, there will be a review of the research design, methodology, and interventions used in the study.

Also, the data analysis plan and procedure will be described, including threats to reliability and validity.

Research Questions

Given the purpose of this study during the COVID-19 pandemic, the primary research questions in this study were:

What factors contributed to PS among APPs in oncology? What was the relationship between PS and clinician WB among APPs in oncology?

Variables

This study represented the first known study to explore characteristics among APPs that may contribute to PS. First, this study examined several factors, including demographic and professional characteristics contributing to PS among APPs in oncology. Respondents reported the following demographic characteristics: age, gender, highest degree obtained, working status, years of experience as an APP and in the oncology practice. Participants also indicated their professional characteristics, including APP profession, oncology specialty, practice location and setting, and clinical role. Additionally, professional team characteristics were obtained, including team leader, number of oncology physicians in practice, team practice model, and hours per week APP spent in direct and indirect patient care. Also, team structure focused on the consistency with which APPs were paired with the same CP.

PS was the main independent variable and predictor variable to examine its relationship with clinician WB. As described in previous studies on PS in health care, LI was another experimental variable among APPs that may contribute to PS. LMX was

another experimental variable to examine the quality of the APP-leader relationship. Clinician WB was the primary dependent and outcome variable in the study.

Conceptual/Operational Definitions

Psychological safety (PS)- PS is a “shared belief among team members that the work environment is safe for interpersonal risk-taking (Edmondson, 1999, p. 250).” PS is also characterized as a “belief that one will not be punished or humiliated for speaking up with ideas, questions, concerns, or mistakes” (Edmondson, 2018, p. 15).

Leader Inclusiveness (LI)- A style of leadership in which team members perceive that they are a member of a workgroup that satisfies needs for “belongingness and uniqueness” (Shore et al., 2011, p. 1264). For the team leader, inclusive leadership can be characterized as “words and deeds by a leader that indicate an invitation and appreciation for others’ contributions” (Nembhard & Edmondson, 2006, p. 947).

Leader-Member-Exchange (LMX)- Another style of leadership that focuses on the “dyad” leader-member relationship and the quality of exchanges that emerges and generates influence (Graen & Uhl-Bien, 1995). The quality of exchange relationships can simply be described as low and high, representing the “out” and “in” groups, respectively.

Clinician Well-Being (WB)- WB is an “integrative concept that characterizes the quality of life concerning a [clinician]’s health and work-related environment, organization and psychosocial factors” (Chari et al., 2018, p. 590). Clinician burnout, among other distress factors, may lead to diminished well-being (Dyrbre et al., 2019).

Measures

The survey package consisted of two main sections, including the opportunity to respond to two open-ended questions. The first section began with a demographic and professional team questionnaire, followed by an open-ended question to provide context about the APP's role during the COVID-19 pandemic. The second section involved the completion of four self-reported scales or instruments for PS, LI, LMX, and WB. Following this second section, APP respondents were asked an open-ended question to reflect on how the context of COVID-19 pandemic may have influenced their responses to the survey.

Demographic and Professional Questionnaire

The Demographic/ Professional Questionnaire was developed to obtain personal characteristics from the sample and explore the APP's professional and team characteristics. Responses to the survey package were anonymous, but essential demographic data, including professional and team practice settings, were obtained and categorized. The demographic questionnaire included the following categorical variables:

- Age (<20, 21-29, 30-39, 40-49, 50-59, 60+)
- Gender (male, female, prefer not to answer)
- Relationship status (single, married, partnered, widowed, prefer not to answer)
- Race or ethnicity (White, non-White/ other)
- Highest educational degree (Bachelors, Masters, Doctorate, prefer not to answer)

- Employment (full-time with $\geq 50\%$ clinical activity, full-time with $< 50\%$ clinical activity, part-time, not currently employed)
- APP profession (PA, NP, CNS, Other)
- Years working as an APP (<1 , 1-5, 6-10, 11-20, and 21+)
- Years working in oncology practice (<1 , 1-5, 6-10, 11-20, and 21+)

Data from the professional questionnaire include the following variables:

- Oncology specialty (medical, surgical, radiation, hematology, multi-specialty, pediatric/other, non-oncology practice)
- Practice location in the United States (urban, suburban, rural, non-US location)
- Practice setting (community hospital, private practice, teaching hospital, VA, other)
- Clinical setting (outpatient, inpatient, both outpatient and inpatient, procedure-based, non-clinical/ other)
- Team leader identification (Collaborating physician, APP supervisor or manager, Non-MD and non-APP leader, other)
- Number of oncology collaborating physicians (0, 1, 2-4, 5+)

- Collaborating physician (CP) team structure: (“I almost always work with the same CP”, “I almost always work with the same small group of CPs”, “I rarely work with the same CP or small group of CPs”)
- Oncology Practice Model (independent visits, shared visits, mixed visits)
- Hours per week (0-20, 21-40, 41-50, 51+)
- Time spent in direct patient care (%) (<25, 25–50, 51-75, > 75)
- Time spent in indirect patient care (%) (<25, 25–50, 51-75, > 75)

Pre-Instrument Context Question

Before the PS instrument questionnaire, respondents were asked the following open-ended question to provide context for the remainder of the survey questions. The primary purpose of this question was to have participants reflect upon their team-based practice, including a setting when team role and interaction were at play during the COVID-19 pandemic. Participants were given 200-character spaces to respond to this question. Following this open-ended question, participants were directed to answer the instrument section of the survey.

“Please take a moment to reflect upon your health care team during the recent COVID-19 pandemic, and briefly describe your role on this team.” (open-text response)

“For the remainder of this survey, please continue to keep in mind your team role during the COVID-19 pandemic as you prepare to answer the following questions.”

Instrument Scales

The second section consisted of four self-report instruments and well-validated scales: Psychological Safety Questionnaire (Edmonson, 1999), Leader Inclusiveness Questionnaire (Nembhard et al., 2006), Leader-Member Exchange (LMX-7)

Questionnaire (Graen & Uhl-Bien, 1995), and Well-Being Index (Dyrbye et al., 2017). Some of the items in the scales were slightly reworded to reflect the intended audience and context, but the meaning of the items remained unchanged.

Psychological Safety (PS) Scale

PS scale is a measure to assess the extent to which APP team members feel safe to take interpersonal risks, such as speaking up and discussing issues openly. PS was measured using Edmondson's (1999) PS Scale, a widely applied measure with a Cronbach's alpha of 0.82. This scale was based on the construct of PS, where each item addresses the shared belief about the extent to which it is safe to be open in a team environment. This seven-item scale was previously validated among physicians, nurses, and respiratory therapists (Tucker, 2007). The scale includes a five-point Likert scale, with the value five indicating the highest level (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree). Although participants were asked to reflect on their work team, the composite score from the PS scale was analyzed on an individual level, as done by Hirak et al. (2012). A positive response to five of the statements and a negative response to two statements (reverse scoring) indicated strong PS.

Leader Inclusiveness (LI) Scale

LI refers to a follower's perception that their leader acknowledges them and displays openness, availability, and accessibility (Carmeli et al., 2010). LI has demonstrated high internal reliability in several studies (Carmeli et al., 2010; Hirak et al., 2012). Nemphard et al. (2006) introduced this construct in the hospital setting and created a simple three-item scale to describe the behavior and attitudes of the physicians-in-charge (Cronbach alpha = 0.75). An adapted version of the three-item LI scale

(Nembhard et al., 2006) was used with APP team members to assess the perceived quality of physician leadership. Participants were asked to rate the level of agreement on a seven-point Likert scale (1= strongly disagree, 7 = strongly agree). An average score was obtained to provide a single perception score for analyses.

Leader-Member Exchange (LMX-7) Scale

LMX-7 is a widely used scale developed by Graen & Uhl-Bien (1995) to measure the quality of relationships with either the leader or one of the followers. This scale was previously validated in the health care setting (Squires et al., 2010; Thompson et al, 2011). Other LMX scales have been developed, but the LMX-7 was noted on meta-analysis across 79 studies (Schriesheim et al., 1999) to provide the soundest psychometric properties of all available LMX measures with a mean reliability coefficient of 0.89. The high Cronbach's alpha supports the use of LMX-7 as a reliable instrument to study the overall quality of relationship between an APP and their team leader. Although this tool can be used to examine general leader/ member exchange qualities, Schriesheim et al. suggested that LMX was best utilized from a member's perspective instead of the leader's perspective.

The LMX-7 consists of seven items that describe the overall quality of the APP relationship with the team leader, such as the CP. The scale uses a five-point Likert scale with five representing the highest level (1 = rarely, 2 = occasionally, 3 = sometimes, 4 = fairly often, and 5 = very often). According to Graen & Uhl-Bien (1995), the total cumulative score reflects the perceived quality of the relationship along a continuum within the following ranges: 7 – 14 (very low), 15 – 19 (low), 20-24 (moderate), 25-29 (high), and 30-35 (very high). As described by Northouse (2019), a total score in the

“high” and “very high” range is representative of the “In” group, and a total score in the “very-low,” “low,” and “moderate” range is representative of the “Out” group.

Well-Being Index (WBI)

The Mayo Well Being Index (WBI) was recently developed to assess multiple dimensions of distress, including depression, anxiety, stress, fatigue, burnout, work-life integration, and meaning in work (Dyrbe et al., 2019). In addition to being studied among physicians, residents, and medical students (Dyrbye et al., 2011, 2014), the WBI was also validated in a large national study of PAs and NPs (Dyrbye et al., 2019) to stratify distress and well-being, along with the risk of medical error and turnover. The instrument consists of nine items, including seven WBI items with a “yes” (one point), or “no” (zero point) response. The remaining two items, meaning in work and work-life balance, utilize a seven-point and five-point Likert scale, respectively (7 = very strongly disagree, and 1 = very strongly agree), and may be scored (one point added for negative response, or one point subtracted from total score for a favorable response). As a result, the total WBI score may range from -2 to 9, with higher scores (≥ 4) indicating a “higher risk,” or greater degree of distress, lower meaning in work, and less satisfaction with work-life integration. In a study by Dyrbye et al. (2019) of US APPs on the efficacy of the WBI, those APPs with a WBI score of ≥ 4 were found to be at greater risk for several adverse outcomes. In this study, the dependent variable of clinician WB was categorized into two groups: high-risk (≥ 4 WBI score) or low-risk (< 4 WBI score) groups.

Post-Instrument Context Question

After completing the instrument questionnaire, respondents were asked the following open-ended question to provide context to their responses to the instruments. Participants were given 200-character spaces to respond to this question.

“Please briefly describe how the COVID-19 pandemic may have affected your health care team, as well as your role in team-based care.” (open-text response)

Reliability and Validity

The survey instruments chosen for this study included three pre-existing scales that demonstrated strong validity and reliability in prior studies. Additionally, the survey package included two open-ended, interpretive short essay questions to provide context related to the COVID-19 pandemic related to team role and team dynamics. One prominent threat to the internal validity was the “subject attitude” threat that could develop from context-based questions associated with the COVID-19 pandemic.

The leading independent variable, PS, was evaluated using the full seven-item PS scale (Edmondson, 1999), demonstrating good internal consistency ($\alpha = .82$) in prior studies. This PS scale was also utilized in several health care settings and demonstrated “construct-level” evidence of validity. However, before this study, the PS scale had not been studied among APPs in team-based practice or within the oncology specialty setting.

LI was evaluated using a simplified three-item scale previously used in the health care setting (Carmeli, 2010; Nembhard et al, 2006), but this scale had not been previously measured in the APP population. An adapted version of the three-item LI scale

demonstrated strong internal consistency ($\alpha = 0.75$) and was utilized with APP team members to assess the perceived quality of physician leadership.

LMX-7 is a seven-item scale studied extensively among teams in health care with robust reliability (Schriesheim et al., 1999). Still, it also had not been studied previously in the APP population. The LMX-7 scale was used to check the overall quality of the leader- APP relationship based on the history of exchanges during the COVID pandemic.

The primary outcome variable, clinician WB was evaluated using the Well-Being Index (WBI), a nine-item scale that measured multiple dimensions of distress. This scale had demonstrated high predictive validity for several adverse distress outcomes, including the area under the ROC curve for the efficacy of several items (Dyrbye et al., 2019). This scale had not been used previously among oncology-specific APPs.

Research Design

This study employed a non-experimental, cross-sectional, correlational survey to examine the factors contributing to PS among oncology APPs and explore the relationship between PS and clinician WB among APPs on oncology. The research design for this study was quantitative, although two open-item response items were used during the survey only to provide context to participant responses.

Participants

The target population for this study included advanced practice providers (APPs) in oncology team-based practice. One practical implication of this study was to transcend the findings of PS and clinician WB to other team-based practices in oncology.

Characteristics of the participants

For this study, a convenience sample of the national population of oncology APPs was taken from the membership database of the Association of Physician Assistants in Oncology (APAO) and the Advanced Practitioner Society for Hematology and Oncology (APSHO). The APAO organization is a constituent organization of the American Academy of PAs (AAPA), and it remains the most prominent national professional organization representing PAs in oncology. APAO membership mainly consists of PAs working in all oncology disciplines, and practice settings across the U.S. Additionally, this sample from APAO membership was most representative of the general oncology PA workforce nationwide. The APSHO is a national professional organization representing NPs, PAs, clinical nurse specialists, advanced degree nurses, and pharmacists working in oncology. The APSHO mission is to “improve the quality of care for patients with cancer by supporting critical issues in education, clinical and professional development” for advanced practitioners in oncology (APSHO, 2020).

Among the survey participants, the specific inclusion criteria included all APPs currently working in oncology in the U.S. regardless of years of experience. However, the specific exclusion criteria included the following:

- Non-APP providers (such as physicians, nurses, therapists, pharmacists, etc.)
- Non-oncology specialty
- Not able to determine a “team leader” in the work unit
- Not currently employed
- APP working outside the United States

- Students and or trainees not already certified as APPs
- Age < 20 years old
- Adults unable to consent

Participant surveys were excluded that did not meet the specific inclusion and exclusion criteria listed above.

Intervention

A link to the study survey was distributed to all APP members of the APAO and APSHO via electronic mail with an invitation to participate in an online survey. The research survey utilized a web based Qualtrics online tool that included multiple-choice, attitude scales, and two short essay questions to provide context for the study. Due to the COVID-19 pandemic, a hard copy version of the survey was not provided. In addition to the survey, participants received a cover letter describing the purpose of this study and a waiver of written documentation of consent to participate in the study. Once participants consented to participate, they were asked a series of eligibility questions to screen for the specific exclusion criteria. Participants that did not meet the above specific study criteria were excluded from the survey. Also, participants that did not consent to the study were not allowed access to the study and were not included in the final study sample. See Appendix A to view a copy of the waiver of written documentation of consent and study survey.

Data Collection Procedures

Data collection was initiated after the study proposal received ethical approval from the Institutional Review Board (IRB) of the University of Houston and the University of Texas MD Anderson Cancer Center. A letter of endorsement was also obtained from the Association of PAs in Oncology (APAO) and the Advanced

Practitioner Society of Hematology and Oncology (APSHO). See Appendix C for copies of endorsement letters.

First, an initial electronic mail was sent to all members of the sample from their respective organizations (e.g., APAO or APSHO). This email included an introduction to the study, including endorsements from the APAO and APSHO organizations. There was an anonymous link to participate in the research study within the electronic mail message that directed subjects to an encrypted Qualtrics web-based survey. The web-based survey remained open for 60 days, and a reminder email to complete the survey was sent out to potential participants on day 30. A combined reminder/ thank you email was sent to potential participants on day 50. Data collection concluded following the 60-day time period, and the web-based survey was then closed to allow for data analyses. The electronic data was then securely merged and checked for data entry errors and coded consistently for analyses.

After completing the survey, participants were invited to participate in a random drawing for four \$25 Amazon gift cards. If respondents chose to participate in the random drawing, they were directed to a separate website with instructions to enter their electronic mail address. Winners of the random gift card drawings were notified after the 60-day time period.

Data Analysis Procedures

Once the data sets were merged and coded appropriately, all data were screened for errors and missing data before analyses. IBM Statistical Package for the Social Sciences (SPSS) version 26.0 computer software was utilized for all statistical analyses. The data analysis plan was conducted in three phases. First, all study variables were

presented using summary statistics, including descriptive and exploratory statistics (e.g., percentages, means, standard deviation, and minimum/maximum values for continuous variables and frequencies and percentages for categorical variables).

Next, a series of bivariate tests (independent samples t-test, One-Way Analysis of variance [ANOVA], Pearson's r correlations) were used to identify which explanatory variables were related to each respective dependent variable at a statistically significant level ($p < .05$). The initial stage of bivariate analysis examined which explanatory variables were significantly associated with the dependent variable PS. The second stage of bivariate analysis examined which study variables were associated with the dependent variable clinician WB (e.g., high vs. low WBI) at a statistically significant level. All explanatory variables that demonstrated a statistically significant relationship with a dependent variable were included in the third phase of the data analysis plan, multivariate analysis.

Specifically, multiple linear regression was used to model the dependent variable PS as a function of all the explanatory variables significantly associated with that dependent variable in bivariate analysis. The multiple linear regression model was assessed in terms of overall statistical significance, R-squared effect size, beta values, and the significance of individual predictors. A binary logistic regression was used to model the dependent variable clinician WB (high vs. low WBI) as a function of all the explanatory variables significantly associated with that dependent variable in bivariate analysis. The binary logistic regression model was assessed in terms of overall statistical significance, odds ratio effect size, and the significance of individual predictors. The

findings in relation to the study research questions were based upon the results of the multivariate analyses.

Within the final inferential analysis presented, all test assumptions related to parametric testing were examined, including normality, homoskedasticity, multicollinearity, linearity, and no undue influence of outliers scores. Criteria for LI, PS, LMX, and clinician WB followed previously established instrument parameters. In terms of psychometric properties, a reliability analysis was conducted for all study scales, including PS, LI, LMX, and clinician WB, to examine if each demonstrated a sufficient level of internal consistency reliability (Cronbach's $\alpha \geq .70$).

In terms of statistical power, the G*power software indicated that within a multiple linear regression model with six predictors, a medium/ large effect size effect (Cohen's $f = .20$) would be detected with power set at .80 and alpha set at .05, using a sample size of 78 study participants.

Summary

Psychological safety (PS) and clinician well-being (WB) were examined in this quantitative, non-experimental, correlational survey employing cross-sectional data collected at the national level using the membership database of the APAO and APSHO. Demographic, professional, and team data and LI and LMX relationship were examined for inter-correlations with PS among oncology APPs. Also, multiple regression analysis helped determine the relationship between LI, PS, and LMX on clinician WB. The study was conducted during the COVID-19 pandemic, and APP participants were allowed to provide context to their responses through two open-ended questions. Finally, the invitation to participate in the study survey was administered over electronic mail, and

APP participants were given up to 60-days to respond to a Qualtrics web-based survey. Operationalizing variables with valid pre-existing instruments addressed threats to validity. Lastly, ethical procedures were employed during original data collection and maintained during secondary analysis.

Chapter IV

Results

Oncology APPs are team-based practitioners that often work alongside a CP or a group of providers to provide quality health care for patients who have cancer. With the growing demands of cancer care, APPs may experience high levels of emotional distress, such as clinician burnout, which may also be exacerbated during the recent global COVID-19 pandemic (Shanafelt et al., 2020). Additionally, health care team dynamics and leadership factors may contribute to overall team effectiveness and clinician WB. PS allows team members to openly communicate and trust one another to share ideas and even admit a mistake. However, teams with low levels of PS experience more frustration, anxiety, fear, and disengagement in the workplace (Carmeli & Gittell, 2009; Edmondson, 1999). Further study is needed to determine whether PS is a factor among oncology APPs and whether there exists a relationship between PS and clinician well-being (WB).

The purpose of this study was to explore the interdependent relationship that oncology APPs have with their CP or team leader and to examine the factors that contribute to PS and the relationship between PS and clinician WB. This study employed a non-experimental, cross-sectional survey across a nationwide convenience sample of oncology APPs from the membership database of two professional oncology APP organizations. APP participants completed survey questions while reflecting on the team environment and interactions with their CP(s) or team leader during the global COVID-19 pandemic.

The study focused on answering the following research questions:

- What are the factors that contribute to PS among APPs in oncology?
- What is the relationship between PS and clinician well-being (WB) among APPs in oncology?

Review of Methodology

As discussed in the preceding chapter, the data analysis plan was conducted in three phases. First, all study variables were presented using descriptive statistics, followed by a series of bivariate tests to identify which variables were related to the dependent variables, PS and clinician WB, at a statistically significant level. All explanatory variables that evidenced a significant relationship with the dependent variables were included in the third phase, multivariate analysis using multiple linear regression models.

Within the final inferential analysis, all test assumptions related to parametric testing were examined and revealed no significant problems. There was a single outlier score within the PS scores distribution that evidenced no undue influence on the analysis. The outlier score was changed from 14.0 to 15.0 (the next score in the distribution that was not an outlier) to mitigate these effects. There were complete data for all study participants, and therefore no need to address missing data values. A reliability analysis indicated a sufficient level of internal consistency reliability for all normed measures, including the instruments reflecting clinician WB (Cronbach's $\alpha = .72$), PS (Cronbach's $\alpha = .90$), LI (Cronbach's $\alpha = .78$), and LMX (Cronbach's $\alpha = .91$).

Final Study Sample

Participants from the membership of the Association of Physician Assistants in Oncology (APAO) and the Advanced Practitioner Society for Hematology and Oncology (APSHO) voluntarily completed the web-based study survey during the 60-day study period in spring 2021. A total of 108 APPs participated in the study. Following the exclusion of surveys that included missing data and did not meet the specific study inclusion and exclusion criteria, the final study obtained 84 responses.

In terms of statistical power, the G*power software indicated that a sample size of 78 study participants would be needed within a multiple linear regression model with six predictors (Cohen's $f=0.20$, power set 0.80, alpha set 0.05). Thus, the current sample of 84 study participants provided sufficient statistical power for the present analysis.

Phase One: Descriptive Analysis

Table 4.1 presents a descriptive analysis of categorical study variables. Data indicated that only about one-quarter of the sample displayed WBI scores with the “high” group, indicating a higher risk for distress ($n=24$, 28.6%). Almost three-quarters sample evidenced an LMX score that reflected an “in-group” level ($n=62$, 73.8%) with a score of 25 or more. Nearly half of the sample was between the ages of 40 – 49 ($n=37$, 44.0%). About half of the sample reported an APP profession of PA ($n=39$, 46.4%) or NP ($n=41$, 48.8%), as well as a primary oncology specialty or subspecialty of medical oncology ($n=43$, 51.2%). Almost three-quarters of the sample reposted an urban location ($n=60$, 71.4%). Nearly two-thirds of the sample described the clinical team leader in oncology practice as a CP ($n=54$, 64.3%).

Most study participants were married ($n=64$, 76.2%), female ($n=78$, 92.9%), of a White race/ethnicity ($n=73$, 86.9%), and reported a highest education level of Masters ($n=69$, 82.1%). Almost half of the study participants reported the number of years worked as an APP in the 11–20 range ($n=33$, 39.3%). About one-third of study participants reported years worked as an APP in the oncology specialty between the range of 11–20 years ($n=29$, 34.5%). Over three-quarters of the sample reported their predominant oncology clinical practice setting as outpatient ($n=68$, 81.0%). Over two-thirds of the sample reported their oncology practice setting as a teaching (academic) hospital ($n=58$, 69.0%). Over half of the sample reported the typical number of hours per week worked in the 41–50 range ($n=43$, 51.2%).

Most of the sample reported the percentage of time spent with in-direct patient care in the < 25 ($n=36$, 42.9%) and 25–50 ($n=37$, 44.0%) categories. About one-third of the sample reported the percentage of time spent in direct patient care in the > 75 category ($n=30$, 35.7%). About half of the study participants reported the number of oncology CPs they primarily work with as two to five ($n=40$, 47.6%). The most commonly reported team model with CP was *I almost always work with the same CP* ($n=47$, 56.0%). Over two-thirds of the sample reported that the predominant oncology practice model with CP was independent visits ($n=57$, 67.9%). Lastly, about 12% ($n=10$, 11.9%) of study participants reported weaker when asked to rate the quality of their relationship with their CP team leader during the COVID-19 pandemic compared to before the pandemic.

Table 4.1*Descriptive Analysis of Categorical Study Variables (n=84)*

Variable	N	%
<i>Well-Being Index (WBI)</i>		
High WBI (Score = greater or equal to 4)	24	28.6
Low WBI (Score = less than 4)	60	71.4
<i>Leader Membership Exchange (LMX)</i>		
Out group (Score=less than 25)	22	26.2
In group (Score=25 or more)	62	73.8
<i>Age</i>		
21 - 29	4	4.8
30 - 39	26	31.0
40 – 49	37	44.0
50 – 59	11	13.1
60 +	6	7.1
<i>APP Profession and/or Clinical Certification</i>		
Physician assistant	39	46.4
Nurse practitioner	41	48.8
Clinical nurse specialist	4	4.8
<i>Primary Oncology Specialty or Subspecialty</i>		
Medical oncology	43	51.2
Surgical oncology	15	17.9
Hematology oncology	15	17.9
Radiation oncology	4	4.8
Multi-specialty	5	6.0
Pediatric or other oncology practice	2	2.4
<i>Location</i>		
Urban	60	71.4
Suburban	21	25.0
Rural	3	3.6
<i>Description of Clinical Team Leader in Oncology Practice</i>		
Collaborating physician	54	64.3
APP supervisor or manager	24	28.6
Non-MD and non-APP leader	6	7.1
<i>Marital Status</i>		
Single	17	20.2
Married	64	76.2
Partnered	1	1.2
Widowed	1	1.2
Prefer not to answer	1	1.2

Note. Table Continues

Table 4.1 (continued)*Descriptive Analysis of Categorical Study Variables (n=84)*

Variable	N	%
<i>Gender</i>		
Male	6	7.1
Female	78	92.9
<i>Race/Ethnicity</i>		
White	73	86.9
Hispanic/Latino/Spanish origin	1	1.2
Black/African American	4	4.8
Asian/Pacific Islander	3	3.6
Other/Prefer not to answer	3	3.6
<i>Highest Education Level</i>		
Bachelors	1	1.2
Masters	69	82.1
Doctorate	14	16.7
<i>Years Worked as an APP</i>		
< 1	1	1.2
1 - 5	19	22.6
6 - 10	18	21.4
11 – 20	33	39.3
21 +	13	15.5
<i>Years worked as an APP in the Oncology Specialty</i>		
< 1	3	3.6
1 - 5	21	25.0
6 - 10	20	23.8
11 – 20	29	34.5
21 +	11	13.1
<i>Predominant Oncology Clinical Practice Setting</i>		
Outpatient	68	81.0
Inpatient	4	4.8
Both Outpatient and Inpatient	12	14.3
<i>Oncology Practice Setting</i>		
Community hospital	15	17.9
Private practice	10	11.9
Teaching (academic) hospital	58	69.0
VA/ Other	1	1.2

Note. Table continues

Table 4.1 (continued)*Descriptive Analysis of Categorical Study Variables (n=84)*

Variable	N	%
<i>Typical Number of Hours Per Week Worked</i>		
< 20	2	2.4
21 - 40	25	29.8
41 - 50	43	51.2
> 50	14	16.7
<i>Percentage of Time Spent with In-Direct Patient Care</i>		
< 25	36	42.9
25 - 50	37	44.0
51-75	10	11.9
>75	1	1.2
<i>Percentage of Time Spent in Direct Patient Care</i>		
< 25	6	7.1
25 - 50	23	27.4
50 - 75	25	29.8
> 75	30	35.7
<i>Number of Oncology Collaborating Physicians (CPs) Primarily Work With</i>		
0	1	1.2
1	23	27.4
2 – 5	40	47.6
6 +	20	23.8
<i>Team Model with Collaborating Physician (CP)</i>		
I almost always work with the same CP	34	40.5
I almost always work with the same small group of CPs	47	56.0
I rarely work with the same CP, or small group of CPs	3	3.6
<i>Predominant Oncology Practice Model with Collaborating Physician</i>		
Independent visits	57	67.9
Shared visits	15	17.9
Mixed visits	12	14.3
<i>Rate the quality of your relationship with your CP team leader during the COVID-19 pandemic compared to before the pandemic</i>		
Weaker	10	11.9
No Difference/Stronger	74	88.1

Note. The total number of respondents was 84

Table 4.2 presents a descriptive analysis of the continuous study variables. Data indicated that the average study participant reported a PS score of 28.51 ($SD=5.50$, MIN/MAX=15.00-36.00) an average LI score of 17.04 ($SD=3.78$, MIN/MAX=6.00-21.00), and an average LMX score of 27.29 ($SD=5.87$, MIN/MAX=8.00-35.00). The distribution of all the scores was approximately normal as the skewness and kurtosis were not significantly greater than three times each respective standard error.

Table 4.2

Descriptive Analysis of Continuous Study Variables (n=84)

Variable	<i>M (SD)</i>	Minimum/ Maximum	Skew (<i>SE</i>)	Kurtosis (<i>SE</i>)
PS ¹	28.51 (5.50)	15.00-36.00	-.71 (.26)	-.32 (.52)
LI ²	17.04 (3.78)	6.00-21.00	-.94 (.26)	.06 (.52)
LMX ³	27.29 (5.87)	8.00-35.00	-.88 (.26)	.40 (.52)

Note. ¹ Psychological safety, ² Leader inclusiveness. ³ Leader-member exchange

Phase Two: Bivariate Analysis with Dependent Variables

Bivariate Analysis Dependent Variable Psychological Safety

Table 4.3 presents a Pearson's r correlation examining the relationship between PS scores by continuous explanatory variables. The two-tailed correlation indicated that higher levels of PS were related to higher levels of LI, $r(82) = .76, p < .01$, and LMX, $r(82) = .72, p < .01$, at a statistically significant level.

Table 4.3

Pearson's r Correlation Between Psychological Safety Scores by Continuous Explanatory Variables (n=84)

Variable	1	2	3
1. PS ¹	--	.76**	.72**
2. LI ²		--	.80**
3. LMX ³			--

Note. ¹ Psychological safety, ² Leader inclusiveness. ³ Leader-member exchange

* $p < .05$, ** $p < .01$.

Table 4.4 presents an independent-samples t-test and One-Way ANOVA analysis of PS scores by categorical explanatory variables. Analysis indicated that PS was not significantly related to age, $F(4, 79) = .37, p = .37$, APP profession, $F(2, 81) = .43, p = .65$, location, $F(2, 81) = .56, p = .57$, description of clinical team leader in oncology practice, $F(2, 81) = .61, p = .55$, marital status, $F(2, 81) = .28, p = .75$, race/ethnicity, $t(34.79) = -3.37, p = .06$, or highest education level, $t(82) = -.15, p = .88$.

However, higher PS scores were significantly related to clinician WB, $t(34.79) = -3.37, p < .01$, whereas lower PS mean scores were evidenced by the group with high WBI scores, indicating a greater risk of distress ($M = 25.21, SD = 6.03$) relative to low WBI scores, or lower risk of distress ($M = 29.83, SD = 4.71$). PS scores were also significantly related to primary oncology specialty or subspecialty, $F(3, 80) = 3.12, p < .05$, where Bonferroni post hoc analysis indicated that the mean score for the surgical oncology group ($M = 6.89, SD = 1.78$) was significantly higher than the medical oncology group ($M = 4.75, SD = .72$). PS scores were also significantly related to the percentage of time

spent with in-direct patient care, $F(2, 81)=3.38, p<.05$, where Bonferroni post hoc analysis indicated that the mean score for the < 25 group ($M=29.61, SD=5.55$) was significantly higher than the < 51 group ($M=24.82, SD=7.01$).

Additionally, PS scores were significantly related to the predominant oncology practice model with CP, $F(2, 81)=4.07, p<.05$, where Bonferroni post hoc analysis indicated that the mean score for the independent visits group ($M=29.46, SD=4.74$) was significantly higher than the shared visits group ($M=25.07, SD=6.73$). Lastly, PS was also significantly related to gender, $t(82)=-3.35, p<.001$, with males evidencing lower mean scores ($M=21.67, SD=5.05$) relative to females ($M=29.04, SD=5.20$). However, the variable gender was not included in the final regression model due to the small number of males in the sample ($n=6$). Lastly, study participants that reported a weaker relationship with their CP team leader during the COVID-19 pandemic compared to before the pandemic demonstrated a lower PS score ($M=24.00, SD=6.55$) relative to those that reported a relationship where there was no difference or a stronger relationship ($M=29.12, SD=5.09$), $t(82)=-2.88, p<.01$.

Table 4.4

Independent Samples T-Test and One-Way ANOVA Analysis of Psychological Safety Scores by Categorical Explanatory Variables (n=84)

Variable	<i>n</i>	<i>M (SD)</i>	<i>t/F(df)</i>	<i>p</i>
<i>Well-Being Index (WBI)</i>			-3.37 (34.79)	.002
High WBI	24	25.21 (6.03)		
Low WBI	60	29.83 (4.71)		
<i>Age</i>			.37 (4, 79)	.37
21 - 29	4	27.75 (6.18)		
30 - 39	26	29.46 (5.42)		
40 - 49	37	28.24 (5.44)		
50 - 59	11	27.27 (6.50)		
60 +	6	28.83 (5.04)		
<i>APP Profession</i>			.43 (2, 81)	.65
Physician assistant	39	28.67 (5.94)		
Nurse practitioner	41	28.61 (5.25)		
Clinical nurse specialist	4	26.00 (3.74)		
<i>Primary Oncology Specialty or Subspecialty</i>			3.12 (3, 80)	.03 ¹
Medical oncology	43	4.75 (.72)		
Surgical oncology	15	6.89 (1.78)		
Hematology oncology	15	4.58 (1.18)		
Other	11	5.86 (1.77)		
<i>Location</i>			.56 (2, 81)	.57
Urban	60	28.15 (5.54)		
Suburban	21	29.62 (5.45)		
Rural	3	28.00 (3.46)		
<i>Description of Clinical Team Leader in Oncology Practice</i>			.61 (2, 81)	.55
Collaborating physician	54	28.02 (6.28)		
APP supervisor or manager	24	29.46 (3.60)		
Non-MD and non-APP Leader	6	29.17 (4.17)		
<i>Marital Status</i>			.28 (2, 81)	.75
Single	17	28.06 (5.67)		
Married	64	28.53 (5.51)		
Other	3	30.67 (5.86)		
<i>Gender</i>			-3.35 (82)	.001
Male	6	21.67 (5.05)		
Female	78	29.04 (5.20)		

Note. Table continues. ¹Bonferroni post hoc analysis indicated that the mean score for the *Surgical oncology* group was significantly higher than the *Medical oncology* group.

Table 4.4 (Continued)

Independent Samples T-Test and One-Way ANOVA Analysis of Psychological Safety Scores by Categorical Explanatory Variables (n=84)

Variable	<i>n</i>	<i>M (SD)</i>	<i>t/F(df)</i>	<i>p</i>
<i>Race/Ethnicity</i>			-3.37 (34.79)	.06
White	73	29.11 (5.03)		
Other	11	24.55 (7.01)		
<i>Highest Education Level</i>			-.15 (82)	.88
Bachelors/Masters	70	28.47 (5.55)		
Doctorate	14	28.71 (5.44)		
<i>% of Time Spent with In-Direct Patient Care</i>			3.38 (2, 81)	.04 ²
< 25	36	29.61 (5.55)		
25 - 50	37	28.54 (4.56)		
Greater than 51	11	24.82 (7.01)		
<i>Predominant Oncology Practice Model with CP</i>			4.07 (2, 81)	.02 ³
Independent visits	57	29.46 (4.74)		
Shared visits	15	25.07 (6.73)		
Mixed visits	12	28.33 (5.94)		
<i>Quality of your relationship with your CP during the COVID-19 pandemic compared to before the pandemic</i>			-2.88 (82)	.005
Weaker	10	24.00 (6.55)		
No Difference/ Stronger	74	29.12 (5.09)		

Note. ²Bonferroni post hoc analysis indicated that the mean score for the < 25 group was significantly higher than the *Greater than 51* group.

³Bonferroni post hoc analysis indicated that the mean score for the *Independent visits* group was significantly higher than the *Shared visits* group.

Bivariate Analysis Dependent Variable Well-Being Index (High vs. Low WBI)

Table 4.5 presents an independent-samples t-test analysis of continuous explanatory variables of clinician WB (high vs low WBI) scores. Analysis WBI scores were not significantly related to LI, $t(33.52)=-1.29$, $p=.21$, or LMX, $t(82)=-1.92$, $p=.06$. However, WBI scores were significantly related to PS scores, $t(34.79)=-3.37$, $p<.01$, with lower PS scores evidenced by the high WBI scores group, indicating a higher risk of

distress ($M=25.21$, $SD=6.03$) relative to the low WBI scores, or lower risk of distress ($M=29.83$, $SD=4.71$).

Table 4.5

Independent Samples T-Test of Well-Being Index (High vs. Low WBI) Scores by Continuous Explanatory Variables (n=84)

Variable	<i>n</i>	<i>M (SD)</i>	<i>t(df)</i>	<i>p</i>
PS ¹				
High WBI	24	25.21 (6.03)		
Low WBI	60	29.83 (4.71)		
			-3.37 (34.79)	.002
LI ²				
High WBI	24	16.08 (4.58)		
Low WBI	60	17.42 (3.38)		
			-1.29 (33.52)	.21
LMX ³				
High WBI	24	25.38 (6.41)		
Low WBI	60	28.05 (5.51)		
			-1.92 (82)	.06

Note. ¹ Psychological safety, ² Leader inclusiveness. ³ Leader-member exchange

Table 4.6 presents a chi-square analysis of WBI (low vs. high) scores by categorical explanatory variables. Analysis indicated that WBI (low vs. high) scores were not significantly relate to age, $X^2(4)=6.27$, $p=.18$, APP profession, $X^2(2)=2.09$, $p=.35$, location, $X^2(2)=2.80$, $p=.25$, description of clinical team leader in oncology practice, $X^2(2)=3.24$, $p=.20$, marital status, $X^2(2)=2.27$, $p=.32$, highest education level, $X^2(1)=0.0$, $p=1.00$, percentage of time spent with in-direct patient care, $X^2(2)=1.31$, $p=.52$, predominant oncology practice model with CP, $X^2(2)=1.54$, $p=.46$, and the relationship of study participants with CP team leader during the COVID-19 pandemic compared to before the pandemic, $X^2(1)=2.55$, $p=.11$.

WBI (low vs. high) scores were significantly related to the variable primary oncology specialty or subspecialty, $X^2(3)=10.68$, $p<.05$, with a significantly lower percentage of the medical oncology (16.3%) and other (18.2%) categories falling into high WBI category. WBI scores were also significantly related to race/ethnicity, $X^2(1)=7.63$, $p<.01$, with a higher percentage of the other category (63.6%) falling into high WBI category relative to the White category (23.3%). Lastly, gender was significantly associated with WBI, $X^2(1)=4.60$, $p<.05$, with a higher percentage of males (66.7%) in the high WBI group relative to females (25.6%). However, the variable gender was not included in the final regression model due to the small number of males in the sample ($n=6$).

Table 4.6

Chi-Square Analysis of Well-Being Index (Low vs. High Index) Scores by Categorical Explanatory Variables (n=84)

Variable	WBI Scores ¹				<i>X</i> ² (<i>df</i>)	<i>p</i>
	Low		High			
	<i>n</i>	(%)	<i>n</i>	(%)		
<i>Age</i>					6.27 (4)	.18
21 - 29	2	(50.0)	2	(50.0)		
30 - 39	16	(61.5)	10	(38.5)		
40 – 49	31	(83.8)	6	(16.2)		
50 – 59	8	(72.7)	3	(27.3)		
60 +	3	(50.0)	3	(50.0)		
<i>APP Profession</i>					2.09 (2)	.35
Physician Assistant	26	(66.7)	13	(33.3)		
Nurse Practitioner	30	(73.2)	11	(26.8)		
Clinical Nurse Specialist	4	(100.0)	0	(0.0)		
<i>Primary Oncology Specialty</i>					10.68 (3)	.014
Medical Oncology	36	(83.7)	7	(16.3)		
Surgical Oncology	7	(46.7)	8	(53.3)		
Hematology Oncology	8	(53.3)	7	(46.7)		
Other	9	(81.8)	2	(18.2)		
<i>Location</i>					2.80 (2)	.25
Urban	40	(66.7)	20	(33.3)		
Suburban	17	(81.0)	4	(19.0)		
Rural	3	(100.0)	0	(0.0)		
<i>Clinical Team Leader</i>					3.24 (2)	.20
Collaborating Physician (CP)	35	(64.8)	19	(35.2)		
APP supervisor or manager	20	(83.3)	4	(16.7)		
Non-MD and non-APP Leader	5	(83.3)	1	(16.7)		
<i>Marital Status</i>					2.27 (2)	.32
Single	12	(70.6)	5	(29.4)		
Married	47	(73.4)	17	(26.6)		
Other	1	(33.3)	2	(66.7)		

Note. Table continues

¹ WBI Low score = less than 4, WBI High score = Greater or equal than 4

Table 4.6 (Continued)

Chi-Square Analysis of Well-Being Index (Low vs. High WBI) Scores by Categorical Explanatory Variables (n=84)

Variable	WBI Scores ¹		$X^2(df)$	p
	Low	High		
	<i>n</i>	<i>(%)</i>		
<i>Gender</i>			4.60 (1)	.03
Male	2	(33.3)	4	(66.7)
Female	58	(74.4)	20	(25.6)
<i>Race/Ethnicity</i>			7.63 (1)	.006
White	56	(76.7)	17	(23.3)
Other	4	(36.4)	7	(63.6)
<i>Highest Education Level</i>			.00 (1)	1.00
Bachelors/Masters	50	(71.4)	20	(28.6)
Doctorate	10	(71.4)	4	(28.6)
<i>% of Time Spent with In-Direct Patient Care</i>			1.31 (2)	.52
< 25	28	(77.8)	8	(22.2)
25 - 50	25	(67.6)	12	(32.4)
Greater than 51	7	(63.6)	4	(36.4)
<i>Oncology Practice Model with CP</i>			1.54 (2)	.46
Independent visits	43	(75.4)	14	(24.6)
Shared visits	9	(60.0)	6	(40.0)
Mixed visits	8	(66.7)	4	(33.3)
<i>Relationship of Study Participants with CP Team Leader During the COVID-19 Pandemic Compared to Before the Pandemic</i>			2.55 (1)	.11
Weaker	5	(50.0)	5	(50.0)
No Difference/ Stronger	55	(74.3)	19	(25.7)

Note. ¹ WBI Low score = less than 4, WBI High score = Greater or equal than 4

Phase Three: Multivariate Analyses

Multivariate Analysis: Dependent Variable Psychological Safety

Table 4.7 presents a hierarchical multiple linear regression analysis examining PS scores. Analysis indicated that within Step Three, the overall model was statistically significant, $F(83)=15.98$, $p<.001$, and explained 71% of the variance in the dependent variable ($R^2=.71$, Adjusted $R^2=.67$). Additionally, within the final model, PS scores were not significantly related to primary oncology specialty or subspecialty, percentage of time spent with in-direct patient care, predominant oncology practice model with CP, or the relationship of study participants with CP team leader during the COVID-19 pandemic compared to before the pandemic.

However, higher PS scores were related to higher LI, $B=.70$, $SE=.17$, $\beta=.48$, $p<.001$ and LMX, $B=.25$, $SE=.11$, $\beta=.27$, $p<.05$, scores at a statistically significant level in the context of the final model. Lastly, lower PS scores were significantly related to being in the high score category within the WBI variable, indicating a higher risk of distress, $B= -2.85$, $SE=.86$, $\beta=-.24$, $p<.001$.

Table 4.7

Hierarchical Multiple Linear Regression Analysis Examining Psychological Safety (PS) Scores (n=84)

Variable	<i>B</i> (<i>SE</i>)	β	<i>p</i>
<i>Step 1</i>			
Primary Oncology Specialty			
Medical Oncology *			
Surgical Oncology	-4.64 (1.59)	-.33	.005
Hematology Oncology	-.84 (1.59)	-.06	.60
Other	-2.66 (1.79)	-.16	.14
<i>Step 2</i>			
Primary Oncology Specialty			
Medical Oncology *			
Surgical Oncology	-3.40 (1.79)	-.24	.06
Hematology Oncology	-1.27 (1.59)	-.09	.43
Other	-2.60 (1.77)	-.16	.15
% of Time Spent with In-Direct Patient Care			
< 25 *			
25 - 50	-.65 (1.25)	-.06	.60
Greater than 51	-3.68 (1.93)	-.23	.06
Predominant Oncology Practice Model with CP			
Independent visits *			
Shared visits	-2.06 (1.81)	-.15	.26
Mixed visits	-.28 (1.73)	-.02	.87
<i>Step 3</i>			
Primary Oncology Specialty			
Medical Oncology *			
Surgical Oncology	-.65 (1.18)	-.05	.58
Hematology Oncology	1.23 (1.02)	.09	.23
Other	-.57 (1.10)	-.04	.61
% of Time Spent with In-Direct Patient Care			
< 25 *			
25 - 50	-.54 (.78)	-.05	.49
Greater than 51	-1.55 (1.23)	-.10	.21
Predominant Oncology Practice Model with CP			
Independent visits *			
Shared visits	-.13 (1.13)	-.01	.91
Mixed visits	-1.46 (1.07)	-.09	.18

Note. * = Indicates reference group for model

Table 4.7 (Continued)

Hierarchical Multiple Linear Regression Analysis Examining Psychological Safety Scores (n=84)

Variable	<i>B</i> (<i>SE</i>)	β	<i>p</i>
The Relationship of Study Participants with CP During the COVID-19 Pandemic Compared to Before the Pandemic	.59 (1.15)	.04	.61
LI ¹	.70 (.17)	.48	.001
LMX ²	.25 (.11)	.27	.018
WBI ³ (0=Low, 1= High)	-2.85 (.86)	-.24	.001

Note. ¹ Leader inclusiveness, ² Leader-member exchange, ³ Well-Being Index

Step 1: Model: $F(83)=3.12$, $p<.05$, $R^2=.11$, Adjusted $R^2=.07$.

Step 2: Model: $F(83)=2.40$, $p<.05$, $R^2=.18$, Adjusted $R^2=.11$.

Step 3: Model: $F(83)=15.98$, $p<.001$, $R^2=.71$, Adjusted $R^2=.67$.

Multivariate Analysis: Dependent Variable Well-Being Index (Low vs. High WBI) Scores

Table 4.8 presents a hierarchical binary logistic regression analysis examining WBI scores (Low vs. High). Within Step Three, the overall model was statistically significant, $X^2(5)=21.39$, $p<.001$, 82.1% of cases categorized correctly. In terms of individual predictors, race was not significantly related to WBI scores within the context of the final model, $B=.30$, $SE=.24$, Wald $X^2=1.56$, $p=.21$. Regarding primary oncology specialty, study participants in hematology-oncology were over five times more likely (OR=5.12, 95% CI=1.29-20.36) to be in the high WBI group relative to the reference group medical oncology, $B=1.63$, $SE=.71$, Wald $X^2=5.36$, $p<.05$. Finally, in the context of the entire model, higher PS scores were significantly associated with a reduced likelihood of being in the high WBI group, $B=-.14$, $SE=.05$, Wald $X^2=7.06$, OR=.87, 95% CI=.78-.96.

Table 4.8

Hierarchical Binary Logistic Regression Analysis Examining Well-Being Index (Low vs. High WBI) Scores (n=84)

Variable	<i>B (SE)</i>	Wald X^2	OR (95% CI)	<i>p</i>
<i>Step 1</i>				
Primary Oncology Specialty				
Medical Oncology *				
Surgical Oncology	1.77 (.66)	7.15	5.88 (1.61-21.52)	.007
Hematology Oncology	1.50 (.66)	5.16	4.50 (1.23-16.48)	.02
Other	.13 (.88)	.02	1.14 (.20-6.47)	.88
<i>Step 2</i>				
Primary Oncology Specialty or Subspecialty				
Medical Oncology *				
Surgical Oncology	1.51 (.70)	4.73	4.55 (1.16-17.80)	.03
Hematology Oncology	1.66 (.68)	5.99	5.25 (1.39-19.85)	.014
Other	.23 (.90)	.07	1.26 (.22-7.28)	.80
Race (White=1, 0=Other)	.38 (.21)	3.27	1.46 (.97-2.20)	.07
<i>Step 3</i>				
Primary Oncology Specialty or Subspecialty				
Medical Oncology *				
Surgical Oncology	1.13 (.76)	2.21	3.08 (.70-13.61)	.14
Hematology Oncology	1.63 (.71)	5.36	5.12 (1.29-20.36)	.02
Other	-.26 (.97)	.07	.77 (.12-5.20)	.79
Race (White=1, 0=Other)	.30 (.24)	1.56	1.35 (.85-2.14)	.21
Psychological Safety	-.14 (.05)	7.06	.87 (.78-.96)	.008

Note. * Indicates reference group for model

Step 1: Model: $X^2(3) = 10.42, p < .05$, 72.6% of cases categorized correctly.

Step 2: Model: $X^2(4) = 13.77, p < .01$, 73.8% of cases categorized correctly.

Step 3: Model: $X^2(5) = 21.39, p < .001$, 82.1% of cases categorized correctly.

Chapter V

Discussion, Implications and Recommendations

Oncology advanced practice providers (APPs) are licensed medical practitioners who collaborate with physician providers to care for cancer patients in a team-based practice setting. APPs are versatile providers that provide quality care in various health care settings, including outpatient, inpatient, procedure-based, and diverse clinical roles. APPs also assume many non-clinical and non-direct patient care roles that are difficult to measure and would otherwise be done or provided by the physician if the APP were not present (Moote et al., 2012). With the expanding role of APP responsibilities beyond clinical care, the interprofessional collaboration and communication among health care team members remain vitally important. Team leadership factors that promote a psychologically safe (PS) environment are also crucial for maintaining high reliability and ensuring favorable health care outcomes, including increased productivity and overall team performance. In contrast, health care teams with low PS have been associated with poor team engagement, increased medical errors, and increased staff turnover which may contribute to a team's overall well-being (Bodenheimer & Williard Grace, 2016; Cheng et al., 2013; Edmondson, 1999). Additionally, high rates of APP burnout in the oncology setting were related to workplace and team leadership factors, such as dissatisfaction with collaborating physician (CP) leadership and lack of feeling valued or recognized for their contributions (Boureau et al., 2020; Tetzlaff et al., 2018). Among APPs in collaboration with physician team leaders, it remains unclear about the factors that may contribute to a psychologically safe environment and whether PS is related to clinician well-being (WB).

The main purpose of this study was to examine the professional and team-leadership factors that may contribute to PS among oncology APPs and determine whether PS is related to clinician WB. This study design was based on a non-experimental, cross-sectional survey across a nationwide sample of oncology APPs utilizing the membership database of two large professional oncology APP organizations. Participants of the study were asked to complete a series of questions while reflecting on their team environment and interactions with their CP(s) or team leader during the global COVID-19 pandemic.

This study answered two research questions:

- What are the factors that contribute to PS among APPs in oncology?
- What is the relationship between PS and clinician WB among APPs in oncology?

Review of the Methodology and Study Sample

Following a 60-day study period, a final sample of 84 APPs completed the survey study and was eligible for data analysis in three phases: summary of descriptive statistics, bivariate testing of explanatory variables, and multivariate analysis using multiple linear regression models. Inferential analysis of the sample revealed no significant problems related to normality, homoskedasticity, multicollinearity, and linearity. Furthermore, reliability analysis indicated an internal consistency for all instruments tested in the study. Also, using the G*power software, the final study sample of 84 participants provided sufficient statistical power within a multiple linear regression model with six predictors (Cohen's $f=.20$, power .80, alpha .05). Overall, all explanatory variables that demonstrated statistical significance ($p<.05$) to dependent variables were

included in multivariate analysis. The findings from multivariate testing helped to answer the two study research questions.

Discussion of the Results

Question 1: What are the factors that contribute to PS among APPs in oncology?

On final multivariate analysis, higher PS scores were related to higher leader inclusiveness (LI) and leader-member exchange (LMX) scores. Both LI and LMX were also significantly related to PS on Pearson's r two-tailed correlational analyses. On bivariate analyses of several demographic and professional characteristics, high PS scores were independently associated with the surgical oncology specialty. Also, low PS scores were independently associated with time (> 51%) spent with in-direct patient care, shared visit oncology practice model, male gender, and those participants that indicated a weaker relationship with their CP during the COVID-19 pandemic compared to before the pandemic. However, following a hierarchical multiple linear regression analysis, none of these demographic and professional factors were statistically significant with PS scores. Among the final analysis, the group with high WBI scores (indicating a higher risk of distress) was significantly related to low PS scores on both bivariate and multivariate analysis. This relationship will be discussed further later in the chapter.

Demographic and Professional Characteristics and Psychological Safety

This study is the first among oncology APPs to examine the demographic and professional characteristics that may contribute to psychological safety (PS). The final study sample includes APP participants from various oncology specialties and practice settings across the US. Through bi-variate analysis, there were several demographic and

professional factors found to be statistically significant. This section briefly explores how oncology specialty, time spent with in-direct patient care, and collaborative practice team model may be related to PS. Due to the small sample of male study participants (n=6), gender was not included in the multiple regression models for analysis and will not be addressed in this section.

Surgical Oncology Specialty

APPs work in all oncology specialties and practice settings in both academic and community locations. In this study, most APPs work in academic centers (60%) and primarily in the outpatient setting (81%), with an additional 14.3% in both outpatient and inpatient settings. Similar to other studies (Tetzlaff et al., 2018), most participants (69.0%) work in either medical or hematology oncology settings. Surgical oncology represents the next largest specialty group (n=15, 17.9%), and in this study, it also was the group with the highest PS scores, compared to other oncology specialty groups. Although PS has not been previously studied in this specific oncology APP population, there could be several reasons why PS scores were higher in the surgical oncology group that warrant further investigation.

Surgical oncology is a branch of surgery dedicated to the surgical management of patients with solid cancer tumors. APPs typically work in the outpatient perioperative setting, but they may also work in the inpatient and surgical assist role. Compared to other oncology APPs, those in surgical oncology are not typically involved in the chemotherapy planning or the management of side effects. APPs that work in the perioperative setting are often relied upon to coordinate a patient's surgical care, update

electronic health record documentation, and to help patients “return to intended oncologic treatment” (RIOT) after cancer surgery (Aloia, et al., 2014). APPs in surgical oncology typically have a well-defined, interdependent role on the surgical care team. Effective and clear communication between the APPs and surgeons remains critical to patient care on all levels. In addition to caring directly for patients in the clinical setting, surgical oncology APPs also perform many “in-direct” patient care-related activities and non-clinical and administrative functions that allow surgeons more time to focus on complex surgical procedures and engage in academic research. Often, the surgical oncology APP may perform necessary activities for quality patient care but remain ‘hidden” as non-revenue producing activities that are difficult to measure (Gilbert & Sherry, 2016). The impact of spending a considerable amount of time with indirect patient care activities will be addressed in more detail in the next section. In the final regression analysis, the surgical oncology specialty setting alone was not significantly related to PS.

Indirect Patient Care

Another factor that was significant in bivariate analysis was the amount of time spent by APPs with indirect patient care. In contrast to direct patient care, indirect patient care commonly refers to the administrative work performed in preparation for a direct patient encounter, such as screening and reviewing patient records, updating electronic health records, corresponding with other health professionals or patient insurance demands, and submitting orders or prescribing medications for patients. Increased administrative demands and workflow inefficiencies have been a known contributor to physician burnout in oncology (Hlubocky et al., 2021). In a study of oncology PAs (Tetzlaff et al., 2018), compared with those working in private practice,

oncology PAs spent more time on indirect patient care in the academic practice setting. Additionally, in multivariate analysis, the time spent on indirect patient care was independently associated with burnout. For collaborative practice teams in oncology, the physician team leader may choose to off-load much of the indirect patient care or administrative work to their APP to allow more time to focus on direct patient care or academic research. Although still considered essential in delivering high-quality patient care, the excess administrative demands of indirect patient care placed on APPs are highly variable, difficult to measure, and may contribute to more extended workdays. Furthermore, much of the time spent on in-direct patient care are non-billable and may remain “hidden” in productivity and value metrics. In a study among oncology NPs, several workplace factors, including value and lack of reward, were associated with intent to leave their job (Bourdeanu et al., 2020). APPs that spend more time on work activities that do not fulfill the extent of their license and training are subject to increased risk of burnout and distress.

The uneven distribution of indirect patient care activities to APP team members may affect team functioning and communication. A psychologically safe environment facilitates open communication and allows team members to share ideas and express concerns that may affect the practice or even one’s well-being. APPs who spend excess time on indirect patient care may also express low PS to share any high work volume or administrative concerns. In this study, APPs that spent more time on indirect patient care activities were associated with lower PS scores. However, in the final multiple regression analysis, indirect patient care was not significantly related to PS.

Shared Oncology Team Practice Model

In the ambulatory practice setting, there are three main collaborative practice models among physicians and APPs: shared care, independent care, and mixed care (Buswell et al., 2009). In this study, the shared care practice model was independently associated with low PS on bivariate analysis. In a team-based practice setting, a pure shared care model assumes that both the CP and APP see all patients together and may divide up the tasks around each patient. In this model, one would assume that the co-management of patients between the APP and CP would promote effective team collaboration and communication, thus higher PS levels. Despite being a less efficient practice model, the shared care model implies that both the APP and CP work closely together to provide quality patient care for each encounter. However, the shared care model does not suggest that the APP and CP perform equal amounts of patient care, and there could be an overlap or even duplication of work among team members for each patient encounter. In most cases of shared care practice, the APP may complete most (if not all) of the clinical documentation on behalf of the team, and the CP adds a co-managed note or addendum, along with the billing for services rendered. For shared care practice encounters, the CP receives full reimbursement and credit for the patient visit, and it may be difficult to track or measure the APP's level of patient care contribution. In a study by Bruinooge et al. (2018), APPs who practice with a shared-only type model reported the lowest level of satisfaction compared to those in independent-only models.

In this study, most respondents indicated a predominant independent care model (67.9%), compared to the shared care visit model (17.9%). Compared with other models, the independent care model was more commonly practiced among APPs in oncology

(Bruinooge et al., 2018) which also implied a higher level of mutual trust and respect among team members. In prior studies on collaborative practice (Buswell et al., 2009, Towle et al., 2011), both the CP and APP reported being “very satisfied” with the independent care model, which was also associated with increased team productivity and APP job satisfaction. On the contrary, APPs reported lower satisfaction with the shared care model, which may be attributed to the supportive role that APPs are relegated to, rather than practicing independently to the full extent of their training and licensure. However, on the final multiple regression analysis, the shared care collaborative practice model was not significantly related to PS.

Team Leadership Factors and Psychological Safety

On the final multiple regression model, both team leadership factors (LI and LMX) were significantly related to PS. No other demographic or professional characteristic variables were associated with PS on hierarchical multiple linear regression. In this study, both LI characteristics and the quality of leader-member relationships were noted to correlate with PS scores among APPs in oncology collaborative practice teams. This study touched on the impact of relational leadership among APPs and CP and their association with PS in team-based practice.

Leader Inclusiveness (LI)

At the core of relational leadership theory is the concept of inclusive leadership, which refers to the leader’s behavior that “invites and appreciates inputs from others” (Carmeli et al., 2010). From the follower’s perspective, does the leader listen and pay attention to the follower’s needs? Does the leader welcome input, questions, and even challenges from team members? Does the leader invite followers to participate in shared

decision-making? Despite differences in professional status, LI focuses on the relationship behavior of the CP that invites and acknowledges the APP's views in team-based practice.

In a national study of oncology PAs by Tetzlaff (2018), professional burnout was more likely to be reported by PAs who “did not feel valued by their CP”, “did not feel encouraged to achieve professional goals”, and “whose contributions to the practice were not acknowledged”. The overall composite score for perceived CP leadership qualities was directly related to the risk of burnout. Few studies have examined the unique, collaborative practice relationship between the APP and their CP and how the quality of this relationship may affect team functioning, including PS.

In this study, the three-item LI scale was adapted from Nemhard et al. (2006), validated (Cronbach alpha = 0.75) in the hospital setting among NICU physician leaders and non-physician team members. APPs have a lower professional status than physician leaders and are better positioned to assess the degree of CP inclusivity than those with the same high professional status. Like prior studies (Carmeli et al., 2010; Hirak et al., 2012), this study confirmed that LI was positively associated with PS among oncology APPs. When the CP was perceived as inclusive and welcoming of others' input and ideas, then PS was more significant. For example, an oncology physician leader who encouraged the APP to take the initiative and provide feedback helped create a safe environment for team members to speak openly about new ideas, suggestions, or even potential mistakes or errors. Conversely, a physician leader who does not value the opinion of others equally and does not ask for team members' feedback or ideas would be

characterized as having low LI, which would be correlated with low PS among team members.

Leader-Member Exchange (LMX)

As noted in this study, APPs may have worked with multiple CPs, and each CP may have worked with more than one APP in a collaborative practice setting. In this study, only 27.4% of APPs reported working with only one CP, and nearly half of APPs (47.6%) worked with two to five CPs, and 23.8% of APPs worked with six or more CPs. Despite most APPs working with multiple CPs, almost all of the APPs in the study (96.5%) reported working with the same CP or group of CPs in a collaborative practice setting. However, a CP may have chosen to engage with certain team members more than others even within the same team setting. Furthermore, a CP may have favored certain APPs over others and directed more attention, knowledge, or even work benefits to those individuals. The LMX theory suggested that a leader may have variable relationship experiences with followers (Graen & Uhl-Bien, 1995). Therefore, PS may also be varied between followers in the same group. Additionally, the quality of each dyadic relationship between CP and APP may be different based on the depth and frequency of transactional experiences. According to Northouse (2019), the LMX-7 score may be categorized into two distinct groups: “In” group (total score in the “high” and “very high” range) and the “Out” group (total score in the “very low,” “low” and “moderate” field). In this study, most oncology APPs (73.8%) had LMX-7 scores within the “In” group category, indicating that most of the APPs felt they had a good relationship with their CP leader. When measured as a continuous study variable, higher LMX-7 scores were positively related to higher levels of PS. These results suggested that

when the leader-member relationships were strong, APPs felt that the team-unit environment was safer and were more willing to speak up and take more risks. This was the first known study among to examine the LMX theory among APPs, as well as its relationship with PS.

Explanatory Variables and Clinician Well-Being

Question 2: What is the relationship between PS and clinician well-being (WB) among APPs in oncology? What factors are related to clinician well-being (WB) among APPs in oncology?

In this study, several demographic, professional, and team-leadership factors among oncology APPs were examined to determine its relationship to the risk of clinician distress, as described by the Mayo Well-Being Index (WBI). On bivariate analysis, APPs of the medical oncology specialty were significantly related to low WBI scores, with 83.7% APPs reporting WBI scores within the low-risk group of distress. Additionally, the low WBI group was significantly associated with oncology APPs of the White race and female gender. Conversely, APPs in the high WBI score group have a greater risk of clinician distress, and on bivariate analysis, this group was related to those APPs of non-White race and male gender. However, due to the small sample size, gender was excluded from the stepwise regression analysis. Additionally, with only 13.1% of the sample indicating a non-White race, the relationship between WBI scores and race/ethnicity was negligible and not found to be significant on the final model. Only PS was significantly related to WBI scores on stepwise hierarchical multi-variate analysis on the final hierarchical multiple regression model. APPs that reported lower PS scores were significantly associated with being within the high WBI group, associated with a greater

risk of clinician distress. Regarding those APPs in medical oncology, the APPs in the hematology oncology specialty were five times more likely to be in the high-risk WBI group.

As discussed, the Mayo WBI instrument is a self-assessment tool that helps predict clinician distress on multiple dimensions, including low QOL, extreme fatigue, burnout, suicidal ideation, and increased risk of turnover and self-reported medical errors (Dyrbye et al., 2011). Based on a national study of APPs by Dyrbye et al. (2019), APPs within the high-risk WBI group were at greater risk for several adverse outcomes, including:

- 9-fold higher risk of burnout
- 3-fold higher risk of severe fatigue
- 4-fold risk of poor overall quality of life
- 1.7-fold higher risk of recent patient care error
- 3-fold higher risk of moderate or greater intent to leave their current position for reasons other than retirement in the next two years

Oncology Specialty and Clinician Well-Being

In this study, APPs who work in the medical oncology specialty reported the lowest WBI scores, indicating a lower risk of clinician distress than APP of other oncology specialties. Interestingly, on bivariate analysis, as the surgical oncology specialty was associated with high PS scores, the medical oncology specialty was related to a lower distress risk. On the hierarchical stepwise multiple regression model, the study participants in the hematology oncology specialty were five times more likely to be in the high WBI group, indicating a greater risk of clinician distress. However, only 4.8% of

the study sample reported being in the hematology oncology specialty in this study. Furthermore, there may be some overlap between both hematology-oncology and medical oncology specialties, especially in the community oncology setting, which could contribute to some sampling errors. Overall, though, the oncology specialty was not associated with either PS or clinician distress on the final regression models. Like other APP studies (Tetzlaff et al., 2020), oncology specialty was not an independent factor related to burnout.

Psychological Safety and Clinician Well-Being

In this study, the most significant finding was the relationship between PS and clinician WB, with higher PS scores (29.83) related to APPs within the low WBI group, and lower PS scores (25.21) related to APPs within the high WBI group, indicating APPs at a greater risk of clinician distress. On both final regression models, PS remained significantly related to clinician WB in this study. This was the first known study to examine the relationship between PS and WB, or risk of distress among APPs.

In the field of oncology, APPs have commonly worked with their CP in a team-based practice setting. Among a nationwide sample of oncology APPs, no specific demographic or professional characteristics were significantly related to PS. However, team-leadership factors, such as LI and quality of LMX relationship, were contributing factors to PS on the final regression analysis. Within the same sample, when examining clinician WB (low risk vs high risk of distress) as the dependent variable, only PS was found to be significantly related on the final stepwise regression model. Other demographic, professional, and team-leadership factors were not significant in relation to clinician WB.

This study revealed that when APPs felt safe to speak up, offered ideas, or raised concerns in a team setting, their risk of clinician distress was lower, and thus their WB was higher. APPs with lower levels of PS that did not feel safe to express concerns or ask questions of the CP or team members may have been subject to greater risk of adverse outcomes, including fatigue, burnout, poor quality of life, and even turnover. Team-relationship factors, including CP LI and the quality of APP and CP-leader relationship, may be associated with overall PS scores but were not significantly related to being in the high or low-risk WBI groups. Also, the scores from the WBI placed respondents in either two categories: lower or greater risk of multiple dimensions of distress. The WBI was not intended to specify which adverse outcomes of distress the respondent was at most significant risk for. Therefore, this study does not make any direct associations between PS and any particular area of clinician distress, including professional burnout or job satisfaction. Further research will be needed to stratify which aspect of clinician distress may be related to PS in team practice settings.

Impact of COVID-19 Pandemic

This study took place during the middle of the COVID-19 pandemic from February 2021 through April 2021. Recent studies have reported the notable impact of the COVID-19 pandemic on the well-being of oncologists and oncology team members, including the increased risk of burnout, stress, and poor mental health (AAPA, 2020; Hlubocky et al., 2021). Additionally, oncology team members had to modify cancer care delivery, including delays in chemotherapy and surgeries and rapid implementation of telemedicine visits. As previously mentioned, APPs have encountered significant staffing changes, including increased furlough, turnover, and reduction in pay (AAPA,

2020; AANP, 2020). APPs have also reported increased workload with in-direct care and administrative responsibilities related to COVID-19 policy changes. The pandemic had affected team communication with less social interaction and more reliance on virtual meetings.

As participants prepared to answer questions in the study survey, they were asked to reflect upon their team role during the COVID-19 pandemic specifically. When asked to rate the quality of their relationship with their CP team leader compared to before the pandemic, most of the participants (88.1%) reported “no difference or stronger.” For participants who rated a weaker relationship with the CP team leader during the pandemic, their PS score was lower than those who indicated a stronger relationship. However, within the final model, PS scores were not significantly related to the relationship of study participants with CP team leaders during the COVID-19 pandemic compared to before the pandemic. Additionally, for those participants that indicated a stronger relationship with the CP team leader during the pandemic, the WBI scores were within the low-risk group. However, upon bivariate analysis, this relationship was also not statistically significant.

In this study, APP participants were prompted to describe how the COVID-19 pandemic may have affected their health care team. A variety of open free-text responses were received with several recurring themes noted. The previous question in the survey asked participants to rate the quality of their relationship with the CP team leader compared to how it was before the pandemic. Table 5.1 presented a summary of the five most common themes based on participant responses on how the pandemic affected their oncology care team and practice and their report on how the pandemic affects their

relationship with the CP team leader. However, the primary purpose of the open-ended question was to provide context for APP reflection of their relationship with the CP team leader during the COVID-19 pandemic. For the remainder of the survey, APPs were asked to focus on their relationship with the CP team leader during the pandemic when completing the instruments on PS, LI, LMX, and WBI. Further study will be needed to examine the various team-related and practice changes directly and indirectly attributed to the COVID-19 pandemic.

Table 5.1*The Effect of COVID-19 Pandemic on Oncology Health Care Teams*

Question 37: During the COVID-19 Pandemic, how would you rate the quality of your relationship with our CP team leader compared to how it was before the pandemic?

*Much Stronger, Stronger,
or No Difference*

Much Weaker, Weaker

74 (88.1%)

10 (11.9%)

Question 38: Please briefly describe how the COVID-19 pandemic may have affected your health care team, as well as your role in team-based care with your CP team leader.
*5 Most Common Themes or Responses Among Oncology APPs **

Stronger Team Relationship

Weaker Team Relationships

- Increased teamwork and more lines of effective communication (e.g., virtual meetings)
- Increased independence on patient visits (less need for shared visit encounters)
- Increased dependency on APP/ staff support by physician leader(s)
- Implementation of telemedicine (video and phone visits for patients)
- Remote work allows for better work-life integration

- Staffing shortages, increased absences, and turnover leads to increased workload and stress
- Decreased communication with team members and staff isolation
- Increased anxiety and stress related to COVID risk and effects on self/ others
- Increased administrative burden and in-direct patient care duties
- Ongoing adaptability to change (e.g., data changes, policies, and supplies)

Note. * Five most common themes or responses to question 38, categorized by the response to question 37 on the “quality of relationship with CP team leader compared to how it was before the pandemic.”

Limitations of the Study

This research study was subject to several fundamental limitations. First, despite having a nationwide sample of oncology APPs, the overall survey response from the membership of two leading oncology professional organizations, each with membership exceeding 1000 oncology APPs, was quite sparse, resulting in a relatively small sample size. The web-based survey was introduced to APP members via an electronic mail invitation on three-separate occasions during a 60-day study period. Due to restrictions during the COVID-19 pandemic, there were few opportunities for organizations to introduce the study, and there was no live event to recruit additional participants. Responding to surveys could be burdensome for APPs, especially during the pandemic, and there could be an inherent self-report bias. To limit sampling bias, the study investigator performed no other means of active recruitment outside of what was listed in the IRB protocol. This smaller sample could also result in a non-response bias from limited means to engage potential APP participants. Also, within the study sample, the APP representation of certain groups was small, including male APPs, non-White race, non-medical oncology, and inpatient providers. The final study sample may not be representative of the nationwide oncology APP population. More extensive studies could strengthen the validity of the findings. However, despite these sample limitations, the statistical power was still sufficient, with a final study size of 84 participants.

Another potential limitation in the study may have been the ambiguous interpretation of collaborative practice and the definition of team leader. Although APPs commonly work with physician leaders, this study revealed that APPs may have worked with multiple CP(s), and their clinical team leader may not be an oncology physician.

The identification of a team leader could even be another APP or non-clinical team member. When responding to survey questions on PS and quality of CP team leadership, APPs may have had difficulty recognizing an individual team leader or whether a team structure with clear leadership even exists. However, despite working with multiple CPs or team leaders, study participants were focused on a team-based practice setting during the COVID-19 pandemic. Also, since most oncology APPs work in a collaborative team-based environment and the construct of PS was considered a group-level phenomenon, this potential limitation on team leadership identification should have minimal effects.

The main dependent variable in this study was clinician well-being which was described by the Mayo Well-Being Index (WBI) survey, a screening tool to stratify multiple dimensions of clinician distress. Although the WBI was validated in a large national population of APPs (Dyrbye et al., 2019), the instrument had limitations in identifying specific distress parameters, including which conditions were more predominant and relevant among individuals and groups. Both well-being and clinician distress were multi-dimensional constructs that were difficult to define even in healthcare settings. Also, there were no gold standard instruments to assess these constructs. Much of the APP and oncology literature on well-being has focused on the condition of professional burnout, which was often related to other adverse outcomes. Like other burnout instruments, the WBI was not designed to evaluate or diagnose any specific mental health condition, nor was the WBI able to determine the causation or directional effect of distress. For this study, the WBI categorized APPs into two main groups: high-risk or low-risk on multiple domains of distress, including both individual-level and adverse outcomes at work.

Lastly, since this survey study took place during the COVID-19 pandemic, several unknown external factors could affect the investigation. As reported by study participants, the pandemic was associated with sudden staffing changes, including layoff, turnover, and adjustments to team responsibilities. In addition to mental and physical exhaustion, the pandemic may also have caused changes to team structure and leadership among health care professionals, which could affect survey results. Additionally, since the study was cross-sectional, the results were dependent on how the individual APP was feeling when completing the survey in areas of distress and team-leader relationships. The results from the study could substantially vary if completed before, after, or during different stages of the pandemic. Future longitudinal studies both during and after the pandemic may be helpful to clarify and determine the impact of PS on clinician WB among APPs.

Implications for Practice

This study may be the first one to examine the role of PS among APPs and how it may be related to clinician WB. This study also extends the body of research on how PS affects health care teams, particularly in the care of cancer patients. The study findings could have practical implications on team leadership factors within health care organizations. Specifically, the collaborative practice relationship between a physician team leader and APP, including team dynamics and effective communication, may have profound effects on patient care delivery and clinician WB. Inclusive leadership may not be commonly discussed in the hospital leadership curriculum, and there should be an increased emphasis on health care team engagement rather than individual leader-driven projects alone. Furthermore, the quality of leader-member engagement may also

contribute to a psychologically safe environment which has been associated with improvements in team learning behaviors, quality improvement projects, and patient safety reporting (Edmondson, 1999; Hirak et al., 2012; Tucker et al., 2006). There are many factors that may contribute to the quality of leader–member relationships, and the inclusion of certain members more than others. This study demonstrates that team PS is related to solid quality team relationships. However, Edmondson (2018) described PS as interpersonal beliefs that may vary from team to team, even among organizations with strong leadership culture and context. With both leader inclusiveness and the quality of leader relationships contributing to team PS, organizations should invest in training leaders to be more open, accessible, and available to all team members. In a group practice, cultivating strong healthy relationships may involve a concerted effort by leaders to hold regular “huddle” meetings and connect with individual team members during breaks.

This study also demonstrates that high PS is associated with a lower risk of clinician distress and better overall well-being. Also, teams with low PS may be subject to more significant risks of clinician distress, as described by the WBI. Optimizing clinician WB has been a priority initiative for many oncology practices for several years. Based on a comprehensive study among American Society of Clinical Oncology (ASCO) members, 45% of U.S. medical oncologist report burnout symptoms (Shanafelt et al., 2014). In a recent follow-up study by Tetzlaff et al. (2021), 48.7% of the oncology PAs reported having at least one burnout symptom compared to 38.5% found in a similar study in 2015. In this study, 28.6% of APP participants reported being in the high-risk group for clinician distress. There are numerous stressors in the oncology workplace

setting, and the potential causes of clinician burnout remain multifactorial. As described in the APP burnout literature, APP role and team-based factors, such as spending a higher percentage of time with in-direct patient care, hours worked per week, and practicing below the full extent of education and training, have been associated with high burnout rates (Bourdeanu et al., 2020; Tetzlaff et al., 2018). This study adds PS as another factor among collaborative practice teams that contributes significantly to overall clinician WB. Suppose oncology APPs do not feel safe to speak up and take interpersonal risks in the workplace. In that case, they may be a higher risk of distress, including depression, anxiety, stress, fatigue, and burnout. Additionally, APPs with higher distress may also be subject to increased risk of medical error and job turnover, impacting both patient safety and team outcomes. Organizations looking to mitigate clinician distress should also investigate health care team dynamics, including PS in the workplace. Managers and physician leaders should promote APP engagement, team learning, and positive risk-taking behaviors and remove the fear of failure. Team-building strategies should be employed that encourage positive group-member exchanges that facilitate trust, the sharing of ideas and concerns, and the inclusion of each member's contributions and diversity.

Implications for Education and Training

Creating and cultivating a psychologically safe work environment takes concerted effort and hard work, and it cannot be mandated or directly altered by any individual. Prioritizing PS begins with both leader and team member awareness through research, education, and training on multiple levels. In the health care setting, physicians, APPs, and other clinical staff members receive training traditionally within their professional

training and is frequently independent from each other without purposed integrative learning. Additionally, team-learning opportunities within collaborative practice settings usually occur “on-the-job” rather than in a classroom setting. According to Edmondson (2018), the first step in creating a psychologically safe environment is to “set the stage” by reframing failure and identifying what is at stake. For clinical providers, “framing the work” may also include developing self-awareness through a leadership self-assessment or an emotional intelligence tool. Additionally, interprofessional training and education about team member roles and effective team communication are essential for group practice. Specific leadership behaviors, including leader inclusiveness, trustworthiness, adaptability, and team engagement, may be addressed and taught in simulations that enable leaders to practice and learn from failures without any real consequence. For leaders with higher professional status, gathering input from all team members, including implementing 360 feedback, may enhance group accountability and promote open communication. Situational and inclusive leadership, including team-building exercises, should also be incorporated in the team member and leadership development curriculum.

During formalized training of medical students, residents, and fellows, an introductory course on interprofessional collaboration, including the importance of effective communication and team PS, should be integrated in the graduate medical core curriculum. APPs should also receive similar training, including leadership development and effective team communication. Medical and nursing students and trainees could work together earlier in training to learn about each team member’s role and contributions within oncology care teams. Additionally, health care professionals should know about the risks of clinician distress and how to develop positive well-being while

caring for patients even during difficult circumstances. Health care providers should also learn about wellness practices and resources to sustain health and prevent professional burnout. Although this study focused on the physician team leader and APP relationship, further work can investigate how PS affects other health care team members and their WB.

Implications for Future Research

There is still much to learn about collaborative practice teams in health care, especially investigating the team-leadership factors among APPs, physicians, and other health care team members. Although the construct of PS has been widely studied in the health care setting, much of the research is still in its infancy stage. The literature examining the APPs in collaborative practice settings is scarce. In general, the APP profession is still relatively young and continues to grow and evolve rapidly along with changes in our health care landscape. Furthermore, much is to be learned about team-related and leadership factors that affect APPs and professional and clinical outcomes. Clinician WB and burnout are currently hot topics and quite prevalent in the literature, especially during unprecedented change and distress associated with the COVID-19 pandemic. However, it remains unclear how the pandemic has affected collaborative practice teams as many APP participants in this study report either “no change” or stronger relationships with physician leaders compared to prior to the pandemic. This cross-sectional study during the pandemic only provides a “snapshot” of critical team-related factors, such as PS, that may affect collaborative practice teams and their well-being. This single study could not make any firm assertions on causality, and future

studies should consider examining these factors with models utilizing longitudinal surveys or experimental designs with leadership or well-being interventions.

Future research should also be expanded to examine health care team dynamics, including constructs on team independence, team structure and roles, and other team relationship factors. PS remains an essential construct when investigating team effectiveness and outcomes. LI remains a consistent antecedent and predictor of team PS. LMX has also been widely studied in health care, but not among APPs in collaborative practice. Future studies examining LMX relationships between team members should investigate both sides of the dyadic relationship and how the CP - APP relationship may change over time. Additionally, previous studies have examined professional status as a significant predictor of PS (Nembhard & Edmondson, 2006), but this study could be expanded to include all health care team members, including APPs, nurses, residents, and fellows. Power distance was another construct that may influence team PS, which may change over time with both experience and change in professional status.

The outcome variable of clinician WB and distress should be further delineated and refined. In this study, the Mayo Well-Being Index (WBI) was used to categorize participants in either a high or low-risk group of clinician distress based on multiple dimensions of adverse outcomes. In a study by Welp and Manser (2016), studies that examine teamwork and clinician well-being should take a more holistic approach and focus on not the individual profession, but rather the entire multi-professional team. Observational methods of measurements may help complement the strength of surveys to offer a more holistic understanding of PS and well-being. Future studies should

investigate how PS may impact specific areas of distress, such as burnout, depression, job satisfaction, and turnover. Additional validated instruments should be incorporated to strengthen the research analysis. The WBI was designed to be a screening tool for distress, and periodic assessment and feedback may be helpful, with or without specific WB interventions that prevent or alleviate clinician distress. Clinician WB is another construct that should be investigated further with longitudinal or experimental design studies utilizing various interventions.

Lastly, this study was focused on the oncology APP population, and the study sample was relatively small due to the recruitment methods and limitations with electronic mail surveys. Although the study was drawn from a random, national convenience sample of APPs from various oncology disciplines, it remains unclear whether the study participants were representative of the oncology APP population in general. Future studies can expand the distribution of web-based surveys through other promotional means, such as during live conference gatherings or events with additional incentives to increase study participation. Other professional organizations or single health care institutions could participate in a similar study and examine team-related factors and WB within their context. In addition, this study could be expanded to other health care team professionals, such as nurses, physical therapists, dietitians, medical assistants, and other industries that utilize a team-based approach, allowing for replication of the study findings beyond the health care context.

Table 5.2*Research Questions and Summary of Study Implications*

Study Questions:	What are the factors that contribute to PS among oncology APPs?	What is the relationship between PS and clinician WB among oncology APPs?
Study Findings	<ul style="list-style-type: none"> • Leader inclusiveness (LI) • Leader-member exchange (LMX) • Clinician well-being (WB) 	<ul style="list-style-type: none"> • High PS related to low risk of distress • Low PS related to high risk of distress
Implications for Practice	<ul style="list-style-type: none"> • Examine collaborative practice team dynamics, including team-leadership factors • Promote team-engagement, clear communication, and team-learning to improve team PS • Promote interdependence and social support among work teams 	<ul style="list-style-type: none"> • Improve PS as part of WB optimization strategies • High risk groups of distress should examine team PS and consider interventions to improve relationships • Organizational, systematic, and individual interventions to optimize WB
Implications for Education and Training	<ul style="list-style-type: none"> • Interprofessional education (IPE) and training • Faculty development, “resident-as-teacher” training, 360 feedback, leadership development curriculum to incorporate inclusive and situational leadership principles • Optimize interpersonal communication skill development among team members • Reframe “failure” with emphasis on team-learning 	<ul style="list-style-type: none"> • Increase awareness, education and research on PS and clinician WB, including implementation of periodic survey measurements • Leadership self-assessment or emotional intelligence tools to reflect on interpersonal strengths/ weaknesses, as well as individual perception of team environment and culture • Mobilize educational resources to reduce risk of distress and optimize WB
Implications for Future Research	<ul style="list-style-type: none"> • Investigate other team relationship factors (e.g., interdependence, structure, roles, power distance, status, etc.) • Factor analysis of team-leadership factors (e.g., LI and LMX) and PS • Examine moderators and mediating variables to PS • Longitudinal study; experimental design with leadership interventions • Larger representative sample of APPs (or smaller sub-groups) • Survey CP or team leader perspective of PS within teams 	<ul style="list-style-type: none"> • Investigate specific areas of distress (e.g., burnout, depression, turnover, etc.) as it relates to PS and team-leadership factors • Examine mediator and moderator variables between PS and clinician WB • Expand study of PS and clinician WB to other groups, settings, or even non-health care industries • Longitudinal study; mixed observational methods; experimental design with various WB interventions

Conclusion

The main purpose of this study was to examine the factors contributing to PS among oncology APPs and determine the relationship between PS and clinician WB. In addition to demographic and professional characteristics, this study examined the collaborative practice relationship between oncology APPs and their physician team leader, including team-leadership factors, such as LI and LMX, and how it relates to PS. This study confirmed both LI and LMX relationships are significantly associated with PS. This study also demonstrated that PS was positively associated with clinician WB among oncology APPs and that higher PS scores were related to a lower risk of distress at multiple dimensions. This study demonstrates that PS is an essential component of collaborative practice teams involving APPs. This study helps move the research stream forward on factors that contribute to team functioning and effectiveness and how the role of PS may affect the workplace, including the WB of clinicians.

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Appendix A

Waiver of Documentation of Informed Consent

Q1.

COLLABORATIVE PRACTICE TEAMS IN ONCOLOGY: EXAMINING THE ROLE OF PSYCHOLOGICAL SAFETY AND ITS RELATIONSHIP WITH CLINICIAN WELL-BEING AMONG ADVANCED PRACTICE PROVIDERS

Investigator: Steven Wei, MS, MPH, PA-C

This project is part of a doctoral thesis being conducted under the supervision of Dr. Robert Hausmann (faculty thesis advisor) and Dr. Sara McNeil (senior faculty investigator).

Key Information:

The following focused information is being presented to assist you in understanding the key elements of this study, as well as the basic reasons why you may or may not wish to consider taking part. This section is only a summary; more detailed information, including how to contact the research team for additional information or questions, follows within the remainder of this document under the "Detailed Information" heading.

What should I know about a research study?

Someone will explain this research study to you.

Taking part in the research is voluntary; whether or not you take part is up to you.

- You can choose not to take part in the study.
- You can agree to take part and later change your mind.
- Your decision will not be held against you.
- You can ask all the questions you want before you decide and can ask questions at any time during the study.

We invite you to take part in a research study about psychological safety and clinician well-being among collaborative practice teams because you meet the following criteria as an advanced practice provider (APP) in the field of oncology. This study is being sponsored by the Association of Physician Assistants in Oncology (APAO) and the Advanced Practitioner Society for Hematology and Oncology (APSHO).

In general, your participation in the research involves the voluntary completion of an anonymous, short (15 minute), web-based survey to help describe your collaborative practice setting in the field of oncology during the global COVID-19 pandemic. You will be given a questionnaire to help describe your collaborative practice team, including your relationship with your physician team leader. You will also be asked questions to help measure dimensions of clinician well-being and distress based on your team relationship during the crisis of the global COVID-19 pandemic.

There are no known risks to taking part in this survey. There are also no personal benefits for survey participation; however, the possible benefit to society may include the elucidation of factors within collaborative practice teams that may affect team member relationships and impact APP clinician well-being. You will not receive any compensation for participation in this survey. You may also choose not to participate in this study.

Detailed Information:

The following is more detailed information about this study, in addition to the information listed above.

Why is this research being done?

The purpose of this doctoral research study is to examine the interdependent relationship that oncology APPs have with his or her collaborating physician or team leader and to describe the relationship between psychological safety and clinician well-being. Participants in the study will be asked to reflect upon his or her team working relationship during the global COVID-19 pandemic.

To my knowledge, this will be the first research study to examine psychological safety among oncology APPs. Additionally, this may be the first study to examine team leader-member relationship factors and clinician well-being among oncology APPs. The results and/ insights gained from this study will help bridge the knowledge gap between teamwork in collaborative practice models and clinician well-being in the field of oncology.

How long will the research last?

We expect that you will need approximately 15 minutes to complete this online survey in a single sitting.

How many people will be studied?

We expect about 300 people will participate in this research study.

What happens if I say yes, I want to be in this research?

If you agree to participate in this study, you will be directed to an anonymous, 41-item questionnaire that consists of multiple-choice and two open-ended questions. This secure, web-based survey should take 15 minutes to complete. We encourage you to complete the survey in its entirety during a single sitting, but if you are not comfortable completing any of the items, then you may leave that question blank. You may also return to complete the survey later during the 60-day study period; however, you will only be allowed to complete one survey during that time period. This research study will not include any personally identifying information, and all your responses will remain anonymous.

What happens if I do not want to be in this research?

You can choose not to take part in the research and it will not be held against you. Choosing not to take part will involve no penalty or loss of benefit to which you are otherwise entitled.

What happens if I say yes, but I change my mind later?

You can leave the research at any time and it will not be held against you. However, if you stop in the middle of the study and do not complete all multiple-choice questions, the already collected data will be removed from the study record.

Is there any way being in this study could be bad for me?

There are no foreseeable risks related to the procedures conducted as part of this study. If you choose to take part and undergo a negative event you feel is related to the study, please inform your study team.

Will I get anything for being in this study?

Following the completion of this survey study, you will be eligible to participate in a random drawing of four \$25 Amazon gift cards. If you choose to participate, you will be directed to a separate website that will ask you to share your personal (non-business) electronic mail address. All gift card drawings will take place at the conclusion of the research study, and winners of the gift cards will be notified by electronic mail. There is no obligation to participate in the gift card drawing and it will not affect the research study in any way.

Will being in this study help me in any way?

There are no known benefits to you from your taking part in this research. However, possible benefits to the APP community include the elucidation of factors within collaborative practice teams in oncology that may affect team member relationships and impact clinician well-being. This information may provide insight into future areas of research.

What happens to the information collected for the research?

Your taking part in this project is anonymous, and the information you provide cannot be linked to your identity. We may publish the results of this research. However, unless otherwise detailed in this document, we will keep your name and other identifying information confidential.

Can I be removed from the research without my OK?

The person in charge of the research study or the sponsor can remove you from the research study without your approval. Possible reasons for removal include not completing all multiple-choice questions in the survey and not eligible due to specific inclusion and exclusion criteria listed in the study.

Who can I talk to?

If you have questions, concerns, or complaints, or think the research has hurt you, you should talk to the research team at Steven Wei atshwei@uh.edu (Principal Investigator) or Dr. Sara McNeil (Senior Faculty Investigator) at 713-745-4975.

This research has been reviewed and approved by the University of Houston Institutional Review Board (IRB).

You may also talk to them at (713) 743-9204 or cphs@central.uh.edu if:

- Your questions, concerns, or complaints are not being answered by the research team.
- You cannot reach the research team.
- You want to talk to someone besides the research team.
- You have questions about your rights as a research subject.
- You want to get information or provide input about this research.

STATEMENT BY PERSON AGREEING TO PARTICIPATE IN THIS STUDY

I have read the consent information above, and I freely and voluntarily choose to participate in this study.

- Yes, I agree to consent to participate in the study
- No, I do not agree consent to participate in the study

STUDY ELIGIBILITY QUESTIONNAIRE (Inclusion and Exclusion Criteria)

Q2.

Which of the following oncology APP professional organizations are you currently a member of?

- Association of Physician Assistants in Oncology (APAO)
- Advanced Practitioner Society for Hematology and Oncology (APSHO)
- Both APAO and APSHO
- Neither APAO, nor APSHO

Q3.

Are you currently either a student or trainee?

- Yes
- No

Q4.

Which age range do you currently belong in?

- < 20
- 21 - 29
- 30 - 39
- 40 - 49
- 50 - 59
- 60 +

Q5.

Please indicate your APP profession and/or clinical certification.

- Physician Assistant (PA)
- Nurse Practitioner (NP)
- Clinical Nurse Specialist (CNS)
- Other

Q6.

Are you currently employed as an advanced practice provider (APP)?

- Yes (full-time; clinical activity \geq 50%)
- Yes (full-time; clinical activity < 50%)
- Yes (part-time)
- Not currently employed as an APP

Q7.

Please indicate your primary oncology specialty or subspecialty:

- Medical oncology
- Surgical Oncology
- Radiation Oncology
- Hematology Oncology
- Multi-specialty
- Pediatric or other oncology practice
- Non-oncology practice

Q8.

Please describe your oncology practice location in the United States.

- Urban
- Suburban
- Rural
- Other location outside of the United States

Q9.

How do you best describe your clinical team leader in oncology practice?

- Collaborating physician
- APP supervisor or manager
- Non-MD and non-APP leader
- Other, or prefer not to answer

SECTION A: DEMOGRAPHIC QUESTIONNAIRE

Q10.

What is your sex? (please check one)

- Male
- Female
- Prefer not to answer

Q11.

What is your relationship status? (please check one)

- Single
- Married / Partnered
- Widowed
- Prefer not to answer

Q12.

How do you describe your race or ethnicity?

- White
- Hispanic,
- Latino, or Spanish origin
- Black or African American
- Native American Indian or Alaska Native
- Asian or Pacific Islander
- Other or prefer not to answer

Q13.

Please indicate highest educational degree or level obtained (please check one).

- Bachelors
- Masters
- Doctorate
- Prefer not to answer

Q14.

How long have you worked as an APP (years of service)?

- < 1
- 1 - 5
- 6 - 10
- 11 - 20
- 21 +

Q15.

How long have you worked as an APP in the oncology specialty (years of service)?

- < 1
- 1 - 5
- 6 - 10
- 11 - 20
- 21 +

SECTION B: PROFESSIONAL AND TEAM QUESTIONNAIRE

Q16.

Please indicate your predominant oncology clinical practice setting:

- Outpatient
- Inpatient
- Both outpatient and inpatient
- Procedure-based service
- Non-clinical/ Other

Q17.

How would you best describe your oncology practice setting?

- Community hospital
- Private practice
- Teaching (Academic) hospital
- VA/ Other

Q18.

Please indicate the typical number of hours per week you work.

- < 20
- 21 - 40
- 41 - 50
- > 50

Q19.

Please indicate the percentage of time spent in direct patient care (%).

- < 25
- 25 - 50
- 51 - 75
- > 75

Q20.

Please indicate the percentage of time spent with in-direct patient care (%):

- < 25
- 25 - 50
- 51 - 75
- > 75

Q21.

How many oncology collaborating physicians (CPs) do you primarily work with?

- 0
- 1
- 2 - 5
- 6+

Q22.

Which of the following best describes your team model with collaborating physician (CP)?

- Independent visits (APP see patients independently, but works with CP to address critical decision-making)
- Shared visits (Both APP and CP see the same patients)
- Mixed visits (neither independent nor shared type of visit is predominant)

Q23.

How would you best describe your predominant oncology practice model with your collaborating physician (CP)?

- I almost always work with the same CP
- I almost always work with the same small group of CPs
- I rarely work with the same CP, or small group of CPs

SECTION C: HEALTH CARE TEAM ROLE AND CONTEXT DURING COVID-19 PANDEMIC

Please take a moment to reflect upon your primary health care team during the recent COVID-19 global pandemic.

Q24.

Briefly describe your role on this team with your collaborating physician (CP).
(Optional; Free text response)

For the remainder of this survey, please continue to keep in mind your team role during the COVID-19 pandemic as you prepare to answer the following survey questions.

SECTION D:

Q25. Psychological Safety (PS) Scale (Edmondson, 1999)

Please use the following rating scale to indicate how accurately each statement describes your experience working in your primary oncology health care team.

(Strongly disagree, Disagree, Neutral, Agree, Strongly agree)

- Members of this team can bring up problems and tough issues.
- I feel safe to take a risk on this team.
- It is difficult to ask other members of this team for help
- No one on this team would deliberately act in a way that undermines my efforts.
- Working with members of this team, my unique skills and talents are valued and utilized.
- If I make a mistake on this team, it is often held against me.
- People on this team sometimes reject others for being different.

Q26: Leader Inclusiveness Scale (Nembhard & Edmondson, 2006)

Please use the following rating scale to indicate how accurately each statement describes your collaborating physician (CP) team leader.

Please indicate the degree to which you think the item is true for you on the rating scale above the item.

(Strongly disagree, Disagree, Somewhat disagree, Neutral agree nor disagree, Somewhat agree, Agree, Strongly agree)

- My CP team leader encourages members to take initiative
- My CP team leader asks for the input of team members that belong to other professional groups
- My CP team leader does not value the opinion of others equally

SECTION E: LMX-7 Scale (Graen & Uhl-Bien, 1995)

This questionnaire contains items that ask you to describe your relationship with your collaborating physician (CP) team leader.

For each of the items, please indicate the degree to which you think the item is true for you on the rating scale above the item

Q27:

Do you know where you stand with your CP team leader... [and] do you usually know how satisfied your leader is with what you do?

(Rarely, Occasionally, Sometimes, Fairly often, Very often)

Q28:

How well does your CP team leader understand your job problems and needs?

(Not a bit, A little, A fair amount, Quite a bit, A great deal)

Q29:

How well does your CP team leader recognize your potential?

(Not at all, A little, Moderately, Mostly, Fully)

Q30:

Regardless of how much formal authority your CP team leader has built into his or her position, what are the chances that your leader would use his power to help you solve problems in your work?

(None, Small, Moderate, High, Very high)

Q31:

Again, regardless of the amount of formal authority your CP team leader has, what are the chances that he or she would "bail you out" at his or her expense?

(None, Small, Moderate, High, Very high)

Q32:

I have enough confidence in my CP team leader that I would defend and justify his or her decision if he or she were not present to do so

(Strongly disagree, Disagree, Neutral, Agree, Strongly agree)

Q33:

How would you characterize your working relationship with your CP team leader?

(Extremely ineffective, Worse than average, Average, Better than average, Extremely effective)

SECTION F: Well-Being Index (Dyrbye et al., 2019)

Q34:

During the past 6 – 12 months in the setting of the COVID-19 pandemic: (Yes / No)

- Have you felt burned out from your work?
- Have you worried that our work is hardening you emotionally?
- Have you often been bothered by feeling down, depressed, or hopeless?
- Have you fallen asleep while sitting inactive in a public space?
- Have you felt that all the things you had to do were piling up so high that you could not overcome them?
- Have you been bothered by emotional problems (such as feeling anxious, depressed, or irritable)?
- Has your physical health interfered with your ability to do your daily work at home and/or away from home?

Q35:

Please rate how much agree with the following statements.

- The work I do is meaningful to me

(Very strongly disagree, Disagree, Somewhat disagree, Neither agree or disagree, Somewhat agree, Agree, Very strongly agree)

- My work schedule leaves me enough time for my personal/ family life.

(Strongly agree, Agree, Neutral, Disagree, Strongly disagree)

SECTION G: Team- Based Care During COVID-19 Pandemic

Q37:

During the COVID-19 pandemic, how would you rate the quality of your relationship with your CP team leader compared to how it was before the pandemic?

(Much weaker, Weaker, No difference, Stronger, Much stronger)

Q38:

Please briefly describe how the COVID-19 pandemic may have affected your health care team, as well as your role in team-based care with your CP team leader. (Optional; Free text response)

SECTION H: Post-Survey Question

Thank you for participating in this research study.

You are now eligible to participate in a random \$25 Amazon gift card drawing that will occur at the end of the study period. If you are interested in participating, please click the link below to be directed to a separate site to share your personal, non-business email address. Participation in the gift card drawing is completely optional and separate from the research study

APPENDIX B

Summary of Survey Package Instruments

Instrument & Question Number	Purpose	Number of Items & Question Type	Analysis & Scoring	Data Type
Section A & B				
Demographic Questionnaire (Q1 – Q15)	Collect personal characteristics from the sample and confirm study eligibility	15 items; multiple choice, single answer	Descriptive Bivariate Multivariate ¹	Categorical
Professional Questionnaire (Q16 – Q23)	Explore the APP's professional and team characteristics	8 items; multiple choice, single answer	Descriptive Bivariate Multivariate ¹	Categorical
Section C				
Health Care Team Role and Context during COVID-19 pandemic (Q 24)	Participants reflect on their role in team-based practice during the COVID-19 pandemic	1 question; open text response; 200 character limit	None ²	Qualitative
Section D				
Psychological Safety (PS) Questionnaire (Edmonson, 1999) (Q 25)	Assess the extent to which APP team members feel safe to take interpersonal risks, such as speaking up and discussing issues openly	7 items; 5-point Likert scale	Descriptive Bivariate Multivariate ¹ A positive response to five of the statements and a negative response to two statements (reverse scoring) indicated strong PS	Continuous

Section D (Continued)				
Instrument & Question Number	Purpose	Number of Items & Question Type	Analysis & Scoring	Data Type
<p>Leader Inclusiveness (LI) Questionnaire (Nembhard et al., 2006)</p> <p>(Q 26)</p>	<p>Assess the perceived quality of physician leadership</p>	<p>3 items; 7-point Likert scale</p>	<p>Descriptive Bivariate Multivariate ¹</p> <p>An average score was obtained to provide a single perception score for analyses</p>	<p>Continuous</p>
Section E				
<p>Leader-Member Exchange (LMX-7) Questionnaire (Graen & Uhl-Bien, 1995)</p> <p>(Q27 – Q33)</p>	<p>Measure the quality of relationships with either the leader or one of the followers</p>	<p>7 items; 5-point Likert scale</p>	<p>Descriptive Bivariate Multivariate ¹</p> <p>The total cumulative score reflects the perceived quality of the relationship along a continuum.</p> <p>LMX cumulative score can also be categorized as: In-group (25-35) Out-group (7–24)</p>	<p>Continuous & Categorical</p>

Section F				
Instrument & Question Number	Purpose	Number of Items & Question Type	Analysis & Scoring	Data Type
Well-Being Index (Dyrbye et al., 2017) (Q34 – 36)	Assess multiple dimensions of distress, including depression, anxiety, stress, fatigue, burnout, work-life integration, and meaning in work	9 items: 7 with yes or no response, 2 items with 7-point and 5-point Likert scale	Descriptive Bivariate Multivariate ¹ Total points reflect well-being that can be categorized as either high-risk (≥ 4 WBI) or low-risk (< 4 WBI)	Categorical
Section G				
Team-Based Care during COVID-19 Pandemic (Q37 – Q 38)	Provide context to the responses in the instruments	1 item; multiple-choice, single answer	Descriptive Bivariate	Categorical
		1 question; open text response; 200 character limit	None ²	Qualitative

Note. ¹ Only the explanatory variables that were statistically significant on bivariate analysis were included in multivariate analysis. ² Qualitative responses from Q24 & Q38 were not included in the study analysis

APPENDIX C

Statements of IRB Approval

University of Houston IRB Approval (December 12, 2020; Page 1)



DIVISION OF RESEARCH
Institutional Review Boards

APPROVAL OF SUBMISSION

December 12, 2020

Steven Wei
shwei@uh.edu

Dear Steven Wei:

On November 30, 2020, the IRB reviewed the following submission:

Type of Review:	Initial Study
Title of Study:	Collaborative Practice Teams in Oncology: Examining the Role of Psychological Safety and its Relationship with Clinician Well-Being Among Advanced Practice Providers
Investigator:	Steven Wei
IRB ID:	STUDY00002675
Funding/ Proposed Funding:	Name: Unfunded
Award ID:	
Award Title:	
IND, IDE, or HDE:	None
Documents Reviewed:	<ul style="list-style-type: none"> • Sample Day 30 email to sample from APAO.pdf, Category: Recruitment Materials; • HRP 502e consent.Swei.pdf, Category: Consent Form; • Sample Day 1 email to sample from APSHO.pdf, Category: Recruitment Materials; • HRP-503.Swei.IRB.12.6.20.pdf, Category: IRB Protocol; • Steven Wei- Doctoral Research Study Endorsement.APAO.pdf, Category: Letters of Cooperation / Permission; • Sample Day 50 email to sample from APSHO.pdf, Category: Recruitment Materials; • HRP-412 checklist pregnant women.Swei.docx, Category: Completed Checklists; • HRP-411 Swei.Waiver of written doc of consent.docx, Category: Completed Checklists; • Sample Day 1 email to sample from APAO.pdf, Category: Recruitment Materials; • IRB modification letter. Swei. 12.6.2020.pdf, Category: Other; • Wei Letter of Endorsement.APSHO - FINAL.pdf, Category: Letters of Cooperation / Permission; • Qualtrics Survey Swei Doctoral Research 11.2020.pdf, Category: Study tools (ex: surveys, interview/focus group questions, data collection forms, etc.); • Sample Day 30 email to sample from APSHO.pdf,

University of Houston IRB Approval (December 12, 2020; Page 2)



DIVISION OF RESEARCH

Institutional Review Boards

	Category: Recruitment Materials; • Sample Day 50 email to sample from APAO.pdf, Category: Recruitment Materials;
Review Category:	Exempt
Committee Name:	Designated review
IRB Coordinator:	Maria Martinez

The IRB approved the study on December 12, 2020; recruitment and procedures detailed within the approved protocol may now be initiated.

As this study was approved under an exempt or expedited process, recently revised regulatory requirements do not require the submission of annual continuing review documentation. However, it is critical that the following submissions are made to the IRB to ensure continued compliance:

- Modifications to the protocol prior to initiating any changes (for example, the addition of study personnel, updated recruitment materials, change in study design, requests for additional subjects)
- Reportable New Information/Unanticipated Problems Involving Risks to Subjects or Others
- Study Closure

Unless a waiver has been granted by the IRB, use the stamped consent form approved by the IRB to document consent. The approved version may be downloaded from the documents tab.

In conducting this study, you are required to follow the requirements listed in the Investigator Manual (HRP-103), which can be found by navigating to the IRB Library within the IRB system.

Sincerely,

Research Integrity and Oversight (RIO) Office
University of Houston, Division of Research
713 743 9204
cphs@central.uh.edu
<http://www.uh.edu/research/compliance/irb-cphs/>

University of Houston IRB Modification (January 21, 2021; Page 1/2)



DIVISION OF RESEARCH
Institutional Review Boards

APPROVAL OF SUBMISSION

January 25, 2021

Steven Wei
shwei@uh.edu

Dear Steven Wei:

On January 25, 2021, the IRB reviewed the following submission:

Type of Review:	Modification
Title of Study:	Collaborative Practice Teams in Oncology: Examining the Role of Psychological Safety and its Relationship with Clinician Well-Being Among Advanced Practice Providers
Investigator:	Steven Wei
IRB ID:	STUDY00002675
Submission ID:	MOD00003309
Funding/ Proposed Funding:	Name: Unfunded
Award ID:	None
Award Title:	
IND, IDE, or HDE:	None
Documents Reviewed:	<ul style="list-style-type: none"> • Sample Day 30 email to sample from APAO.revised.pdf, Category: Recruitment Materials; • Sample Day 30 email to sample from APSHO.revised.pdf, Category: Recruitment Materials; • Sample Day 50 email to sample from APAO.revised.pdf, Category: Recruitment Materials; • Sample Day 50 email to sample from APSHO.revised.pdf, Category: Recruitment Materials; • Sample Day 1 email to sample from APAO.revised.pdf, Category: Recruitment Materials; • Sample Day 1 email to sample from APSHO.revised.pdf, Category: Recruitment Materials;
Review Category:	Exempt
Committee Name:	Not Applicable
IRB Coordinator:	<u>Maria Martinez</u>

The IRB approved the following revision on January 25, 2021.

University of Houston IRB Modification (January 21, 2021; Page 2/2)**Summary of approved modification(s):**

At the recommendation from the MD Anderson IRB reviewer, I will need to submit a minor modification to the recruitment documents only in my study. No revisions were needed for the survey, waiver of consent, or study protocol. I have not started the study yet, and no study subjects have been enrolled.

MD Anderson IRB reviewer suggests the removal of my MD Anderson credentials at the bottom of my email sample templates (6 documents).

I will submit a revised version of the 1-day, 30-day, 50-day sample emails from APAO/ APSHO to study participants and include "track changes" that indicate the removal of only my MD Anderson credentials in the signature portion of the email template.

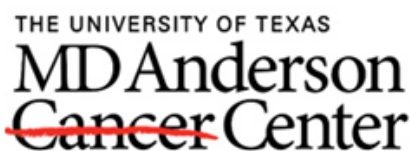
Please let me know if you have any questions.

In conducting this study, you are required to follow the requirements listed in the Investigator Manual (HRP-103), which can be found by navigating to the IRB Library within the IRB system.

If your study meets the NIH or FDA definitions of clinical trial, or may be published in an ICMJE journal, registration at ClinicalTrials.gov is required. See the [UH ClinicalTrials.gov webpage](#) for guidance and instructions.

Sincerely,

Research Integrity and Oversight (RIO) Office
University of Houston, Division of Research
713 743 9204
cphs@central.uh.edu
<http://www.uh.edu/research/compliance/irb-cphs/>

Acknowledgement of Request to Cede IRB Oversight Approval (January 21, 2021)

Making Cancer History®

Office of Human Subject Protection
7007 Bertner Avenue - Unit 1637
Houston, Texas 77030
Mainline: 713-792-6477 (2-6477)

ACKNOWLEDGEMENT OF REQUEST TO CEDE IRB OVERSIGHT APPROVAL

January 21, 2021

Steven Wei
Surgical Oncology

Courtney Holladay
Leadership Institute

Protocol ID and Title: 2020-1075, Collaborative Practice Teams in Oncology: Examining the Role of Psychological Safety and its Relationship with Clinician Well-Being among Advanced Practice Providers

This letter serves as documentation that an IRB Chair or designee at The University of Texas MD Anderson Cancer Center (MD Anderson) has completed an abbreviated review of the protocol and has determined that MD Anderson may rely on the University of Houston IRB for IRB oversight.

Sincerely,

Amber Cumpian

|

APPENDIX D

Letters of Endorsement

1. *Association of Physician Assistants in Oncology*



**222 S Westmonte Dr, Suite #111
Altamonte Springs, FL 32714
P 407-774-7880 * Fax 407-774-6440**

Ryan Clayton
Executive Director

November 5, 2020

Dear Institutional Review Board (IRB) Committee:

On behalf of the Association of Physician Assistants in Oncology (APAO), I am writing this letter of support for **Steven Wei, MS, MPH, PA-C**, who is currently an Ed.D. candidate in the Professional Leadership in Health Science Education program at the University of Houston.

The APAO endorses Mr. Wei's proposed doctoral research study on "*Collaborative Practice Teams in Oncology: Examining the Role of Psychological Safety and Its Relationship with Clinician Well-Being Among Advanced Practice Providers*" which aligns well with our organization's mission, values, and goals.

Our board of directors has reviewed Mr. Wei's proposed research protocol, including his online survey and waiver of informed consent form. We approve of Mr. Wei's research study and endorse his protocol submission to the University of Houston and the University of Texas MD Anderson Cancer Center Institutional Review Board.

Once Mr. Wei receives IRB approval for his study, then we will request a copy of this IRB approval letter for our records. We will then plan to discuss with Mr. Wei the details of his planned research process, including timeline for survey deployment in early 2021.

If you have any questions, please feel free to reach out to us at 407.774.7880.

Sincerely,

A handwritten signature in blue ink, appearing to read 'Ryan Clayton', is written over a light blue horizontal line.

Executive Director
Association of Physician Assistants in Oncology

APPENDIX C (Continued)

2. *Advanced Practitioner Society for Hematology and Oncology*



Advanced Practitioner
Society for Hematology
and Oncology

Sandra Kurtin, PhD, ANP-C, AOCN
President, Advanced Practitioner Society for Hematology and Oncology
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October 27, 2020

Dear Institutional Review Board (IRB) Committee:

On behalf on the Advanced Practitioner Society for Hematology and Oncology (APSHO), I am writing this letter of support for **Steven Wei, MS, MPH, PA-C**, who is currently an Ed.D. candidate in the Professional Leadership in Health Science Education program at the University of Houston.

APSHO endorses Mr. Wei's proposed doctoral research study on "*Collaborative Practice Teams in Oncology: Examining the Role of Psychological Safety and Its Relationship with Clinician Well-Being Among Advanced Practice Providers*" which aligns well with our organization's mission, values, and goals. Our review committee has examined Mr. Wei's proposed research protocol, including his online survey and waiver of informed consent form. We approve of Mr. Wei's research study and endorse his protocol submission to the University of Houston and the University of Texas MD Anderson Cancer Center Institutional Review Board.

Once Mr. Wei receives IRB approval for his study, he will need to submit a copy of the IRB approval letter for our records. We will then work with Mr. Wei to operationalize the data collection process to ensure compliance with the IRB approved project and APSHO's secured server to protect member and organizational privacy.

If you have any questions, please feel free to contact our Executive Director, Wendy Vogel at wwogel@hbside.com or at 423-676-4031.

Sincerely,

Sandra Kurtin, PhD, ANP-C, AOCN
President
Advanced Practitioner Society of Hematology and Oncology

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