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RESEARCH ARTICLE

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Nurse practitioner model of care for the initiation of pre-exposure prophylaxis: A case series study

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Abstract

Aim: The purpose of this study was to create and implement a nurse practitioner model of care in the initiation of a pre-exposure prophylaxis (PrEP) protocol with African American men who have sex with men (MSM).

Design: A case series design was used to implement the protocol for a nurse practitioner PrEP-based model of care.

Methods: The participatory, evidence-based, patient-focus process (PEPPA) framework and the American Association of Colleges of Nursing (AACN) Doctoral Essentials for Advanced Practice were aligned to guide the development, implementation, and evaluation of this advanced practice role in an urban medical clinic.

Results: Seven African American HIV-negative MSM who received treatment under the nurse practitioner PrEP-based model of care had increased PrEP knowledge and medication adherence and did not contract a sexually transmitted infection.

Conclusions: New models of care can be created to meet the Getting to Zero HIV initiative of reducing rates of HIV infections with MSM.

KEYWORDS
American Association of Colleges of Nursing, Doctoral Essentials, men who have sex with men, models of care, nurse practitioner, pre-exposure prophylaxis

1 | INTRODUCTION

In the United States, HIV continues to have a disproportionate impact on certain populations, particularly African American men who have sex with men (MSM; Centers for Disease Control and Prevention [CDC], 2019a). African American MSM account for six out of every 10 new HIV diagnoses among African Americans living in the South (CDC, 2019a). Sixty three percent of African American MSM diagnosed with HIV who live in the south represent approximately 50% of the new cases of HIV infection in the United States (CDC, 2019a). Nine southern states disproportionally affected by HIV include Alabama, Florida, Georgia, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee and Texas (CDC, 2019a). African American MSM living in these states tend to share specific characteristics, including overall poor health, high poverty rates, high levels of sexually transmitted infections (STIs) and low levels of insurance coverage (CDC, 2019a).

New approaches to HIV prevention are urgently needed to reduce the growing number of HIV infections among African American MSM. Despite demonstrated efficacy, the implementation of pre-exposure prophylaxis (PrEP) to prevent HIV infections has been slow (Nunn et al., 2017). The PrEP care continuum involves identifying those at risk, increasing and enhancing PrEP awareness, providing PrEP access, linking to PrEP care and retention into care. Given

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that effective PrEP uptake requires at-risk patients to regularly take medication, several factors are associated with adherence. In addition to the biomedical aspect, biobehavioural or biopsychosocial (social, psychological, cultural and structural) factors contribute to whether retention in the PrEP care continuum succeeds or fails (Nunn et al., 2017).

2 | BACKGROUND

Despite the benefits of PrEP, there are many obstacles in making PrEP accessible to high-risk populations. In 2018, the CDC estimated that 18% of the 1.2 million (N = 219,700) in the United States who could benefit from taking PrEP actually received a PrEP prescription (CDC, 2020a); and, only 11% of African American MSM use it as a prevention strategy (CDC, 2019b). Currently, there are not enough HIV specialists to meet the demand for PrEP in the United States (Ellis et al., 2019). A study by Maier and Aiken (2016) found that patient care tasks are being shifted from physicians to nurse practitioners (NPs) in order to increase workforce capacity. The rapid growth of NPs in the workforce has led policy makers to advocate for greater use of NPs. Recognizing NPs as an obvious and untapped resource as a PrEP provider in underserved areas where healthcare and personnel are limited has accelerated the need for NP-based models for HIV prevention (Nelson et al., 2018).

Nurse practitioners work differently from physicians and physician assistants in that their practice is grounded in principles of professional nursing with an emphasis on patient-centred, holistic care rather than biologic and pathologic components of health care. Professional nursing is determined by three attributes: cognitive, attitudinal and psychomotor (Ghadirian et al., 2014). Therefore, NPs can provide holistic care, which integrates psychological, cultural, spiritual and social factors to improve health. Despite the value of having NPs administering PrEP, their role has been limited.

In the HIV Prevention Trials Network (HPTN) 073 study, an advanced practice nurse self-determination theory-based care coordination model was used to facilitate PrEP uptake and adherence among Black MSM (Nelson et al., 2018). The results demonstrated that NPs already have a solid evidence base for care coordination in improving health outcomes in areas of health disparities. With the projected number of NPs expected to increase by 93% by 2025 in the United States, there would be 110,540 in practice (Nelson et al., 2018), resulting in the potential addition of a large and important resource to expand prevention efforts with PrEP care to those most at risk. However, NPs in acute care settings may be reluctant to prescribe PrEP to those who would require continuous medical monitoring (Nelson et al., 2018). In a cross-sectional study of a national subset of NPs (N = 271), the majority indicated that they had no PrEP training, never discussed PrEP with patients and demonstrated low self-efficacy in delivering PrEP-related care (Ellis et al., 2019).

Bono et al. (2021) highlighted the scarcity of HIV specialists in the United States. This translates unevenly across the United States, with 81% of counties, mostly rural, lacking HIV-experienced clinicians. Additionally, NPs in the United States have been found to have higher odds than physicians to prescribe PrEP to patients, even though NPs are equally willing a priori and experience lower awareness of PrEP (see the meta-analysis provided in Zhang et al., 2020). However, this requires some legal modifications in some states where NPs are legally limited in their ability to prescribe PrEP (Salvant-Valentine et al., 2022). These authors make out the case that, in the United States, approximately half of the individuals for whom PrEP is indicated live in states with such limitations, and that an enhanced role by NPs in PrEP prescription could provide much needed support to many of the 1 million individuals in the United States for whom PrEP is indicated but not currently prescribed. This is an important health equity issue, since many of these individuals belong to mostly underserved racial and sexual minority groups, and where NPs are oftentimes the healthcare practitioner closest to patients' needs. O'Byrne et al. (2019) proposed that no resource should be left untapped, underused or unexplored, in order to provide patients with the best HIV-related available care. This is especially relevant in a situation where the status quo of insufficient or unused medical resources for some populations can increase disease prevalence and burden and cost lives. Advanced practice nurses (i.e., those with a master or doctoral-level education who can prescribe medications, which include NPs) can provide a Pareto efficient solution to a problem that is unlikely to go away on its own.

There are currently no known NP-based models of PrEP care (Nelson et al., 2018) and, to our knowledge, no doctoral-prepared NP-based PrEP models of care in the literature. The southern region of the United States has the largest number of new HIV cases and less PrEP service capacity when compared to other parts of the country (Zhu et al., 2021). Hence the need for NP-based models for HIV prevention are greatly needed in this region of the country. In this study, we propose developing a NP-based PrEP model of care at a highly populated infectious disease clinic in North Carolina.

The purpose of this manuscript is to report findings from a PrEP protocol led by a doctoral-prepared NP for HIV-negative African American MSM examining medication adherence, knowledge retention and STI outcomes after 2 months when compared with baseline. The findings from this study add to the literature on advancing NP models of care.

3 | METHODS

For this study, a case-series design was used to examine the outcomes from a NP PrEP-based model of care with HIV-negative African American MSM. A case series is a group of observations involving patients, including detailed health information such as diagnosis, treatment and corresponding treatment response, as well as follow-up information, who are given similar treatment prior to and after an intervention and without a control group (Mathes & Pieper, 2017). Case series with more than three patients contribute to generalizable knowledge and require approval from institutional review boards (Mathes & Pieper, 2017). After obtaining institutional

review board approval (IRB00052082), participants were recruited to participate in the PrEP protocol with the doctoral-prepared NP.

The current PrEP provider in the infectious disease clinic was a primary care physician. It was noted that the physician had limited availability in meeting the immediate needs of the patients in the infectious disease clinic. The development of the NP PrEP provider role would allow for immediacy with patients' needs and a front-line provider to assist patients prescribed PrEP. For example, the NP was able to contact the pharmacy to verify prescription refills, time that a physician may not have to complete this task.

Using the participatory, evidence-based, patient-focus process (PEPPA) framework for guiding the development, implementation and evaluation of the advanced nursing practice role the NP PrEP-based model of care was developed (Bryant-Lukosius et al., 2004). The NP in this study graduated in 2019 from a Doctor of Nursing Practice (DNP) that built upon the American Association of Colleges of Nursing (AACN, 2016) Doctoral Essentials for Advanced Practice nursing education. The underpinnings of doctoral nursing education is based on societal demands and interprofessional work environments (AACN, 2016). DNPs who prepare for advance practice roles (i.e., PrEP provider), will have a more specialized practice in the area of advanced practice nursing. To develop the NP PrEP-based model of care, we aligned the PEPPA framework and doctoral essentials to develop the PrEP provider role for the doctoral-prepared NP (See Table 1).

The PEPPA framework is a systematic guide to promoting and advocating the implementation and evaluation of advanced nursing practice roles. The framework is shaped by values consistent with the role of an advanced practice nurse. The nine steps of the framework are designed to support advanced practice nurse role development and integration within healthcare systems, such as infectious disease settings (Bryant-Lukosius & Dicenso, 2004).

Step one of the PEPPA framework requires the NP to define the patient population and current model of care. This step aligns with Essentials I, II, III and VII (AACN, 2016). This involves scientific underpinning for practice; organizational leadership for quality improvement and systems thinking; clinical scholarship pertaining to evidence-based practice; and clinical prevention for improving population health of the nation. Step two involves identifying stakeholders, recruiting participants and coordinating PrEP care continuum. This aligns with Essentials II, III, V and VI. As previously noted with Essentials II and III, Essentials V and VI consist of advocating for healthcare policies and interprofessional collaboration for improving patient outcomes. Step three requires the NP to determine a new model of care and aligns with Essentials II and VIII for advanced nursing practice. Step four requires the NP to identify priority problems and goals to improve the model of care. This step aligns with Essentials IV, VII, V and VI. This requires patient care technology in addition to clinical prevention, healthcare advocacy, and interprofessional collaboration. Step five requires modification to the current model of care and defining a new model of care. The NP will include holistic therapeutic intervention and analytic skills in evaluating links among practice, organizations, populations and policies. This step aligns with previously described Essentials II, III, VI and VIII.

Step six involves planning model-of-care implementation strategies. It consists of clinical judgement, estimation of resources, evaluating links among practice, organizations and policy issues, and aligns with five essentials (Essentials II, III, VI, V and VII). The next step, Step seven, requires the NP to initiate the new PrEP provider role. This involves advanced levels of clinical judgement, use of analytic skills to evaluate links among services, and education of individuals, and groups about the PrEP provider role. This step involves six essentials (Essentials II, III, VI, V, VII and VIII). Step eight requires the NP to evaluate the PrEP provider role and model of care. This will involve periodic assessments of the model of care, identify professional development, and other professionals integral to the care-coordination model. This involved Essentials I, II, III and VIII. While not a part of this study, the final step (Step 9) involves long-term monitoring of the NP-based PrEP model of care. This step involves Essentials II, III and VIII. SQUIRE guidelines were used (Bryant-Lukosius & Dicenso, 2004) (See Appendix S1).

3.1 | Sample

The participants were African American HIV-negative men who belonged to a high-risk group of men (those who had anal sex with men, who had been diagnosed with an STI within the past 6 months, identified as intravenous drug users, and who were not taking PrEP). Those younger than 18 years of age, unable to give consent, HIV-positive or infected with hepatitis B or C were excluded from participating in the study. An attending physician and scheduler screened all referrals in the clinic. Next, all referrals for PrEP were directed to the NP. A convenience sample of 26 HIV-negative MSM were screened. Eighteen volunteers were eligible to participate of which 8 did not consent: 10 were scheduled, but 3 did not show up. The final sample size consisted of 7 African American HIV-negative MSM.

3.2 | Setting

The setting for this study was an infectious disease clinic at a local urban hospital in North Carolina. The clinic provides interdisciplinary care services to more than 2,000 patients across the HIV care continuum. Approximately half of the patients who receive services at this clinic are MSM.

3.3 | PrEP protocol development

The doctoral-prepared NP led the development of the PrEP provider role and protocol. The patient population was identified, institutional buy-in was obtained from administrators, key stakeholders,

TABLE 1 PEPPA framework and AACN Doctoral Essentials

PEPPA Framework	AACN Doctoral Essentials
Define patient population and describe current model of care • Conduct a comprehensive and systematic assessment of those eligible for PrEP incorporating diverse and culturally sensitive approaches	Essential I. Scientific underpinnings for practice Essential II. Organizational and systems leadership for quality improvement and systems thinking Essential III. Clinical scholarship and analytical methods for evidence-based practice Essential VII: Clinical prevention and population health for improving the nation's health
Identify stakeholders and recruit participants • Coordinate PrEP care continuum with service providers most likely to be involved with the treatment plan • Recruit eligible participants and assess willingness to take PrEP using assessment tools	Essential II. Organizational and systems leadership for quality improvement and systems thinking Essential III. Clinical scholarship and analytical methods for evidence-based practice Essential V. Healthcare policy for advocacy in health care Essential VI: Interprofessional collaboration for improving patient and population health outcomes
Determine the need for a new model of care • Identify current needs for PrEP delivery to eligible population	Essential II. Organizational and systems leadership for quality improvement and systems thinking Essentia VIII. Advanced Nursing Practice
Identify priority problems and goals to improve model of care • Identify major pediments to PrEP management • Educate and guide individuals and groups through situational transitions	Essential IV. Information systems/technology and patient care technology for the improvement and transformation of health care Essential VII: Clinical prevention and population health for improving the nation's health Essential V. Healthcare policy for advocacy in health care Essential VI: Interprofessional collaboration for improving patient and population health outcomes
Define new model of care and DNP NP PrEP provider role • Identify current modifications to the current model of care: will this involve the scheduler, physician and NP? • Design holistic therapeutic interventions based on nursing science and other sciences. Educate and guide individuals and groups through situational transitions. • Use conceptual and analytic skills in evaluating the links among practice, organizations, population, fiscal and policy issues • Demonstrate advanced levels of clinical judgement, systems thinking, and accountability in designing evidence-based care to improve health outcomes	Essential II. Organizational and systems leadership for quality improvement and systems thinking Essential III. Clinical scholarship and analytical methods for evidence-based practice Essential VI: Interprofessional collaboration for improving patient and population health outcomes Essential VIII. Advanced Nursing Practice
Plan implementation strategies (identify outcomes, outline evaluation plan, collect baseline data) • Demonstrate advanced levels of clinical judgement, systems thinking and accountability in designing evidence-based care to improve health outcomes • Estimate resources (training, patient education). Educate and guide individuals and groups through situational transitions. Operational resources (pharmacy, physician, patient scheduler) • Use conceptual and analytic skills in evaluating the links among practice, organizations, population, fiscal and policy issues • Educate and guide individuals and groups through complex health and situational transitions	Essential II. Organizational and systems leadership for quality improvement and systems thinking Essential III. Clinical scholarship and analytical methods for evidence-based practice Essential VI: Interprofessional collaboration for improving patient and population health outcomes Essential V. Healthcare policy for advocacy in health care Essential VII: Clinical prevention and population health for improving the nation's health
Initiate DNP NP PrEP provider role • Identify NP as the PrEP provider within the practice; evaluate patient progress • Demonstrate advanced levels of clinical judgement, systems thinking, and accountability in designing evidence-based care to improve health outcomes • Use conceptual and analytic skills in evaluating the links among practice, organizations, population, fiscal and policy issues • Educate and guide individuals and groups through complex health and situational transitions.	Essential II. Organizational and systems leadership for quality improvement and systems thinking Essential III. Clinical scholarship and analytical methods for evidence-based practice Essential VI: Interprofessional collaboration for improving patient and population health outcomes Essential V. Healthcare policy for advocacy in health care Essential VII: Clinical prevention and population health for improving the nation's health Essential VIII. Advanced Nursing Practice

TABLE 1 (Continued)

PEPPA Framework	AACN Doctoral Essentials
Evaluate DNP NP PrEP provider role and model of care • Conduct periodic assessments of the DNP NP model of care, identify professional development, identify need for other professionals in the care coordination model. • Use conceptual and analytic skills in evaluating the links among practice, organizations, population, fiscal and policy issues	Essential I. Scientific underpinnings for practice Essential II. Organizational and systems leadership for quality improvement and systems thinking Essential III. Clinical scholarship and analytical methods for evidence-based practice Essential VIII. Advanced Nursing Practice
Long-term monitoring of the DNP NP in the PrEP model of care • Conduct periodic self-assessment of the PrEP model of care • Use conceptual and analytic skills in evaluating the links among practice, organizations, population, fiscal and policy issues	Essential II. Organizational and systems leadership for quality improvement and systems thinking Essential III. Clinical scholarship and analytical methods for evidence-based practice Essential VIII. Advanced Nursing Practice

and agency staff (clinic infectious disease doctors, NPs, social workers and patient navigators). CDC guidelines, peer-reviewed literature and the Evaluation of Candidacy for HIV PrEP survey were used to guide the development of the protocol (O'Byrne et al., 2019). Based on the need, a new model of care was proposed.

On the *first* visit, participants met the doctoral-prepared NP. The NP discussed the PrEP protocol and provided participants with information about the project, including the purpose and an explanation of data collection procedures. After completing the Attitudes and Behaviors PrEP 19-item survey (Gersch et al., 2014) and a brief 9-item PrEP pre-test knowledge survey (See Appendices S2 and S3), the face-to-face educational intervention followed. The educational intervention provided information on PrEP indications, side effects and frequency for taking the medication (daily). Prior to PrEP initiation and at each *follow-up visit* (months 1 and 3), the following laboratory tests were collected: HIV antigen antibody, comprehensive metabolic panel (CMP), hepatitis panel and syphilis (Rapid Plasma Reagin). Gonorrhoea and chlamydia swabs were collected at the anatomical sites of exposure along with urine specimens as needed (CDC, 2020a). Each participant was provided a PrEP 101 informational handout at the end of the initial session. A medication log was provided to each patient at baseline so that they could record every time they took PrEP. All patients were asked to bring their log with them to each follow-up visit. Condoms were available for distribution at each of the visits (*visit 1*, *baseline; visit 2*, *one month; and visit 3*, *three-month follow-ups*) (see Table 2).

During the follow-up sessions (*visit 2*, *one month; and visit 3*, *three months*), the NP reviewed the PrEP 101 handout and laboratory results with each participant. Strategies to maintain PrEP adherence as well as consequences of unprotected sexual encounters were emphasized. Condoms were distributed as needed. The NP contacted the clinic pharmacy to monitor prescription refills before each follow-up visit. At the two follow-up visits (*months 1 and 3*), the 9-item PrEP knowledge survey was administered as a posttest. Participants were given a $25 gift card upon enrollment and at the second follow-up (*visit 3 - three months*) visit. We encouraged the participants to be open and honest with their responses. Participants were assured that the information would remain confidential and anonymity would be ensured.

3.4 | Data analysis

All data were collected and entered onto Excel spreadsheets. Due to the small sample size, all study outcomes were analysed using descriptive statistics.

4 | FINDINGS

From 7 January–7 March 2019, a total of seven participants agreed to participate in the study. The sample was African American MSM ($N = 7$), with an average age of 29.7 years (SD 3.4), who were employed ($N = 7$) and had attended college ($N = 6$). None of the participants had significant past medical health problems. One participant had unilateral agenesis of the kidney, which did not interfere with PrEP administration. Five (71.4%) participants attended the first follow-up visit and four of those participants also attended the second follow-up visit, resulting in an overall attrition of 42.9% between baseline and the end of the study period.

4.1 | PrEP knowledge

At the initial visit (*baseline*) only 5 (71%) of the seven participants demonstrated accurate PrEP knowledge by scoring 100% on the 9-item pre-test questionnaire. The following four pre-test questions were answered correctly by all participants:

- PrEP is 100% effective in reducing HIV risk.
- If you take PrEP, should you stop using condoms when having sex?
- Is there a vaccine to help your body fight off HIV for several years?
- How often should you take PrEP?

At the first follow-up visit (*1 month later*), the 5 returning participants demonstrated 100% accuracy with PrEP knowledge. At the *3-month* follow-up visit (*visit 3*), the 4 returning participants demonstrated 100% accuracy with PrEP knowledge.

4.2 | Medication adherence

All seven participants obtained their refills. Of the five participants who returned for the first follow-up visit (*1 month later*); just two of them (40%) brought their medication log. Only 3 of the 5 participants (60%) reported taking PrEP without any missed doses. The other two participants self-reported missing up to three pills in the first month. At visit three (*3-month follow-up*), all four of the participants obtained their refills. Three (75%) did not bring their medication logs for review and reported not missing any doses. Only 1 of the 4 participants (25%) brought his medication log for review, which indicated 5 missing doses out of the assigned 30 pills for the month. Reasons for the missed doses included:

- Forgetting to take PrEP because they fell asleep.
- Working late and inability to get home to take the medication.
- Side effects that caused discomfort.

4.3 | STI outcomes

All participants (*N* = 7) tested negative for HIV at *baseline* and at *both follow-up visits* (*months 1 and 3*). At *baseline*, 2 participants (28.6%) were treated for an STI. One was treated for syphilis, and one was treated empirically for trichomonas (treatment was required since the participant's partner reported being positive for trichomonas). One participant refused a rectal swab despite having engaged in anal sex (this was the same participant who was treated for trichomonas).

4.4 | High-risk sexual behaviours

At *baseline*, 71.4% (*N* = 5) reported currently having multiple partners, and just 28.6% (*N* = 2) reported consistent condom use. At the first follow-up visit (*1 month later*) with five participants after initial attrition, 80% (*N* = 4) reported having multiple partners, and just 1 (20%) reported 100% condom use in the ensuing time period, while the others reported inconsistent condom use. At the second follow-up visit (*3 months later*) with four participants, half of the participants (*N* = 2, 50%) reported consistent condom use (100% usage) and having had multiple partners. Those who had multiple partners reported that their partners were HIV-negative. The other 2 (50%) participants said that since they were on PrEP, they did not have to use condoms. These two did not report the HIV status of their sexual partners.

5 | DISCUSSION

Scholarship is the hallmark of doctoral education. DNP-prepared nurses provide advanced nursing practice and leadership using evidence-based findings. An example of the type of scholarship that can be produced is the development and evaluation of new practice models. Mastery of an advanced specialty within nursing practice is required for DNP graduates. The creation of a DNP NP-led PrEP model of care was developed.

Participants who returned for the two follow-up visits demonstrated 100% accuracy with the 9-item PrEP knowledge test. We were able to confirm medication refills with the pharmacy. Only one participant reported missing five pills in 1 month. All of the returning participants stayed HIV-negative and STI-free at both follow-up visits.

Secondary outcomes, however, included riskier behaviour when it came to rates of condom use and the number of sexual partners. Despite showing accuracy with PrEP knowledge questions, participants reported inconsistent condom use and multiple sexual partners. Although PrEP and condoms provide comprehensive protection against STIs, the absence of condom use does not invalidate the effectiveness of PrEP in preventing HIV (Calabrese et al., 2017). The daily PrEP regimen was emphasized as well as consistent condom use and the use of other protective barriers such as dental

TABLE 2 PrEP pilot protocol

Study procedures	Baseline	Follow-up visit 1 (1 month–4 weeks)	Follow-up visit 2 (3 months)
Obtain specimens for HIV testing, complete metabolic panel (CMP) hepatitis panel, STI testing (as needed)	X	X	X
Review PrEP criteria/screening tool (24-item survey) Attitudes and Behaviours Toward PrEP	X		
Assess readiness to take PrEP survey	X		
Conduct face-to-face educational session and administer PrEP 101 handout	X	X	X
Contact pharmacy about refills before visits		X	X
Administer 9-item PrEP knowledge pre/post test	X	X	X
Give incentive gift card	X		X

dams for high-risk sexual activity. However, consistent with the literature, PrEP knowledge does not always lead to a change in sexual behaviours, and an increase in STI rates have been reported while patients were taking PrEP (Barreiro, 2018; Traeger et al., 2019).

The results of this study mirror challenges in many other studies in general: small sample size, high dropout rates, limited staff support for participant recruitment and retention and in this case, increased acts of condomless sex (Sullivan & Siegler, 2019). One challenge occurred when participants who did not return for the follow-up visits had received more than a 1-month supply of PrEP. This allowed participants to skip both follow-up visits, when they would have otherwise received a refill on the second visit had they attended. With COVID-19, the CDC is now recommending prescriptions of 90-day supplies of PrEP to minimize trips to the pharmacy and facilitate PrEP adherence (McCray & Mermin, 2020). We have incorporated this change into the protocol.

Presently in 2021, Gilead is able to provide PrEP at no cost to the uninsured or those unable to afford their medicine through the U.S. Department of Health and Human Services' Ready, Set, PrEP program (Office of Infectious Disease and HIV/AIDs Policy, 2021). Until COVID-19 is under control, the CDC recommends quarterly testing instead of monthly testing to help protect staff and patients (McCray & Mermin, 2020). Additional testing options include HIV home specimen test kits (blood, swabs or urine) and HIV self-test swabs. While the latter is not recommended due to poor sensitivity in detecting recent HIV infections, it is acceptable if no other test is available (MacGowan et al., 2020). MacGowan et al. (2020) found that with mailed HIV self-test kits, patients taking PrEP tested themselves more frequently than those who had participated in face-to-face clinic visits. Also, those who used the HIV self-test kits did not increase sexually risky behaviours. Currently, during COVID-19, the clinic has not implemented home testing kits with patients but is giving 3-month prescriptions for PrEP.

This study has notable limitations: small sample size, high dropout rate, poor documentation on the part of participants and urgent-care setting (not long-term setting). Also, a longer follow-up period would have been ideal, though our study period of 3 months aligns with standard PrEP prescription supplies of 90 days (McCray & Mermin, 2020). Despite its small sample size, trends suggest that adding a nurse-based PrEP protocol with an educational intervention may improve PrEP knowledge, medication adherence and STI prevention (O'Byrne et al., 2019). Out of the four participants who completed both follow-up visits, only one completed his medication log. There is no way to validate whether the other three participants missed doses except for self-report, despite having their medication refills verified with the pharmacy. This nurse-led study was conducted in a traditional urban medical setting. Results may have varied if the project had been conducted in a rural setting.

Initial data indicates that additional organizational resources are needed for a successful rollout. First, extra staff is needed to assist with the retention process. This could be addressed by hiring patient navigators who are often successful in recruiting and retaining patients in the PrEP care continuum (CDC, 2020b). Second, clinical trials suggest that PrEP uptake and adherence can be boosted with bidirectional text messages or email support (social and structural factors) (Fuchs et al., 2018). Third, adherence could be improved with the use of peer interventions such as storytelling (social and psychological factors) (Sophus et al., 2018). We will continue to examine longitudinal assessments of this advanced practice model of care and make revisions as needed. The findings from this study suggest that a NP PrEP-based model of care could be used to underscore the importance of prescribing and monitoring those at high risk for HIV. The role was created and successfully implemented.

In summary, NP-based models of care can help scale up PrEP treatment to those most at risk for sexually transmitted diseases. Despite distrust of medical establishments, nurses have represented the most trusted profession 19 years in a row according to a most recent Gallup poll (Gaines, 2021). NPs can take the lead in developing such programmes. This trust, along with advanced clinical skills, can translate into new models of care for HIV prevention along the PrEP continuum.

The tele-PrEP landscape (PrEP and associated services) began before the COVID-19 pandemic but increased during the pandemic (Dawson et al., 2022). The telehealth delivery process has been synchronous, asynchronous and hybrid. Tele-PrEP enhances the NP-based PrEP provider model by address disparities in PrEP services. The process is convenient and confidential. Facilitators of tele-PrEP include multistate licensing, community-based partnerships, marketing strategies and assisting the uninsured with insurance enrolments. Access challenges to tele-PrEP services have excluded women, people of colour, policies (laws prohibiting some aspects of tele-PrEP), knowledge gaps and multistate credentialing (Dawson et al., 2022). The NP PrEP provider can follow CDC guidelines for offering PrEP during the pandemic. Once an HIV-negative status has been confirmed, quarterly HIV testing and home testing kits should be offered. Providing clients with a 90-day supply of PrEP can reduce trips to the pharmacy and promote adherence (CDC, 2020a).

Since PrEP adherence rates were not ideal to the daily treatment regimen, on-demand or intermittent PrEP could have been offered as an option. While on-demand PrEP is recommended for MSM who experience periods of sexual inactivity, have impaired kidney function, use a condom intermittently, or do not want to commit to a daily treatment regimen, it can expand PrEP access to eligible MSM (NYC Health, 2022). The on-demand option will require the NP PrEP provider to discuss the 2-1-1 schedule. This schedule will require the individual to take two tablets 24 hr before sex, 1 tablet 24 hr after the first dose, and another tablet 24 hr later. This dosing schedule works effectively for MSM who engage in receptive and insertive anal sex, for those who have sex less than once a week, and for those who have a predictable sex life. Notably, side effects were found to occur more often with on-demand PrEP compared to the daily dosing of PrEP (Highleyman, 2020). The NP PrEP provider will have to provide counselling about the use of condoms when not taking PrEP, and that emergency PEP (postexposure prophylaxis) can be taken if a PrEP dose is missed (Highleyman, 2020). It is recommended that the patient comes in every 3 months to test for STIs.

6 | RELEVANCE TO CLINICAL PRACTICE

Postexposure prophylaxis medications have the potential to reduce rates of HIV infection. With the shortage of primary care physicians, NPs hold promise as a significant resource in closing the gap to PrEP access for at-risk populations. Doctoral-prepared advanced practice nurses can be guided by the AACN essentials for innovation and excellence in nursing education to develop and implement models of care to reduce rates of HIV infection.

7 | IMPACT STATEMENT

What does this paper contribute to the wider global clinical community?

- Nurse practitioners are an important and underutilized resource to expand HIV prevention efforts to those most at risk globally.
- This case series study provides preliminary evidence that the development of a nurse practitioner PrEP-based model of care to be valuable in expanding efforts to prescribing PrEP to a priority population.
- Nurses with professional clinical doctorates can be instrumental in designing and implementing models of care informed by role development in nursing curricula.

CONFLICT OF INTEREST

The authors, Judith Cornelius, Laura Gunn, Cynthia Dalton and Bernard Davis, declare no conflict of interest.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

ETHICAL APPROVAL

The protocol was implemented with human subjects so ethical approval was required. The researchers received approval from the Wake Forest University Institutional Review Board (IRB00052082). Signed informed consent was obtained and confidentialy and anonymity of information was protected.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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