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Dementia care management in primary care practices: a descriptive study among nurse practitioners

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Abstract

Background More than 55 million people worldwide have dementia, and every year, 10 million new cases are diagnosed. In the United States (U.S.) alone, 6.9 million Americans ages 65 and older have dementia. Health systems are searching for innovative solutions to expand the primary care system's capacity to care for these patients. Advanced practice nurses such as nurse practitioners (NPs) are vital to increasing primary care capacity to meet the need, yet primary care NPs often face structural, organizational, and workforce challenges. More specifically, little is known about NPs who care for dementia patients in primary care settings. This study explored the practice structural capabilities, organizational context, and job outcomes (i.e., burnout, job dissatisfaction, and intent to leave the practice) among NPs providing care for patients with dementia in U.S. primary care practices.

Methods We conducted a national cross-sectional survey of NPs using modified Dillman methods. Between 2021 and 2023, NPs working in primary care practices who cared for patients with dementia received a mail and online survey. Additional survey mailings, emails, postcard reminders, and phone calls encouraged non-respondents to participate. In total, 968 NPs responded across 847 practices. We estimated a response rate of 16.4-36.4%.

Results NPs reported that the quality of dementia care in their practices is poorer than the overall care provided. About 45% of NPs indicated that dementia care in their practices is less than "very good," while only 17% reported that the overall care delivered falls below that standard. Additionally, NPs reported significant deficits in practice structural capabilities for dementia care and challenges with administration within their organization. The findings show that over a third of NPs report burnout.

Conclusions Given the projected growth in the number of patients with dementia and the growing workforce of NPs worldwide, policy and practice efforts should be directed toward strengthening primary care practices to provide quality care for dementia patients. Bolstering NP workforce capacity and supporting NP roles in dementia care could improve organizational capacity to provide dementia care. However, widespread burnout among NPs found in our study could undermine their contribution to the dementia care workforce.

Keywords Primary care, Dementia, Nurse practitioners, Quality care, Health workforce

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Background

Currently, more than 55 million people have dementia worldwide, and every year, 10 million new cases are diagnosed [1]. The annual cost of caring for dementia globally is now above US\$ 1.3 trillion and is projected to rise to US\$ 2.8 trillion by 2030 [2]. In the United States (U.S.) alone, 6.9 million Americans ages 65 and older have dementia [3]. As the U.S. population ages, the number of persons living with dementia will increase, affecting almost 14 million Americans by 2060 [3]. Delivering high-quality health care to patients with dementia is a global priority, yet patients with dementia have poorer health outcomes [4], including higher rates of acute care episodes (hospitalizations and emergency department (ED) visits), than other older adults without dementia, whether they reside at home or in congregate care settings [5, 6].

The primary care system is typically the first point of contact for patients when dementia symptoms arise, highlighting the need for an adequately trained and wellresourced primary care workforce to provide appropriate evaluation, management, and care for patients with dementia [7, 8]. Yet, persistent healthcare workforce shortages globally create challenges for primary care to meet the demand for dementia care. World Health Organization (WHO) estimates major healthcare workforce shortages, especially in low- and middle-income countries [9], which by 2023 will have a shortfall of 10 million healthcare workers. Resource-rich countries also face healthcare worker shortages. In the U.S., a well-documented shortage of primary care physicians and geriatricians exists, and the primary care system is structurally underprepared to care for the growing population of older adults with dementia [10-12]. From 2010 to 2020, the national per capita supply of geriatricians in the U.S. decreased by 12.7%, from 13.4 per 100 000 older adults in 2010 to 11.7 per 100 000 older adults in 2020 [13]. Currently, an estimated 34-59% of the population aged 65 years and older lives in areas with dementia specialist shortfalls [14]. Innovative healthcare workforce solutions are needed both in the U.S. and internationally to ensure that the growing population of patients with dementia has access to high-quality care.

The growing workforce of advanced practice nurses (APNs) can play a critical role in the care of dementia patients. APNs are nurses with a minimum master's degree who have expert knowledge, complex decisionmaking skills, and clinical competencies for expanded practice [15]. Globally, APNs' scope of practice includes treatment decisions, performing advanced clinical assessments/diagnoses, prescribing medications, ordering tests and examinations, and referrals, and have roles that are beyond the scope of registered nurses [16]. The most common APN roles recognized on a global scale are nurse practitioners (NPs) and clinical nurse specialists. Increasingly, countries across the globe are developing the APN workforce. A 2020 World Health Organization report found that 50 of 95 countries surveyed (53%) have such advanced nursing roles [17].

NPs in the U.S. make a decisive contribution to increasing the capacity of the existing healthcare workforce to meet the diverse and complex health needs of patients with dementia. The NP workforce has grown rapidly, quadrupling from 91,000 in 2010 to 431,000 in 2025 [18, 19], and will grow 45% between 2022 and 2032 [20]. NPs are the fastest-growing component of the primary care workforce in the U.S. and could be a critical resource for expanding access to high-quality dementia care. Indeed, some argue that NPs and dementia care are the "Perfect Fit," based on NPs' holistic nursing education and team orientation to patient-centered care that includes the patient's family and care partners [21].

The NP workforce often plays a key role in comprehensive dementia care programs, which are designed to ensure that both the medical and psychosocial needs of patients and care partners are met. Such care can improve the quality of life for patients with dementia, reduce strain on their families, and extend the duration of care at home. For example, the Guiding an Improved Dementia Experience (GUIDE) model, launched in 2024 in selected locations, supplements health care with navigation to essential social services to meet patients' needs [22]. NPs are involved in delivering care to patients with dementia in many other models of care [23, 24], which are informed by evidence on integrating memory care and primary care through interdisciplinary teams often led or supported by NPs [22-25]. Comprehensive dementia care models have effectively improved the quality of care provided to patients with dementia and their care partners [26–29]. When NPs are active in dementia care, improvements can be achieved in adherence to evidence-based care protocols (e.g., for assessment, screening, and counseling) [26], healthcare utilization patterns [27, 28], and the mitigation of behavioral and psychological symptoms of patients [29].

Yet, NPs often practice in primary care practices that lack adequate structures to deliver care to patients [30]. Studies conducted with NPs employed in primary care practices have identified challenges such as lack of resources, poor communication with practice administrators, and insufficient practice support that impact NP care [30, 31]. These issues often result in negative professional outcomes, including burnout, job dissatisfaction, and high turnover rates [32], challenging patient care and outcomes [33]. Furthermore, while research is clear that key practice structural capabilities, such as disease registries, reminder systems, and care coordination, are essential in delivering high-quality care and reducing

unnecessary acute care utilization [34–36], little is known about the degree to which these structural capabilities are available for managing dementia care in primary care practices.

Given the growing demand for dementia care, understanding how primary care practices can strengthen its delivery by NPs is essential. For the first time, the present study explored the practice structural capabilities, organizational context, and job outcomes (i.e., burnout, job dissatisfaction, and intent to leave the practice) among NPs in the U.S. who provide care for patients with dementia in primary care practices. NPs' insights can help improve care for patients with dementia and design innovative healthcare workforce solutions to meet the demand for dementia care both in the U.S. and internationally.

Methods

Design and setting

Study participants

We sampled NPs from primary care practices delivering care to people with dementia in 2021, identified using the Medicare Fee-For-Service Provider Utilization & Payment Data Physician and Other Supplier public use file [37]. We first searched for NPs who had visits with 30 or more patients with at least one claim-associated dementia diagnosis code. Then, to identify primary care practices, we used IQVIA's OneKey database, which contains data on the demographic and practice characteristics of most ambulatory care clinicians in the U.S [38]. This dataset contains NP name, gender, National Provider Identifier (NPI), NP contact information, and practice organization characteristics. Using a practice-level identifier, we linked the identified NPs from the Medicare data to the primary care practices where they worked in the OneKey data. We defined primary care practices as those for which at least 50% of physicians had family practice, general practice, geriatrics, internal medicine, preventive medicine, or pediatrics specialty identifiers [39]. Finally, we requested contact information from IQVIA for all NPs working in these practices. In total, we identified 11,518 NPs caring for patients with dementia across 2,197 primary care practices.

Data collection

Using a Dillman approach for mixed-mode surveys [40], we disseminated a survey (Supplement 1) to eligible NPs through mail and e-mail from November 2021 through September 2023. Between three waves of data collection, we sent six survey mailings, eight mailed postcard reminders, and two e-mails with 12 e-mail reminders to encourage non-respondents to participate. We monitored the response rate and periodically increased the incentives during the survey process, starting with a \$20 incentive and culminating in a \$60 incentive. In total,

968 NPs responded across 847 practices. To calculate the accurate response rate, we called the practices of NPs who did not respond to our survey. Based on these calls, we determined that NPs included in our original sample were not eligible for the study. Using data from the nonresponder survey, we estimated a response rate of 16.4%, assuming that 28.8% of non-respondents were ineligible for our study or 36.4% if 4,816 NPs (75,6%) receiving our survey were ineligible. More details on the survey and response rate are reported elsewhere (removed for review).

NP survey tool and measures

We asked NPs to answer questions on their demographics (i.e., age, race, ethnicity, gender, marital status, education, licensure, and certification), practice structural capabilities [41], quality of care delivered, organizational context [42], and job outcomes (i.e., burnout, job satisfaction, and intent to leave).

Practice structural dapabilities NPs completed items adapted from the Structural Capability Index [41] regarding how their primary care practices managed dementia care, as well as other chronic conditions. The Structural Capability Index has been widely used to evaluate primary care practice attributes linked with high-quality care delivery [34]. NPs reported if their practices used seven specific tools, templates, or reminders in the care of patients with dementia.

Quality of care The NPs were asked to rate the overall quality of care their organization delivers "as a whole" and, separately, "for dementia patients" on a scale of 1 (Poor)—5 (Excellent). This tool has been widely used in research to measure quality of care from clinicians' perspectives [43, 44].

NP organizational context NPs completed the Nurse Practitioner-Primary Care Organizational Climate Questionnaire (NP-PCOCQ), a validated tool to assess NP work environments [41]. The items on the tool ask NPs how much they agree that specific working conditions are present in their practices using a 4-point Likert-like scale from "strongly agree" to "strongly disagree". For ease of interpretation, we have dichotomized responses by combining "strongly agree" and "agree" and "strongly disagree" and "disagree" to measure the presence of these organizational attributes in NP practices.

Job outcomes Burnout was measured on a five-point Likert scale ranging from 1 ("I enjoy my work. I have no symptoms of burnout.") to 5 ("I feel completely burned out and often wonder if I can go on. I am at the point where I may need some changes or may need to seek some sort

Table 1	Demographic,	work, and	practice	characteristics	of NPs

Characteristics	N=968
Demographics	
Age	
Mean (SD)	47.5 (11.57)
Range	26-81
Sex, % (n)	
Female	89.3 (815)
Race, % (n)	
White	88.8 (809)
Black	5.7 (52)
American Indian or Alaska Native	0.3 (3)
Asian	2.6 (24)
Native Hawaiian or other Pacific Islander	0.2 (2)
Hispanic or Latino, % (<i>n</i>)	
Yes	5.3 (48)
Work Characteristics	
Years in current position	
Mean (SD)	7.74 (6.94)
Range	0.08-42
Highest Degree Earned, % (<i>n</i>)	
Master's Degree	81.8 (746)
Doctorate of Nursing Practice (DNP)	15.5 (141)
Other	2.7 (25)
Average hours worked per week	()
Mean (SD)	40.7 (10.37)
< 20	39(37)
21-30	6.3 (60)
31-40	62 2 (590)
> 40	27.6 (262)
Practice Characteristics	,
Main practice setting $\%(n)$	
Physician practice	56 3 (541)
Community health center	10.6 (102)
Hospital-based clinic	14.4 (138)
Retail-based clinic	0.8 (8)
Lirgent care clinic	6.5 (62)
Nurse managed health center	2.8 (27)
Number of PCP in the clinic	2.0 (27)
Nurse practitioners Mean (SD)	46 (647)
1	1.6 (0.17)
2-4	55.4 (524)
5-10	24.6 (233)
> 10	5.9 (56)
Physician assistants Mean (SD)	0.9 (3.90)
Physicians Mean (SD)	0.5 (5.55) 4.6 (9.77)
Practice location % (n)	1.0 (2.77)
Purel	27.2 (262)
	27.2 (203)
UIUdII ND managing patients as the main provider $O(1/2)$	/ ∠.8 (/ 04)
Nor independently	250 (242)
res, independently	33.9 (342)
res, independently and With other providers	5Z.U (495)
	9.0 (86)

of help."). This non-proprietary, single-item measure has been used in burnout studies among primary care staff [44, 45]. We used a threshold of 3/5 to classify burnout [46]. Job satisfaction was measured using a four-point Likert scale from 1 ("very dissatisfied") to 4 ("very satisfied"). Ratings of 1 and 2 ("dissatisfied") were considered to reflect job dissatisfaction. Intent to leave their job in the next year was similarly scored using a four-point Likert scale from 1 ("very unlikely") to 4 ("very likely"). Responses 3 and 4 were considered likely to leave their job. These measures of job satisfaction and turnover intention have been widely used in previous research on nursing outcomes [32, 47].

Data analysis

We used descriptive statistics to compute the study variables' means, standard deviations, and frequencies. Means comparisons were conducted using paired sample t-tests. All analyses were conducted using R Statistical Software [48].

Results

Characteristics of NP participants and practices

In total, 968 NPs from 847 practices completed the survey. Table 1 presents the demographic and work characteristics of NPs at practices where they provide dementia care and the characteristics of these practices. The average age of NPs was about 48 years, and about 90% were female. The study participants had, on average, 8 years of experience in their current position. About 16% of the NPs reported a Doctor of Nursing Practice (DNP) degree.

Over half (56.3%) of responding NPs were employed in physician practices, followed by hospital-based clinics (14.4%) and community health centers (10.6%), employing an average of 4.6 NPs per practice. NPs reported they worked with an average of 4.6 physicians and 0.9 physician assistants within their practice. Most (72.8%) NPs were employed in urban practices. About 36% of NPs reported independently managing their patient panels, and 52% of NPs managed patient panels independently and with other clinicians.

Practice structural capabilities for dementia care

Figure 1 presents the reports of NPs on the practice structural capabilities available to them to deliver care. NPs reported somewhat greater practice structural capabilities for managing other chronic conditions, such as congestive heart failure (63%), hypertension (74%), or depression (79%) than for dementia (59%; n = 544). While about 60% of NPs reported having capabilities, the remaining approximately 40% of NPs reported a lack of appropriate capabilities to manage dementia care in primary care practices.



Chronic Condition

Fig. 1 NPs reporting practice structural capabilities for chronic conditions and dementia (n = 928)





Fig. 2 NPs reporting practice structural capabilities specifically for dementia care (n = 544)

Those 544 NPs who reported having practice structural capabilities were asked how they used them (Fig. 2). About 50% of this subsample reported using standardized tools for Activities of Daily Living Assessments, and 31.8% for caregiver needs assessments. Automated reminders were more available: over 88% of the NPs with any dementia-related tools reported having reminders for Annual Wellness Visits for Medicare patients, 83.8% for medication reconciliation and management, 83.8% for depression and behavioral symptom assessment, and 69.3% for assessment and care planning visits for patients with cognitive impairment. Among the full sample of NPs, over 70% reported having some sort of registry to track chronic disease management; in contrast, only 14.7% reported having a registry for dementia care.

Overall quality of care and dementia care

As seen in Figs. 3 and 80% of NPs rated the quality of overall care in their practice setting as "very good" or "excellent". In contrast, only half rated their practices' dementia care as "very good" or "excellent". Quality scores were significantly lower for dementia care (M = 3.59) than for overall care (M = 4.16, t[935] = -22.12, p <.001), and more NPs reported the quality of care for dementia as "poor" compared to the quality of the overall care within the practices.

Organizational context of NP care and NP outcomes

Table 2 reports NP responses on various aspects of organizational context within their practices and job outcomes (i.e., burnout, job dissatisfaction, and intent to



Fig. 3 Quality of Care Ratings of Overall and Dementia Care

Table 2 Organizational context of NP care and NP outcomes

Organizational Context		
	Agree	
NP Role and Representation in the Organizations		
NP role is well understood	89.9	
Feel valued by my organization	82.0	
NPs are represented in important committees	75.2	
NPs are an integral part of my organization	91.8	
NP Relations with Physicians		
Physicians support my patient care decisions	97.1	
I feel valued by my physician colleagues	91.5	
NP and physicians collaborate to provide care	94.1	
Physicians and NPs practice as a team	90.3	
NP Relations with Administrators		
Administration is open to NP ideas to improve patient care	77.2	
Administration takes NP concerns seriously	72.7	
Administration shares information equally with NPs and physicians	69.2	
Administration treats NPs and physicians equally	48.4	
Administration makes efforts to improve working conditions for NPs	67.0	
In my organization, there is constant communication be- tween NPs and Administration	61.8	
NP Outcomes	% (n)	
Burnout		
Yes	35.8	
	(337)	
Satisfied with current job		
Yes	92.0	
	(866)	
Likely to leave current job in the coming year		
Yes	21.3 (200)	

leave). Overall, NPs reported relatively positive responses to most questions pertaining to their role and representation in their organizations. For example, 82% of NPs reported that the organization values their role, and 89% reported that the NP role is well understood in their practices.

NPs also reported high rates of collaboration and teamwork with practice physicians in caring for patients with dementia. Over 90% of NPs reported feeling valued and supported by the physicians they work with. NPs reported fewer positive relationships with practice administrators, indicating a lack of regular communication (39% reporting) and a perception of unequal treatment of NPs and physicians (over 51% reporting this discrepancy). Almost one-third of NPs also reported that the administration does not share information equally between NPs and physicians.

Regarding job outcomes, 36% of NPs reported being burned out. Although only 8% reported being dissatisfied with their jobs, more than one in five NPs (21%) reported their intent to leave their job in the next year.

Discussion

Recognizing growing pressures to strengthen the dementia care workforce [49] and the important roles NPs can play, we conducted the first national survey of NPs in the U.S. who provide care to patients with dementia. Our goal was to understand the structural and organizational attributes of their practices and elicit their insights into ways to improve dementia care. We asked respondents to evaluate the quality of dementia care in their practice, their relationships with physicians and administrators, and their burnout levels, job satisfaction, and intent to leave their jobs in the coming year. Our findings indicate that many primary care practices employing NPs lack the necessary practice structural capabilities to manage dementia care effectively. Practices are better equipped to manage other chronic conditions such as asthma, cardiovascular disease, diabetes, and depression, indicated by NP reports of greater availability of practice structural capabilities such as registries and reminder systems for those conditions.

Our findings are consistent with other research providing insights into the systemic challenges clinicians encounter when managing dementia within a primary care setting [50], including lack of resources and time, training, and care coordination services. These challenges often lead to delayed diagnosis of dementia and potentially poor outcomes [50], including higher rates of potentially preventable acute care utilization [51]. These findings indicate a need to make investments in primary care practices to improve their structural capabilities for delivering high-quality dementia care and to promote the use of those capabilities when they exist. Studies show that the vast majority of dementia patients are cared for in primary care practices [52]. Therefore, focusing on specific primary care practice enhancements, particularly care coordination and support, is essential to better care for these patients [53]. Strengthening primary care practices can ensure that these practices are better prepared to manage the increase in dementia care demand and that patients with dementia receive optimal care and have the best outcomes.

On the other hand, nearly 70% of NPs surveyed reported that cognitive assessment and care planning one core element of high-quality dementia care—was available in their practice, and about 40% reported providing this service themselves. This proportion is much higher than found in an analysis of national Medicare data based on the frequency of use of specific billing codes for this type of service [54]. However, since we did not query NPs about the use of those codes, we cannot draw firm comparisons.

NPs in our study reported feeling valued in their organizations by both physicians and administrators but highlighted the limited opportunities to participate in key organizational committees and strained working relationships with administrators. These issues may restrict NPs' access to essential organizational resources and information needed for care delivery, hinder their ability to contribute to quality improvement initiatives, and negatively impact the quality of patient care and outcomes. As more practices integrate NPs into their workforce, addressing structural and organizational deficits and ensuring that NPs are empowered to contribute the full range of their abilities will be critical to ensuring high-quality care for Page 7 of 10

patients with dementia and could positively impact NPs practice and job satisfaction.

Nearly 40% of NPs in our study report burnout, which raises concerns about the well-being of these clinicians and the long-term consequences on the capacity of the dementia-capable workforce. Of note, our data were collected during 2021-2023, when clinicians and healthcare systems were still enmeshed in or recovering from the COVID-19 pandemic. This burnout rate is substantially higher than the 25% reported by primary care NPs prior to the COVID-19 pandemic [55]. Furthermore, almost one in five NPs reported intent to leave their position in the coming year despite reporting being satisfied with their job, an unexpected discrepancy not illuminated by our survey. Previous research has highlighted the importance of supportive organizational environments in mitigating burnout, improving job satisfaction among healthcare providers, including NPs, and retaining them in clinical positions [32, 44, 55]. Thus, more research is needed to better understand organizational attributes affecting burnout, job satisfaction, and turnover among NPs caring for dementia patients so initiatives can be taken to improve these organizational attributes and prevent negative workforce outcomes.

Globally, the APN workforce, including the NP workforce, is growing, and NPs are capable of delivering highquality, patient-centered care tailored to the complex needs of patients with dementia. However, to sustain a robust supply of NPs entering and remaining in the dementia workforce, systematic policy and organizational changes will be necessary to strengthen the NP workforce in dementia care. Primary care practices employing NPs should make investments to ensure adequate organizational support and resources for NPs to provide dementia care and foster collaborative relationships between NPs and administrators [56, 57]. These support, resources, and collaborative relationships are necessary for these clinicians to undertake complex care tasks for dementia patients. Given that the global uptake of APNs is growing, and many policies have been implemented to expand the scope of practice as a strategy to increase primary care [58], our findings may provide insights into how to support this growing workforce to deliver care to patients with dementia.

Limitations.

Our study has several limitations. By sampling practices where an NP had at least 30 distinct individuals with dementia-related claims (higher than the median number of about 25 in 2022 [39]), we may have unintentionally recruited NPs with greater involvement and expertise in dementia care or working in more dementia-capable environments than the general NP population. Nevertheless, NPs in our study rated dementia care quality as poorer than care for other chronic conditions in their practice and identified limitations in their practices' structural capabilities for dementia care. Our survey design did not allow us to evaluate potential biases influencing NPs' ratings of their practices and professional relationships. We also did not ask whether these practices implemented any specific dementia care model.

Our response rate is lower than conventionally recommended for survey research; though typical for largescale surveys of clinicians [59, 60], we cannot ensure that results are generalizable. However, the demographic and work characteristics of NPs in our survey are comparable to those in a national sample survey of NPs [61]. For example, 81.8% of NPs in our sample reported a master's degree compared to 81.1% in the national sample. As noted above, our data collection took place from 2021 to 2023, and thus, responses could have been influenced by the COVID-19 pandemic. Finally, we have not tested the relationship between structural and organizational attributes and quality of care or NP workforce outcomes. Future research should focus on testing these critical relationships.

Conclusion

We identified significant gaps in dementia care management and quality in primary care practices compared to the care provided for other chronic conditions from the perspectives of NPs. These deficiencies in primary care practices reflect critical shortcomings in the healthcare system's ability to support the complex needs of patients with dementia. With the prevalence of dementia steadily increasing, coupled with the growing role of NPs in dementia care, targeted investments in primary care practices are urgently needed. More research is needed to better understand how to deliver optimal care to patients with dementia in primary care practices, identify key structural attributes of practices that support dementia care, and improve working conditions for clinicians. Prioritizing strategic improvements in NP practices and improving working conditions can enhance the quality of dementia care, safeguard clinician well-being, and serve as crucial steps toward a more sustainable healthcare system capable of meeting the complex needs of the dementia population.

Abbreviations

U.S.	United States
ED	Emergency department
APN	Advanced practice nurse
NP	Nurse practitioner
WHO	World Health Organization
GUIDE	Guiding an Improved Dementia Experience
NP-PCOCQ	Nurse Practitioner-Primary Care Organizational Climate
	Questionnaire

Supplementary Information

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Supplementary Material 1

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Author contributions

LP made substantial contributions to the conception and design of the work, acquisition and interpretation of data, and writing of the manuscript. MD interpreted data and was a major contributor in writing the manuscript. GM contributed to the conception and design of the study, interpretation of the data, and writing of the manuscript. KF analyzed and interpreted the data, created tables and figures, and contributed to the writing of the manuscript. JPD contributed to the conception and design of the study and writing of the manuscript. SB made substantial contributions to the conception and design of the study, interpretation of the manuscript. TS contributed to the conception and design of the study, interpretation of the data, and writing of the manuscript. SW contributed to data acquisition and analysis. MOJ interpreted data and was a major contributor in writing the manuscript. All authors read and approved the final manuscript.

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Data availability

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

The Columbia University Medical Center Review Board approved the study (Protocol #AAAT2116), and all participants provided informed consent.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

Standard conduct of research

This research study was conducted following the World Medical Association's Declaration of Helsinki.

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- World Health Organization. Dementia. World Health Organization. 2023. http s://www.who.int/news-room/fact-sheets/detail/dementia. Accessed 17 Jan 2025.
- Alzheimer's Disease International. Dementia statistics. Alzheimer's Disease International. https://www.alzint.org/about/dementia-facts-figures/dementia -statistics/. Accessed 17 Jan 2025.
- Alzheimer's A. 2024 Alzheimer's disease facts and figures. Alzheimer's Dement. 2024; https://doi.org/10.1002/alz.13809
- U.S. Department of Health and Human Services. National Plan to Address Alzheimer's Disease: 2023 Update. U.S. Department of Health and Human Services. 2023. https://aspe.hhs.gov/sites/default/files/documents/3c45034a ec6cf63414b8ed7351ce7d95/napa-national-plan-2023-update.pdf. Accessed November 11, 2024.
- LaMantia MA, Stump TE, Messina FC, Miller DK, Callahan CM. Emergency department use among older adults with dementia. Alzheimer Dis Assoc Disord. 2016. https://doi.org/10.1097/WAD.000000000000118.
- Salaj D, Schultz T, Strang P. Nursing home residents with dementia at end of life: emergency department visits, hospitalizations, and acute hospital deaths. J Palliat Med. 2024. https://doi.org/10.1089/jpm.2023.0201.
- Weiss J, Tumosa N, Perweiler E, Forciea MA, Miles T, Blackwell E, et al. Critical workforce gaps in dementia education and training. J Am Geriatr Soc. 2020. h ttps://doi.org/10.1111/jgs.16341.
- Heintz H, Monette P, Epstein-Lubow G, Smith L, Rowlett S, Forester BP. Emerging collaborative care models for dementia care in the primary care Aetting: a narrative review. Am J Geriatr Psychiatry. 2020. https://doi.org/10.1016/j.jagp. 2019.07.015.
- World Health Organization. Health workforce. World Health Organization. ht tps://www.who.int/health-topics/health-workforce#tab=tab_1. Accessed 17 Jan 2025.
- Health Resources and Services Administration. Health workforce shortage areas. data.hrsa.gov. 2024. https://data.hrsa.gov/topics/health-workforce/shor tage-areas. Accessed 11 Nov 2024.
- Lester PE, Dharmarajan TS, Weinstein E. The looming geriatrician shortage: ramifications and solutions. J Aging Health. 2020. https://doi.org/10.1177/089 8264319879325.
- American Association of Medical Colleges. The complexities of physician supply and demand: projections from 2021 to 2036. 2024. https://www.aamc .org/media/75236/download. Accessed 11 Nov 2024.
- Xue Y, Poghosyan L, Lin Q. Supply and geographic distribution of geriatric physicians and geriatric nurse practitioners. JAMA Netw Open. 2024. https:// doi.org/10.1001/jamanetworkopen.2024.44659.
- Liu JL, Baker L, Chen AY, Wang J. Geographic variations in shortfalls of dementia specialists in the united States. Health Aff Scholar. 2024. https://doi.org/10. 1093/haschl/qxae088.
- International Council on Nurses. Guidelines on advanced practice nursing 2020. International Council on Nurses. 2020. https://www.icn.ch/system/file s/documents/2020-04/ICN_APN%20Report_EN_WEB.pdf. Accessed 17 Jan 2025.
- Maier CB, Aiken LH, Busse R. Nurses in advanced roles in primary care: policy levers for implementation. OECD Health Working Papers No. 98. 2017; https:// doi.org/10.1787/a8756593-en
- World Health Organization. Global strategy on human resources for health: workforce 2030. World Health Organization. 2016. https://iris.who.int/bitstre am/handle/10665/250368/9789241511131-eng.pdf?sequence=1. Accessed 17 Jan 2025.
- Auerbach DI, Buerhaus PI, Staiger DO. Implications of the rapid growth of the nurse practitioner workforce in the US. Health Aff (Millwood). 2020. https://do i.org/10.1377/hlthaff.2019.00686.
- Nurse Practitioners Gather in Washington, D.C., to Advocate for Patients and Future of Health Care. 2025. https://www.aanp.org/news-feed/nps-gathe r-in-washington-d-c-to-advocate-for-patients-and-future-of-health-care. Accessed 10 April 2025.
- 20. U.S. Bureau of Labor Statistics. Occupational outlook handbook: nurse anesthetists, nurse midwives, and nurse practitioners. U.S. Bureau of Labor Statistics. 2024. https://www.bls.gov/ooh/healthcare/nurse-anesthetists-nurse-midwives-and-nurse-practitioners.htm. Accessed 11 Nov 2024.
- 21. Reuben DB, Fulmer T. Nurse practitioners and dementia care: a perfect fit. Am J Geriatr Psychiatry. 2021. https://doi.org/10.1016/j.jagp.2021.02.040.
- 22. Centers for Medicare & Medicaid Services. Guiding an Improved Dementia Experience (GUIDE) Model. Centers for Medicare & Medicaid Services. 2024.

https://www.cms.gov/priorities/innovation/innovation-models/guide. Accessed 11 Nov 2024.

- Poghosyan L, Brooks JM, Hovsepian V, Pollifrone M, Schlak AE, Sadak T. The growing primary care nurse practitioner workforce: a solution for the aging population living with dementia. Am J Geriatr Psychiatry. 2021. https://doi.or g/10.1016/j.jagp.2021.01.135.
- Clevenger CK, Lingler JH, Zhang Y, Seleri S, Parnas ML, Youmans-Kidder K. Roles of nurse practitioners in comprehensive Alzheimer's disease care: barriers and opportunities for timely diagnosis. Geriatr Nurs. 2024. https://doi.org/ 10.1016/j.gerinurse.2024.11.020.
- Clevenger CK, Cellar J, Kovaleva M, Medders L, Hepburn K. Integrated memory care clinic: design, implementation, and initial results. J Am Geriatr Soc. 2018. https://doi.org/10.1111/jgs.15528.
- Jennings LA, Tan Z, Wenger NS, Cook EA, Han W, McCreath HE, et al. Quality of care provided by a comprehensive dementia care comanagement program. J Am Geriatr Soc. 2016. https://doi.org/10.1111/jgs.14251.
- Jennings LA, Laffan AM, Schlissel AC, Colligan E, Tan Z, Wenger NS, et al. Health care utilization and cost outcomes of a comprehensive dementia care program for medicare beneficiaries. JAMA Intern Med. 2019. https://doi.org/1 0.1001/jamainternmed.2018.5579.
- Kosar CM, Thapa BB, Muench U, Santostefano C, Gadbois EA, Oh H, et al. Nurse practitioner care, scope of practice, and end-of-life outcomes for nursing home residents with dementia. JAMA Health Forum. 2024. https://doi.org /10.1001/jamahealthforum.2024.0825.
- Reuben DB, Tan ZS, Romero T, Wenger NS, Keeler E, Jennings LA. Patient and caregiver benefit from a comprehensive dementia care program: 1-Year results from the UCLA Alzheimer's and dementia care program. J Am Geriatr Soc. 2019. https://doi.org/10.1111/jgs.16085.
- Poghosyan L, Ghaffari A, Liu J, McHugh M. Organizational support for nurse practitioners in primary care and workforce outcomes. Nurs Res. 2020. https:/ /doi.org/10.1097/NNR0000000000425.
- Poghosyan L, Bernhardt J. Transformational leadership to promote nurse practitioner practice in primary care. J Nurs Manag. 2018. https://doi.org/10.1 111/jonm.12636.
- Schlak A, Poghosyan L, Rosa WE, Mathew S, Liu J, Martsolf G, et al. The impact of primary care practice structural capabilities on nurse practitioner burnout, job satisfaction, and intent to leave. Med Care. 2023. https://doi.org/10.1097/ MLR.000000000001931.
- Poghosyan L, Liu J, Schlak A, Courtwright S, Flsndrick K, Nantsupawat A, et al. Primary care nurse practitioner burnout and ED use and hospitalizations among chronically ill medicare beneficiaries. Inquiry. 2023. https://doi.org/10. 1177/00469580231219108.
- Martsolf GR, Kandrack R, Baird M, Friedberg MW. Estimating associations between medical home adoption, utilization, and quality: a comparision of evaluation approaches. Med Care. 2018. https://doi.org/10.1097/MLR.000000 000000842.
- Friedberg MW, Rosenthal MB, Werner RM, Volpp KG, Schneider EC. Effects of a medical home and shared savings intervention on quality and utilization of care. JAMA Intern Med. 2015. https://doi.org/10.1001/jamainternmed.2015.20 47.
- Burton RA, Zuckerman S, Haber SG, Keyes V. Patient-centered medical home activities associated with low medicare spending and utilization. Ann Fam Med. 2020. https://doi.org/10.1370/afm.2589.
- Centers for Medicare & Medicaid Services. Medicare physician & other practitioners by provider. Centers for Medicare & Medicaid Services. 2018. https://d ata.cms.gov/provider-summary-by-type-of-service/medicare-physician-othe r-practitioners/medicare-physician-other-practitioners-by-provider/data/201 8. Accessed 11 Nov 2024.
- IQVIA Inc. OneKey reference assets. IQVIA Inc. 2020. https://www.iqvia.com/l ocations/united-states/solutions/life-sciences/information-solutions/essentia l-information/onekey-reference-assets. Accessed 11 Nov 2024.
- Barnes H, Richards MR, McHugh MD, Martsolf G. Rural and nonrural primary care physician practices increasingly rely on nurse practitioners. Health Aff (Millwood). 2018. https://doi.org/10.1377/hlthaff.2017.1158.
- Dillman D, Smyth J, Christian L. Internet, phone, mail, and mixed-mode surveys: the tailored design method. Hoboken, NJ: John Wiley & Sons, Inc.; 2014.
- Martsolf GR, Ashwood S, Friedberg MW, Rodriguez HP. Linking structural capabilities and workplace climate in community health centers. Inquiry. 2018. https://doi.org/10.1177/0046958018794542.
- 42. Poghosyan L, Ghaffari A, Shaffer J. Nurse practitioner primary care organizational climate questionnaire: item response theory and differential item functioning. J Clin Nurs. 2019. https://doi.org/10.1111/jocn.14895.

- Abraham CK, Zheng K, Norful AA, Ghaffari A, Liu J, Poghosyan L. Primary care nurse practitioner burnout and perceptions of quality care. Nurs Forum. 2021. https://doi.org/10.1111/nuf.12579.
- Dolan ED, Mohr D, Lempa M, Joos S, Fihn SD, Nelson KM, et al. Using a single item to measure burnout in primary care staff: a psychometric evaluation. J Gen Intern Med. 2015. https://doi.org/10.1007/s11606-014-3112-6.
- Edwards ST, Marino M, Balasubramanian BA, Solberg LI, Valenzuela S, Springer R, et al. Burnout among physicians, advanced practice clinicians and staff in smaller primary care practices. J Gen Intern Med. 2018. https://doi.org/10.100 7/s11606-018-4679-0.
- Kim DK, Scott P, Poghosyan L, Martsolf GR. Burnout, job satisfaction, and turnover intention among primary care nurse practitioners with their own patient panels. Nurs Outlook. 2024. https://doi.org/10.1016/j.outlook.2024.10 2190.
- 48. R Core Team. R: a Language and environment for statistical computing. Vienna, Austria: R Foundation for Statistical Computing; 2023.
- Office of the Assistant Secretary for Planning and Evaluation. National plan to address Alzheimer's disease: 2023 update. Office of the Assistant Secretary for Planning and Evaluation. 2024. https://aspe.hhs.gov/reports/national-plan-20 23-update. Accessed 11 Nov 2024.
- Sideman AB, Ma M, Hernandez de Jesus A, Alagappan C, Razon N, Dohan D, et al. Primary care practitioner perspectives on the role of primary care in dementia diagnosis and care. JAMA Netw Open. 2023. https://doi.org/10.100 1/jamanetworkopen.2023.36030.
- Davydow DS, Zivin K, Katon WJ, Pontone GM, Chwastiak L, Langa K, et al. Neuropsychiatric disorders and potentially preventable hospitalizations in a prospective cohort study of older Americans. J Gen Intern Med. 2014. https:// doi.org/10.1007/s11606-014-2916-8.
- Maust DT, Davis RC, Muench U, Marcus SC, Spetz J. Clinician type and care setting for treatment of medicare beneficiaries with dementia. Alzheimers Dement. 2025;21(3):e70102. https://doi.org/10.1002/alz.70102.
- Österholm J, Larsson Ranada Å, Nedlund AC. Mapping collaboration and coordination of health and care services for older people with dementia: A

scoping review. Health Soc Care Commun. 2023;2023(1):8858773. https://doi. org/10.1155/2023/8858773.

- Li J, Andy C, Mitchell S. Use of medicare's new reimbursement codes for cognitive assessment and care planning, 2017–2018. JAMA Netw Open. 2021. htt ps://doi.org/10.1001/jamanetworkopen.2021.25725.
- Abraham CM, Zheng K, Norful AA, Ghaffari A, Liu J, Poghosyan L. Primary care practice environment and burnout among nurse practitioners. J Nurse Pract. 2021. https://doi.org/10.1016/j.nurpra.2020.11.009.
- Hovsepian VE, Liu J, Schlak AE, et al. Structural capabilities in primary care practices where nurse practitioners care for persons living with dementia. Int J Older People Nurs. 2023. https://doi.org/10.1111/opn.12556.
- Carthon JMB, Brom H, Poghosyan L, Daus M, Todd B, Aiken L. Supportive clinical practice environments associated with patient-centered care. J Nurse Pract. 2020. https://doi.org/10.1016/j.nurpra.2020.01.019.
- Wheeler KJ, Miller M, Pulcini J, Gray D, Ladd E, Rayans MK. Advanced practice nursing roles, regulation, education, and practice: a global study. Ann Glob Health. 2022. https://doi.org/10.5334/aogh.3698.
- Lasater KB, Jarrin OF, Aiken LH, McHugh MD, Sloane DM, Smith HL. A methodology for studying organizational performance: a multistate survey of front-line providers. Med Care. 2019. https://doi.org/10.1097/MLR.00000000 0001167.
- de Koning R, Egiz A, Kotecha J, Ciuculete AC, Ooi SZY, Bankole NDA, et al. Survey fatigue during the COVID-19 pandemic: an analysis of neurosurgery survey response rates. Front Surg. 2021. https://doi.org/10.3389/fsurg.2021.69 0680.
- 61. American Association of Nurse Practitioners. The state of the nurse practitioner profession 2020. American Association of Nurse Practitioners. 2021. https ://storage.aanp.org/www/documents/no-index/research/2020-NP-Sample-S urvey-Report.pdf. Accessed 11 Nov 2024.

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