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Optimizing full scope of practice for nurse practitioners in primary care: A proposed conceptual model

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ABSTRACT

Background: Nurse practitioners (NPs), if utilized to their optimal potential, could play a key role in meeting the growing demand for primary care.
Purpose: The purpose of this study was to propose a comprehensive model for maximizing NP contributions to primary care which includes the factors affecting NP care and patient outcomes and explains their interrelated impact.
Method: We synthesized the results of the published literature to develop a model, which emphasizes NP scope of practice regulations, institutional policies, NP practice environment, and NP workforce outcomes as determinants of NP care and patient outcomes.
Discussion: Our model provides a framework to help explain how variations in scope of practice regulations at the state-level and institutional policies within organizations directly and indirectly influence the practice environment of NPs, NP workforce outcomes, and patient care and outcomes.
Conclusion: Aligning policy change, organizational innovations, and future research are critical to NP optimal utilization and patient care and outcomes.
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Introduction

The U.S. health care system is at a vital crossroads in regards to health care workforce planning because of the aging population and rising prevalence of chronic illnesses (DeVol & Bedroussian, 2007; Institute of Medicine, 2012). In addition to these strains on the system, the enactment of the Affordable Care Act (ACA) has allowed millions of Americans who were previously uninsured to obtain health insurance and gain better access to health care services (Patient Protection and Affordable Care Act, 2010). Projected increases in demand for care have led policy makers to call for an expansion of the primary care workforce (Institute of Medicine, 2010; National Governors Association, 2012). Currently, physicians, nurse practitioners (NPs), and physician assistants provide the bulk of primary care in the United States (Agency for Healthcare Research and Quality, 2012). One set of projections estimates that by 2025, an additional 52,000 physicians will be needed to meet the severe demand for primary care services (Petterson et al., 2012). This estimate is alarming given that the primary care

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physician workforce is expected to continue to shrink (Association of Medical Colleges Center for Workforce Studies, 2010). In contrast, over the past few decades, the NP workforce has experienced steady growth and is expected to double within the next 15 years (Auerbach, 2012). Contributing to this growth will be the ACA's expansion of loan forgiveness programs and demonstration grants for 1-year residency-training programs for NPs in federally qualified health centers (Patient Protection and Affordable Care Act, 2010). Because NPs will represent a substantial supply of primary care providers (PCPs) in the near future (Poghosyan, Lucero, Rauch, & Berkowitz, 2012), many see their optimal utilization as a key to meeting growing demand for primary care services (Federal Trade Commission, 2014; Institute of Medicine, 2010; RAND Health, 2009).

Utilizing primary care NPs to their full capacity could, in part, mitigate or eliminate primary care shortages (Green, Savin, & Lu, 2013). About half of the NPs in the United States provide direct primary care services (U.S. Department of Health and Human Services, 2014), and they comprise approximately 20% of the total primary care workforce (Agency for Healthcare Research and Quality, January, 2012). However, increasing the number of NPs alone will not address the deficiencies in primary care delivery because many policy and practice setting barriers affect NPs' ability to offer services at the full range of their educational preparation and competencies, which have not been fully explored, understood, or addressed. To date, most efforts in understanding NP practice and challenges facing this workforce have taken a fragmented approach focusing only on some aspects of issues facing these providers, for example, scope of practice regulations (Berg, 2012; Reagan & Salsberry, 2013). To learn how to effectively utilize NPs, maximize their contributions to primary care, and promote high-quality care and better patient outcomes, it is necessary to take a comprehensive approach to understand barriers affecting NPs and their interplay to propose interventions to eliminate them.

NP Care and Patient Outcomes

The high quality and the cost-effectiveness of NP care have been repeatedly documented in comprehensive investigations (Horrocks, Anderson, & Salisbury, 2002; Newhouse et al., 2011). Findings from number of studies suggest that NP involvement in patient care improves the overall health and functional status of patients (Stanik-Hutt et al., 2013) and a range of other outcomes (Hayes, 2007; Hoebeke, 2008; Mundinger et al., 2000). For example, in one study, comparable blood pressure control rates were observed among patients with hypertension receiving care from NPs compared with those receiving care from physicians (Wright, Romboli, Ditulio, Wogen, & Belletti, 2011). In like manner, NPs and physicians had similar screening rates for blood glucose and blood pressure, with NP care supporting better lipid control than physician care (Ohman-Strickland et al., 2008; Stanik-Hutt et al., 2013). In addition, a recent study found that primary care physicians and NPs deliver similar types of services and spend their time in nearly identical ways (Buerhaus, DesRoches, Dittus, & Donelan, 2015). Although similarities are found between the two provider types, the literature does suggest differences in their practice patterns. For example, NPs are more likely to recommend home blood pressure monitoring than are internists or family physicians (Tirabassi, Fang, & Ayala, 2013), which significantly enhance the diagnosis and management of cardiovascular and other conditions (Agarwal, Bills, Hecht, & Light, 2011). Other studies found that NPs were more likely to provide disease education to their patients than physicians and most other health care providers (Hing, Hooker, & Ashman, 2011; Lenz, Mundinger, Hopkins, Lin, & Smolowitz, 2002). Although evidence is clear that NPs are capable of providing high-quality, safe patient care, NPs often are not utilized to their optimal capacity (Institute of Medicine, 2010). Thus, identifying the factors that may potentially affect the utilization of NPs and their contributions to primary care becomes a significant policy, practice, and research priority.

Purpose

The purpose of this article was to conduct a thorough review of the literature and develop a comprehensive model that identifies the potential factors affecting NP care and patient outcomes.

Methods

The literature search was conducted in three electronic databases: Medline, PubMed, and Cumulative Index to Nursing and Allied Health Literature and also used Columbia University library's "Article Search" function to acquire articles from all university databases. Other web sources such as Google Scholar were used to identify additional studies. The search was limited to articles containing keywords or their combinations in the title, abstract, or keywords section. Examples of keywords used were "nurse practitioners," "nurses," "scope of practice," "organization," "practice environment," "work environment," "job satisfaction," "intent to leave," and "turnover." We did not limit our search to a particular time frame to assure that we included most relevant material in building our model.

Titles of articles were screened followed by evaluation of abstracts. We did not limit our search to empirical studies alone because our focus also was to understand policy and other issues that might be important for NP care and outcomes. We included both reviews of literature and research and policy reports. In

building our model, we also relied on the evidence from research studies conducted among staff nurses, as more empirical studies were conducted with these nurses than with NPs, and evidence produced from these studies can guide future NP research.

We reviewed the retrieved articles and had regularly scheduled meetings over a 4-month period to review and discuss articles, construct each domain of the model, and resolve disagreement through consensus. The domain was included in the model when consensus was achieved for it being part of the model. During the process of the model building, new articles were sought and included, and the model was revised accordingly. In sum, the final articles used to build our model consist of policy papers, research studies, including original research and reviews, and reports focused on nursing workforce in the United States.

Results

Based on the existing evidence, we developed a comprehensive model that identifies the factors affecting NP care and patient outcomes and explains their interrelated impact (Figure 1). The model emphasizes NP scope of practice regulations, institutional policies, NP practice environment, and NP workforce outcomes as determinants of NP care and patient outcomes.

Each component of the model is listed in Table 1 and summarized below. In addition to offering a comprehensive overview of factors affecting NP care and outcomes, our model also informs the development of our policy, practice, and research recommendations to promote NP practice and maximize NPs' contributions to patient care and outcomes.

Scope-of-Practice Regulations

Although NPs' educational preparation and training are guided by common accreditation agencies and national certification examinations, the regulation of NP scope of practice (SOP) is inconsistent across the United States. A variety of state-based agencies govern the regulation of NPs and include but are not limited to Boards of Nursing, Boards of Medicine, and Boards of Pharmacy, among others (Kugler, Burnhans, & George, 2011; Pearson, 2012; Phillips, 2010). This diversity in oversight may explain some of the differences in state SOP laws and regulations placed on NP practice which have been found to be particularly restrictive in states where a non-nursing profession is involved in the development of NP-related regulations (Lugo, O'Grady, Hodnicki, & Hanson, 2010).

A number of states allow NPs to independently diagnose and treat patients and also prescribe necessary medication and services; however, some states impose regulatory restrictions such as requiring NPs to collaborate or be supervised by physicians (Barton Associates, 2014). Furthermore, some NPs may be prevented from admitting patients to hospitals for necessary care or from ordering tests or medical equipment; all of which affect their ability to provide appropriate, high-quality care and to ensure patient safety. For example, NPs who practice in New York (NY) may order physical therapy for their patients, while NPs practicing in Florida (FL) may not. Another example is worker's compensation claims, which cannot be completed by NPs practicing in NY, California, or Texas; however, NPs practicing in FL are permitted to complete those (Barton Associates, 2014). These inconsistent schemes lead to wide variations in the autonomy of NPs across the states.

The SOP regulations affecting NPs have been discussed by many, and consensus exists that the variations limit NPs' ability to practice to their full potential and create challenges to uniform NP practice and the delivery of high-quality care (Fairman, Rowe, Hassmiller, & Shalala, 2011; Naylor & Kurtzman, 2010). The landmark report by the Institute of Medicine, *The Future of Nursing: Leading Change, Advancing Health* (Institute of Medicine, 2010), indicated that many regulations governing NP practice create unnecessary barriers for optimal NP practice. The report concluded that these barriers are most notable for NPs in primary care and will have potential implications for access to care. A recent study showed that in states

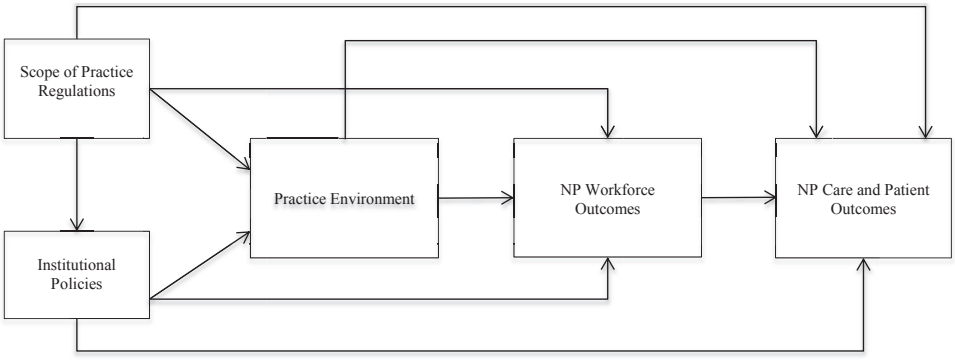

Figure 1 – Proposed model for maximizing nurse practitioner (NP) contributions to primary care.

Table 1 – Examples of Factors Affecting Nurse Practitioner (NP) Optimal Utilization and Related Outcomes

Variability in Scope of Practice Regulations	Institutional Policies	Practice Environment	Workforce Outcomes
Autonomy in care provision Autonomy in prescribing medication Admitting privileges to hospitals Recognition of primary care provider status Ordering physical therapy, tests, or medical equipment Signing parking permits or death certificates	Variability in NP use Policies that restrict NP practice more than legislation or regulation in the state Policies that delegate tasks to NPs that are beyond their scope of practice	NP–physician relationships NP–administration relationships NP–other professionals relationships Organizational support	Stress level Job satisfaction level Burnout Retention

with the least restrictive SOP laws, NPs see more patients (Kuo, Loresto Jr., Rounds, & Goodwin, 2013), thus improving access to primary care services.

Institutional Policies in Organizations Employing NPs

In addition to the licensing and SOP regulations for NPs specific to each state, idiosyncratic differences exist in the parameters of NP practice from one organization to another, even within the same jurisdiction (Laurant et al., 2005). Even in states where NP regulations allow for a fairly broad SOP, organizations may choose to use NPs in narrow ways. For example, in some organizations, NPs only provide urgent care, whereas in others, NPs provide care for chronic conditions (Laurant et al., 2005; Poghosyan, Nannini, Stone, & Smaldone, 2013). NP roles and whether they have their own patient panel and practice as independent PCPs also vary from organization to organization (Hing et al., 2011; Poghosyan et al., 2015). NPs who provide primary care in community health centers are more likely to have their own patient panels and practice with greater independence than NPs who practice in physician offices or clinics affiliated with hospitals (Poghosyan & Aiken, 2015).

Furthermore, organizations may introduce restrictions or policies that directly impact NPs' ability to deliver patient care. For example, one study found that NPs were not allowed to conduct physical assessments in a hospital-affiliated clinic although such work is within the NPs' scope and competencies (Poghosyan et al., 2013). Contrary to restricting NP practice, some organizations may delegate responsibilities to NPs that are beyond their scope or allow NPs to perform tasks for which they are not trained to perform. A report published by the Department of Health and Human Services in 2009 showed that almost two thirds of invasive and almost half of noninvasive services that only physicians are allowed to perform by Medicare were actually performed by "nonphysicians," including NPs because organizations or physicians make decisions regarding to whom to delegate the tasks (Department of Health and Human Services, 2009).

Practice Environments

Researchers have given substantial attention to the quality of practice environments in health care settings because of their direct and indirect impact on quality of care and provider and patient outcomes (Aiken et al., 2011; Kanai-Pak, Aiken, Sloane, & Poghosyan, 2008). For example, if nurses experience supportive practice environments, their risk for poor outcomes including high levels of stress, burnout, and turnover (Malloy et al., 2009; Severinsson, 2003), which can threaten patient safety (Institute of Medicine, 2004; Stone et al., 2007), decreases. On the other hand, unfavorable practice environments, characterized by lack of collegiality, poor relationships between clinicians and leadership, and lack of support and resources have been linked to medical errors, accidents, unsafe work behavior, and other adverse outcomes (Clarke, 2006; Hofmann & Mark, 2006; MacDavitt, Chou, & Stone, 2007).

Critical to promoting high-quality patient care and maximizing the effectiveness and utility of NPs are aspects of their practice environments. Research shows that in primary care organizations, NP-physician relationships, NP-administration relationships, visibility of the NP role as care providers, and support for independent NP practice comprise the dimensions of the NP practice environment (Poghosyan, Nannini, & Clarke, 2013; Poghosyan et al., 2013). These factors appear to influence NP practice within their organizations and the care that NPs are able to deliver. Favorable relationships between NPs and physicians, which include effective communication, knowledge sharing between NPs and physicians, and similar visions of prioritizing care and teamwork, have been reported as factors that facilitate a positive practice environment (Hallas, Butz, & Gitterman, 2004). Furthermore, physicians who work in the same practice setting with NPs and are more familiar with NP skills and competencies appear to

have better working relationships with NPs (Street & Cossman, 2010). In contrast, ineffective communication between NPs and physicians that includes lack of respect, collegiality, or support for NP practice within organizations exacerbates barriers to NP care provision (De Milt, Fitzpatrick, & McNulty, 2011; Hallas et al., 2004; Schiestel, 2007; Weiland, 2008).

Practice environments that are constructive for NP practice also include administrative support such as management promoting NP professional and practice development (Ackerman, Mick, & Witzel, 2010) and the relationship between NPs and administrators (Poghosyan et al., 2013). Favorable relationships between NPs and administrators include administrators' familiarity with the NP role and recognition of it, sharing of resources between NPs and physicians, and promoting the visibility of the NP role within the organization. NPs often times feel that their role is invisible within their organizations and that they do not receive similar level of support as physicians do to deliver care (Bryant-Lukosius, DiCenso, Browne, & Pinelli, 2004; Martin & Hutchinson, 1999). Despite NPs and physicians having similar PCP roles, physicians may have dedicated staff support, whereas NPs might not receive the same help although improvement of efficiency and cost-effectiveness of NP care are usually seen when NPs receive staff support for delivering patient care (Liu, Finkelstein, & Poghosyan, 2014; Poghosyan et al., 2013).

NP Workforce Outcomes

In addition to policy and employer regulations and organizational influence, individual nurses are also accountable for their own practice as their own experiences, knowledge, and skills have been found to affect the quality of patient care (Irvine, Sidani, & Hall, 1997). Complex patients, high workloads, and rapidly changing administrative and organizational structures characterize nurses' work lives. These factors can increase work burden, predispose nurses to negative outcomes of job dissatisfaction, burnout, and turnover and can ultimately influence their performance, quality of care they deliver, and patient outcomes (Aiken et al., 2011).

Job dissatisfaction has been reported as a widespread workforce phenomenon affecting health care providers. Researchers have found that large proportions of nurses are dissatisfied with their jobs (Aiken, Sloane, Bruyneel, Van den Heede, & Sermeus, 2013). Similar results have been reported among primary care physicians (Buchbinder, Wilson, Melick, & Powe, 2001; DeVoe, Fryer Jr., Hargraves, Phillips, & Green, 2002). Among NPs, studies demonstrate that they are dissatisfied with their overall jobs or with certain aspects of their jobs (Pasarón, 2013; Ryan & Ebbert, 2013) such as lack of opportunities for further training, bonuses, and professional advancement or involvement in organizational governance (Wild, Parsons, & Dietz, 2006). One recent study demonstrated that more than one fifth of the primary care NPs were dissatisfied with their jobs (Poghosyan, Liu, Shang, & D'Aunno, in press). In contrast, factors such as a sense of accomplishment and autonomy are reported to be satisfying for NPs (Pron, 2013; Ryan & Ebbert, 2013).

Researchers and policy experts have also concluded that the day-to-day difficulties that nurses face in their jobs may affect their willingness to remain in specific jobs for the short term and in the profession over the long term (Hayes et al., 2006; Lake, 1998). One study demonstrates that 27% of NPs plan to leave their current positions (De Milt et al., 2011). Another one found that if NPs practice in poor environments characterized by negative relationship between NPs and physicians or leadership, or they lack necessary support to deliver care, then they are about 20% more likely to report intent to leave than NPs who practice in favorable practice environments (Poghosyan et al., in press).

Discussion

In this article, we synthesize existing literature pertaining to NP practice and propose a comprehensive model demonstrating the key factors affecting NP care and patient outcomes. Our model provides a framework to help explain how interrelated factors of SOP regulations, institutional policies within organizations, the practice environment of NPs, and NP workforce outcomes affect NP care and patient outcomes. Although NPs are capable of providing high-quality care, regulations and organizations often do not create the best environments for NPs to deliver that care, and these factors may have direct and/or indirect effects on NP outcomes, care, and patient outcomes.

We found that to maximize NPs' contributions to primary care and improve patient outcomes, a variety of factors should be taken into consideration in practice and policy innovations and in future research investigations. In addition to focusing on SOP regulations affecting NP practice across the country, which has received substantial attention from the policy makers, researchers, and NPs, we should also focus on institutional policies and practice environments within organizations employing NPs, as well as understand NP workforce outcomes, because all of these factors taken either together or separately affect the quality of care, access to it, and subsequently patient outcomes. In preparation for an expanded NP workforce and role in primary care, having a better understanding of these factors is necessary for taking actions to promote NPs' effective use. Such a broad view of challenges affecting NPs will also accelerate the design and implementation of necessary changes and interventions to support NPs' maximum utilization in their states and organizations.

It is evident that the existing variable NP SOP regulations challenge uniform care delivery by NPs across the nation and prevent NPs' patients in some states

from having access to timely services, medications, or tests. We also found not only that NP SOP varies from state to state but also that NP practice significantly varies from organization to organization within the same state. In addition to SOP restrictions, NPs are also often restricted by the policies within their organizations. Conversely, NPs may be delegated tasks and responsibilities in their organizations that are beyond their SOP. Both circumstances interfere with NP practice, raise significant quality of care issues, and may jeopardize NP care and patient outcomes. Thus, it is important for policy makers, administrators, and providers to understand policy barriers for NPs within the state and organizational structures in practices employing NPs to ensure that NP practice is within their full legal scope and regulated authority to ensure effective NP care and patient safety.

In addition, attributes of NP practice environments are important factors affecting NPs. The relationships NPs have with physicians and leadership and the supports they receive for care delivery are components of NP practice environments. When NP practice environments are suboptimal, NPs may be unable to effectively utilize their skills and knowledge to provide high-quality, cost-effective patient care. Thus, to promote quality of patient care and ensure patient safety, NP practice environments in primary care organizations should be further investigated.

Our review also found widespread negative outcomes among NPs such as being dissatisfied with their job or having intentions of leaving them. Such findings are concerning as dissatisfied providers are less likely to deliver high quality of care and are more likely to leave their clinical positions. These negative provider outcomes can have detrimental impact on primary care at a time when the system is in a severe need of PCPs and is facing major access and quality-of-care challenges. Furthermore, primary care turnover is expensive as hiring and training new PCPs whose supply is already limited can strain the economic resources of primary care practices. Estimates demonstrate that costs associated with recruiting and training new employees often are more than the annual salary for the position being filled (Cascio, 2006). In short, suboptimal NP outcomes may prevent NPs from effectively utilizing their skills and knowledge to provide care, thus reducing the capacity of a much-needed primary care workforce even further.

Policy, Practice, and Research Recommendations

The Maximizing Nurse Practitioner Contributions to Primary Care Model guided development of policy, practice, and research recommendations. A comprehensive reform that has components of policy and practice change is necessary to maximize the utilization of NPs in primary care.

Policy Change

Because the NP workforce represents a considerable source of human capital, policy changes that maximize NPs' contribution to primary care across the country are needed. State-level SOP policies should mirror NPs' advanced education and training, especially because the literature strongly suggests that in nearly all evaluations and head-to-head comparisons that have been conducted NPs are capable of providing high-quality, safe patient care. Eliminating unnecessary restrictions on NP practice will allow NPs to deliver high quality care they are trained to and capable of delivering, which will have significant implications for access-to-care and cost-of-care issues facing the U.S. health care system. In addition, SOP regulations supporting NP full and independent practice will promote the mobility of the NP workforce and allow NPs to care for patients in underserved areas as in many instances NPs serve as safety-net providers (Esperat, Hanson-Turton, Richardson, Debisette, & Rupinta, 2012). Restrictive SOP polices requiring NPs to work in geographic proximity to physicians limit NPs' ability to practice fully in geographic areas and organizations with the greatest need (e.g., minority communities or practices) and limit policy makers', insurers', and administrators' abilities to propose policies to allow better use of NPs, especially in efforts to eliminate disparities. They may also delay progress in reducing health disparities, as it is well established that recruiting and retaining physicians have been challenging in minority communities (Council on Graduate Medical Education, 2007; Xu et al., 1997). Thus, ultimately, having uniform SOP regulations that promote NP independent practice would help to overcome barriers facing the NP workforce, promote quality of care and outcomes, and assure better care for those in underserved areas.

Organizational Innovations

The primary care landscape in the United States is changing given the new policy initiatives such as Patient-Centered Medical Homes and Accountable Care Organizations, which are being implemented across the country (Fisher, Shortell, Kreindler, Van Citters, & Larson, 2012; National Committee for Quality Assurance, 2011). These structures incorporate new payment mechanisms that support innovative and efficient use of multiple providers to deliver high-quality primary care and therefore create opportunities for better utilization of NPs in care delivery. Effective implementation of these new initiatives requires departures from traditional exclusionary practices and involvement of NPs as independent PCPs. In organizations where NPs are able to have their own patient panels and are permitted to follow their patients and deliver continuous care, patients would benefit as continuity of primary care, when care is concentrated with a single provider, significantly

improves patient outcomes (Fan, Burman, McDonell, & Fihn, 2005; Nyweide et al., 2013). In contrast, organizations that do not allow NPs to deliver continuous care to their patients increase the risk of fragmented primary care, especially for the underserved, forcing patients to choose higher cost options such as hospital care for conditions typically treated in primary care settings. In fact, annually, more than $30 billion is spent for preventable hospitalizations (Jiang, Russo, & Barrett, 2006) because of a group of conditions which should not result in hospitalization if properly managed by PCPs. Effective utilization of NPs in primary care practices may lead to reductions in unnecessary hospitalizations.

In promoting and expanding the NP role in primary care, significant attention should also be given to NP practice environments within their employment settings. Favorable NP practice environments allow NPs to translate their advanced education and skill set to an effective care for patients. Organizations with collegial relationships between care providers and leadership are more likely to deliver high-quality patient care (Dugan, Mick, Scholle, Steidle, & Goldberg, 2011; Litaker et al., 2003; Watts et al., 2009). Furthermore, clinicians having adequate access to support services are more likely to provide better care. Favorable NP practice environments will also affect patient care through their influence on NP outcomes. Practice managers and administrators can take actions to design and support practice environments for NPs that are conducive to promoting high-quality care, improve job satisfaction, and decrease turnover.

Research Recommendations

Empirical evidence for promoting effective utilization of NPs is needed to support their practice and expand this workforce in primary care to ensure that patients have access to timely high-quality care. Future studies should focus on evaluating the impact of our model's components on specific patient outcomes. For example, studies could investigate how restricting the NP role as independent PCP within their organizations affects the outcomes of patents with chronic diseases who need continuous monitoring and follow-up of their conditions. Additional research is also needed to better understand the impact of restrictive SOP policies on the supply of NPs in primary care shortage areas and how they affect health disparities. In addition, longitudinal studies are necessary to understand how changes in SOP regulations affect NP practice and workforce trends over time and how they affect the access to care and patient outcomes.

Policy makers, administrators, and health care professionals need evidence to design organizational structures and practice environments within primary care settings that will support NP care and promote their maximum contributions to patient outcomes. Thus, more research is needed to understand what organizational structures impact NP practice to yield evidence regarding specific actions administrators may take to promote NP practice environments and potentially support and maintain the expansion of the NP workforce in primary care settings. In addition, studies evaluating the impact of organizational changes and interventions are needed.

Limitations

Our article has several limitations. We reviewed the overall body of the literature instead of focusing only on empirical studies. It is possible that some of the sources used in this review and model construction represent opinions of experts rather than empirical findings. In addition, we used evidence from several studies conducted with nurses and primary care physicians, and it is possible that some of the issues facing these health care professionals might not be applicable to NPs. We also did not restrict our literature search to a specific time frame; therefore, some included issues may no longer be relevant for NPs. Although we conducted a comprehensive literature search, it is possible that some articles may not have been revealed in our databases or in peer-reviewed literature and were not incorporated into our model.

Conclusions

We synthesized the existing literature and developed a comprehensive model that emphasizes how SOP regulations and institutional policies within organizations, NP practice environments, and NP workforce outcomes affect NP care and patient outcomes. The model can guide policy and practice recommendations and interventions and be used to guide future research to produce evidence about the specific mechanisms through which each domain in the model affects NP care and outcomes. This evidence is necessary for intervening at policy and organizational levels in designing necessary structures to maximize NP contributions to high-quality primary care and potentially promote better patient outcomes.

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