NP and PA transition to practice: A scoping review of fellowships and onboarding programs

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ABSTRACT

Objectives: Newly graduated NPs and physician associates/assistants (PAs) benefit from transition to practice (TTP) support to move successfully into practice. TTP programs (such as onboarding programs, fellowships, and residencies) hold promise for improving workforce outcomes. The purpose of this scoping review was to describe the literature regarding NP/PA TTP programs.

Methods: Using the Joanna Briggs Institute methodology, a specific approach for systematically conducting reviews, publications from January 1990 to May 2022 were included if they addressed fellowships, residencies, or onboarding programs for NPs or PAs. Final data extraction involved 216 articles.

Results: The pace of publication increased over time, with a noticeable increase since 2015. Articles were most commonly about fellowships or residencies, NPs, and programs set in nonrural, acute care US settings and in academic health centers.

Conclusions: A gap exists in our understanding of onboarding programs and programs focusing on PAs, as well as TTP support in rural and primary care settings. In addition, few articles assess TTP program outcomes such as benefits and costs. This review describes the need for more published literature in these areas.

Keywords: physician associate, PA, nurse practitioner, advanced practice registered nurse, transition to practice, onboarding

Healthcare workforce supply and distribution have been recognized as challenges in the United States for decades.[1] Recent high-profile examinations of workforce burnout and resiliency, as well as workforce shortages exacerbated by the COVID-19 pandemic, have raised the salience of these issues.[2-6] The National Academy of Medicine asserts that "mitigating clinician burnout and supporting professional well-being is essential to providing high-quality patient care."[3] Burnout and resiliency are affected by stresses in healthcare settings. Among NPs and physician associates/assistants (PAs), ample evidence shows that the period of transition from student to professional often is a time of intense personal stress as new clinicians adapt to their roles. The literature establishes that new NPs and PAs benefit from support to transition successfully into their professional roles.[7-11]

This transition to practice (TTP) support has been provided to new-graduate NPs and PAs in two main ways: fellowships or residencies and onboarding programs.[12,13] Fellowships and residencies are the earliest TTP approach for NPs and PAs documented in the literature.[14-16] They usually last 1 to 2 years and are designed for PAs and NPs, who often are considered trainees rather than employees, to complete after they graduate from their entry-level training programs. These programs often

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include specialized didactic and clinical training (such as clinical rotations and simulations) and offer documentation of successful completion.[13,17] In contrast, onboarding programs are shorter in duration (typically lasting 6 months to 1 year), consider participants to be employees of the organization rather than trainees, and do not award a formal credential or certificate at completion.[12,18-20] Although participants in onboarding programs usually earn a competitive starting salary, those who participate in fellowships or residencies often (but not always) receive a stipend that is less than the salary of an employee. Both approaches typically include a gradual ramp-up of clinical responsibilities supported by mentoring and educational activities.[12,19,20] The rationale for implementing both types of programs is based on purported positive outcomes, such as reduced turnover and intent to leave, greater practice autonomy, greater job satisfaction, increased clinical productivity, and successful role transition.[14,21,22] However, information that would enable organizations to weigh the potential benefits and costs of these programs is limited.

Although publications focused on TTP programs have been increasing over the past decade, finding summative information in the literature to guide further research or to inform administrators who wish to implement TTP programs remains difficult. Several published reviews address the concept of TTP, the degree of preparation of NPs and PAs to practice, and role transition for NPs in rural settings.[10,11,23-26] However, reviews addressing TTP programs specifically for PAs and those evaluating outcomes for both types of TTP programs are lacking. In addition, comprehensive information about the distribution of TTP programs across settings and specialties has not been described in the literature.

In this scoping review, we address these gaps by examining the existing literature to describe the state of the science on TTP programs for NPs and PAs. This review is the first to describe the body of literature on fellowships, residencies, and onboarding programs for NPs and PAs. Also, as most of the TTP literature has historically focused on NPs, this review is the first to describe the literature on TTP programs for PAs. Moreover, we were interested in whether the scope of information being reported in the literature is advancing, including whether outcomes of TTP programs are being evaluated and the types of methods being used to evaluate programs. Thus, we also summarize the extent of TTP program outcome evaluation to identify gaps and challenges, as well as inform future research and program development.

TABLE 1. Inclusion and exclusion criteria

Inclusion

- Topic of article must involve description of TTP program. This includes postgraduate training programs (fellowships and residencies), onboarding programs, or TTP methods.
- Population must include PAs and/or NPs (also includes advanced practice RNs, clinical nurse specialists, certified nurse midwives, and nurse anesthetists). Articles that include other types of learners, in addition to NPs and PAs, should be included.

Exclusion

- Does not address TTP
- Does not include NPs and/or PAs
- Addresses RNs, but not NPs
- Addresses PAs or NPs in training programs (preprofessional)
- Describes a program that only improved a particular set of competencies for all NPs and PAs (not just new hires)
- Describes program that addressed only one content area
- Describes a program that only addressed role transition to a faculty role and not a clinical role
- Article is not in English
- Article was published before 1990
- Article was about the concept of TTP versus a specific program

METHODS

This scoping review was conducted in accordance with the Joanna Briggs Institute Methodology for Scoping Reviews. A detailed explanation of the methods was published by Batchelder and colleagues.[27]

Data sources and searches The search strategy aimed to locate published primary studies, systematic reviews, editorials, opinion papers, and conference abstracts.[27] The medical librarian identified key search terms by examining keywords from articles found on preliminary searches on our topic. After the search strategy was finalized by test runs and consultation with the entire team, the following databases were searched: MEDLINE (PubMed), CINAHL Complete, Cochrane Central Register of Controlled Trials (CENTRAL), Embase, Scopus, and Web of Science Core Collection.[27] A medical librarian was responsible for conducting the search, in consultation with the entire study team. The full PubMed search strategy, completed in June 2021, can be found in **Appendix 1,** http://links.lww.com/JAAPA/A17. Secondary search strategies from June 2021 to May 2022 are available by request.

Article selection This scoping review included articles that described fellowships/residencies and onboarding programs for NPs and PAs. All inclusion and exclusion criteria can be found in **Table 1.**

Study/source of evidence selection Following the search, all identified articles were collated and uploaded into Covidence, a web-based systematic review management software, and duplicates were removed. All titles and abstracts were screened by one independent reviewer using the inclusion and exclusion criteria (**Table 1**).[27] Next, detailed citations and the full text of all selected articles were retrieved and imported into Covidence. At this step, a full-text review was conducted by at least two independent reviewers; a third reviewer was included if the original two reviewers disagreed on article inclusion. Reasons for excluding articles were recorded and are

reported in the PRISMA diagram (**Figure 1**).[28]

Data extraction Data were extracted from the included articles by two independent reviewers using a data extraction tool developed by the study team. Items were developed to obtain information needed to address the objectives of the scoping review. Extracted data included type of publication, publication year, type of program, clinician type, practice setting (including country of origin and rurality), organization type, practice specialty, study methods, and outcomes that were assessed (**Appendix 2,** http://links.lww.com/JAAPA/A18). We grouped fellowships and residencies together because they are similar in their requirements, descriptions, and length of program, making it challenging to distinguish between these two types of programs.[17,29]

Data analysis and presentation A descriptive summary of the final sample of articles (N = 216) is presented in **Tables 2** through **4**. Articles were categorized by whether they addressed fellowships and residencies or onboarding programs. Articles were further categorized by type of clinician (NPs, PAs, or both).

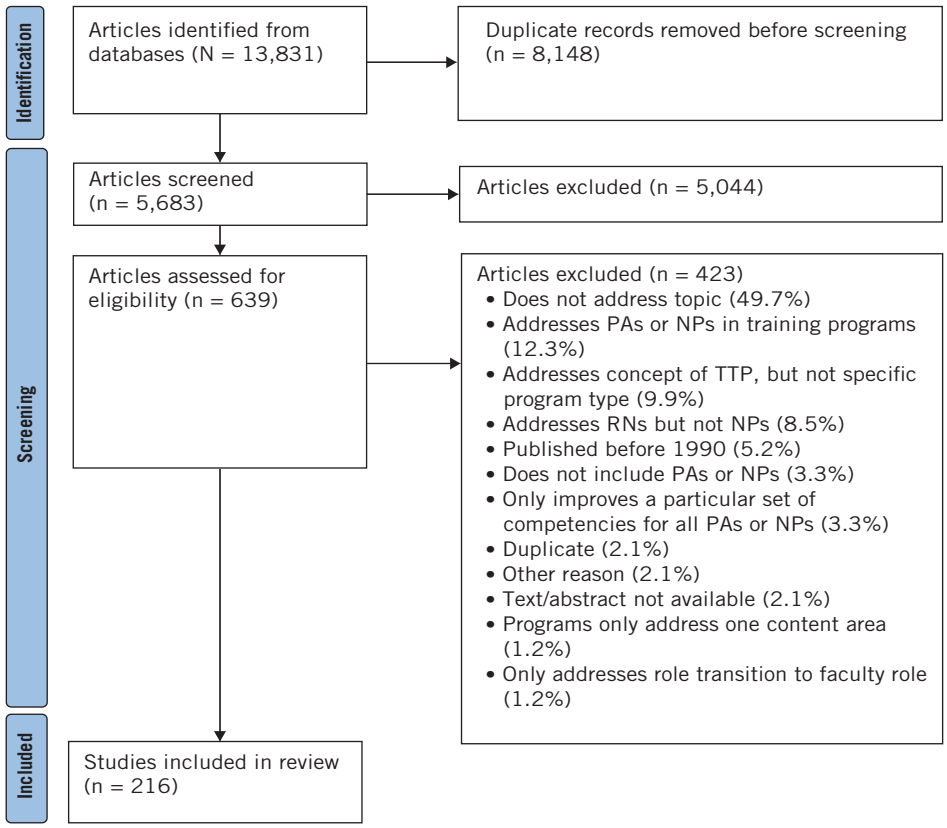

FIGURE 1. PRISMA diagram showing the number of articles identified, the screening process, and the final number of articles included in the review

RESULTS

The database searches retrieved 13,831 articles, and 8,148 duplicates were removed (**Figure 1**). The remaining 5,683 articles were screened by the research team. After initial title and abstract screening, 5,044 articles were excluded, and full-text review resulted in the exclusion of an additional 423 articles. Reasons for excluding articles are presented on the PRISMA diagram (**Figure 1**).[28] The final sample of articles for data extraction was 216.

Among the 216 articles, the majority addressed fellowships or residencies (70%), with 30% addressing onboarding programs. Articles about NPs (52%) were more common than those about PAs (17%) or both clinician types (31%). Among onboarding articles, the majority were about both provider types (56%); articles about fellowships/residencies were most often about NPs (57%).

Article year, publication type, geographical setting, and organization type The pace of publication increased between January 1990 and May 2022 (**Figure 2**), with most articles published after 2015. Although scoping reviews do not include a formal risk of bias assessment, we informally categorized the articles we reviewed as higher or lower quality of evidence. Journal articles and reviews were considered to represent higher levels of evidence compared with opinion articles and abstracts.[30] We considered abstracts to be lower-quality evidence since they present limited information and generally have not gone through as rigorous a peer-review process as a published manuscript. By this metric, the majority (63%) of all articles were of higher quality of evidence, and the remaining 37% were considered lower quality of evidence (**Table 2**). When categorized by program and clinician type, at least half of all articles were considered higher quality; the exceptions were articles addressing onboarding programs for NPs and PAs (44%). Within categories, NP-focused articles tended to be of higher quality of evidence for fellowships or residencies (69%) and onboarding programs (88%) than those focused on PAs only or on both clinician types; however, the counts for these two latter categories tended to be lower. Most articles (94%) were published in the United States (**Table 2**). Papers published outside the United States were more frequently about NPs and onboarding programs. Among all articles, only 31% (n = 66) specified a rural or urban/suburban location, with only a small proportion of these (6%) reporting a rural location.

Sixty-one percent of all articles specified an organization type, with the remaining articles not specific for any type of organization (**Table 2**). Of the articles that specified organization type (n = 131), academic health centers were the most described type (68%). This was consistent across program and clinician type categories. Veterans Administration was the second most reported organization type across the total sample (13%), and only 8% of articles could be identified as set in a safety-net organization such as a federally qualified health center. We also coded 8% of articles as set in an integrated healthcare system, but this did not include the many academic health centers that also are integrated healthcare systems.

Healthcare setting and practice specialty Among the 73% (n = 158) of articles that reported a healthcare setting, the two most frequently reported settings were hospital/inpatient (68%) and office/outpatient (47%, **Table 3**). These settings were the most common across program and clinician type categories except for articles addressing PA fellowships or residencies. In articles about PA-only fellowships or residencies, hospital/inpatient (52%) and ED (52%) settings were the two most commonly described. No articles addressed onboarding programs for PAs only. No articles for either clinician type reported a setting other than hospital/inpatient or office/outpatient. Of note, categories for healthcare setting were not mutually exclusive because some articles addressed more than one setting. For example, a fellowship, residency, or onboarding program for NPs or PAs in orthopedics would likely include patient interactions in an outpatient clinic, an inpatient setting, and possibly in an ED.

Among papers that specified a practice specialty (n = 167, 77%), specialties most likely associated with hospitals (including critical care medicine, surgical subspecialties, emergency medicine, hospital medicine, and general surgery) were predominant (54%; **Table 3**). Articles reporting internal medicine also were common (25%). Primary care (including primary care, family medicine, general internal medicine, and general pediatrics) was reported in 20% of articles, and pediatrics represented 11% of articles. Among fellowship and residency articles, primary care was the most common specialty for NP-only articles (36%), emergency medicine was the most common specialty for PA-only articles (43%), and critical care was the most common specialty for both clinician types (35%). Among onboarding program articles, surgical subspecialties were the most common specialties for NP-only articles (35%) followed by critical care (30%). Only two articles addressing onboarding programs for PAs reported a practice specialty, and both were in primary care. Among articles addressing onboarding programs for NPs and PAs, the two most commonly reported specialties were internal medicine (40%) and critical care (33%). Categories for practice specialty were not mutually exclusive because some articles reported on TTP programs that supported NPs and PAs across multiple specialties.

Methods, outcomes, and funding Results for methods used, outcomes reported, and funding in each included article are shown in **Table 4**. Similar to healthcare setting and practice specialties, articles tended to use and report more than one method or outcome; thus, these categories are not mutually exclusive. The most common method identified among all articles was program description/case study (56%). These articles usually described newly developed fellowships, residencies, or onboarding programs and were common for all clinician type categories. Survey methods were used in 38% of articles, including surveys of program participants or of supervisors about program participants. Other methods included: opinion/editorials (19%), literature reviews (12%), analysis of organizational data (such as turnover and retention data; 10%), and interviews or focus groups (10%). These generalizations held across program and clinician type categories, although proportionately more opinion articles were about fellowships or residencies for PAs.

Forty percent of the articles included in this scoping review did not evaluate outcomes. Among those that did (n = 130, 60%), articles often reported multiple outcomes that included participant- and program-level outcomes (**Table 4**). The most reported outcomes, reported in about one-quarter of articles, were self-reported clinical confidence of the new NP or PA, satisfaction with the TTP program,

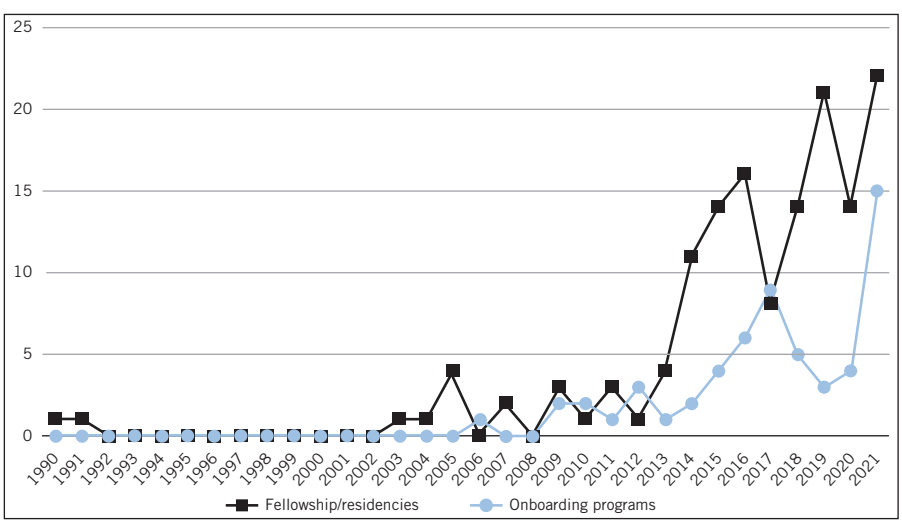

FIGURE 2. Number of publications by year and program type (1990-2021). Articles were retrieved through May 2022; however, because only 5 months in 2022 were collected, 2022 is not included in the figure.

TABLE 2. Article publication types, geographic settings, and organization types by program and clinician type (N = 216)

Variable	Total, n (%)	Fellowship/residency, n (%)			Onboarding, n (%)		
		NPs	PAs	Both	NPs	PAs	Both
Publication type	216 (100)	87 (100)	35 (100)	30 (100)	26 (100)	2 (100)	36 (100)
Journal article	126 (58.3)	54 (62.1)	17 (48.6)	16 (53.3)	22 (84.6)	1 (50.0)	16 (44.4)
Abstract	43 (19.9)	11 (12.6)	3 (8.6)	9 (30)	2 (7.7)	1 (50)	17 (47.2)
Opinion/editorial	37 (17.1)	16 (18.4)	12 (34.3)	5 (16.7)	1 (3.9)	0 (0)	3 (8.3)
Reviews*	10 (4.6)	6 (6.9)	3 (8.6)	0 (0)	1 (3.9)	0 (0)	0 (0)
Country							
United States	204 (94.4)	86 (98.9)	34 (97.1)	29 (96.7)	19 (73.1)	1 (50)	35 (97.2)
Outside the United States	12 (5.6)	1 (1.2)	1 (2.9)	1 (3.3)	7 (26.9)	1 (50)	1 (2.8)
Rurality	66 (30.6)	23 (31.9)	9 (12.5)	12 (16.7)	7 (9.7)	1 (1.4)	14 (19.4)
Urban/suburban	62 (93.9)	22 (95.7)	9 (100)	11 (91.7)	6 (85.7)	1 (100)	13 (92.9)
Rural	4 (6.1)	1 (4.4)	0 (0)	1 (8.36)	1 (14.3)	0 (0)	1 (7.1)
Organization type**	131 (60.7)	48 (55.2)	17 (48.6)	22 (73.3)	14 (53.9)	2 (100)	28 (77.8)
Academic health center	89 (67.9)	28 (58.3)	13 (76.5)	16 (72.7)	9 (64.3)	1 (50)	22 (78.6)
Veterans Administration	17 (13)	12 (25)	4 (25.5)	0 (0)	1 (7.1)	0 (0)	0 (0)
Integrated healthcare system***	11 (8.4)	1 (2.1)	0 (0)	6 (27.3)	1 (7.1)	0 (0)	3 (10.7)
Safety-net organization	11 (8.4)	8 (16.7)	0 (0)	0 (0)	1 (7.1)	0 (0)	2 (7.1)
Office-based practice	4 (3.1)	1 (2.1)	0 (0)	0 (0)	1 (7.1)	0 (0)	2 (7.1)
Other****	11 (8.4)	4 (8.3)	1 (5.9)	0 (0)	2 (14.3)	1 (50)	3 (10.7)

*Reviews include general literature reviews, systematic reviews, and scoping reviews.
**Variable categories are not mutually exclusive.
***Integrated healthcare systems are not considered academic health centers.
****Other organization types include military, community hospitals, comprehensive cancer centers, affiliated private medical schools, staffing organizations, primary care in United Kingdom healthcare system, schools of nursing, birthing centers, quaternary care referral centers, and retail partnerships.

job placement, and turnover or retention. We did not discern patterns of outcomes evaluated across program or clinician type categories. Finally, only one-quarter of articles reported a funding source, and these articles tended to address fellowships or residencies for NPs only.

DISCUSSION

This scoping review was the first to describe the body of literature on fellowships, residencies, and onboarding programs for NPs and PAs. We found that the literature on fellowships and residencies has evolved over a longer period of time and generally is more plentiful (**Figure 2**) and of higher-quality publication type than the literature addressing onboarding programs. Similarly, the literature addressing TTP programs for NPs is more abundant than the literature addressing TTP programs for PAs. Publications about TTP programs in academic health centers and those addressing inpatient, urban, and subspecialty practice are much more plentiful than literature about programs in outpatient, rural, safety-net, or primary care settings (**Tables 2** and **3**).

Instead of implying that TTP is not being addressed in outpatient, rural, safety-net, or primary care settings, we believe other factors may be driving why we see a pattern of greater publication from academic health centers, as well as inpatient and specialty settings. First, our findings may reflect the culture regarding publication and the support for authorship opportunities in these settings. For example, academic health centers promote and reward scholarship among employees and trainees; however, clinicians who work in small outpatient practices and safety-net clinics typically are not expected to publish articles and are rarely granted time to devote to academic pursuits.[31] Also, because subspecialty services most often are located in urban academic health centers, it is no surprise that more publications would emerge from these practice settings and specialties.

A second potential factor driving the higher proportion of articles on TTP programs set in medical and surgical subspecialties and acute care settings is that they are needed to help new-graduate NPs and PAs hone the specialized procedural skills required for these practice settings. Finally, hospital-based fellowships, residencies, and onboarding programs were more likely to include NPs and PAs than other settings, which likely reflects the common practice

of hiring NPs and PAs in similar roles in many hospital specialties.

Because of the high proportion of articles focused on TTP programs in academic health centers and inpatient and specialty settings, our results identified a considerable gap in the literature on TTP programs in the areas of greatest need. Primary care, rural, and safety-net settings have long suffered the most severe workforce issues of distribution and supply, and our review shows scant publications in these areas, especially for TTP programs that include PAs.[32] This gap in the literature could potentially be due to a lack of publication of TTP program efforts or the lack of resources to support programs in these settings.[26,33-35] For example, fellowships and residencies may be more difficult to establish in smaller, community, or safety-net settings than in academic health centers. Academic health centers often have greater access to necessary resources, such as academic culture, mentors and preceptors, teaching and learning spaces, advanced learning technologies, and a critical mass of learners (such as new graduates from local universities). For these reasons, onboarding programs might be a better fit for community and safety-net settings that lack academic infrastructure. Because NPs and PAs account for more than half of the clinicians in these settings, evidence to support new graduates and ensure successful TTP is needed.[26,33,35] Our scoping review has identified gaps in the literature that should point researchers and funders to support additional research on TTP support, especially onboarding programs, in primary care, outpatient, rural, and safety-net settings.

The methods described in the included articles were predominantly descriptions of programs or opinions/editorials, with 40% of articles not evaluating outcomes. Systematic reviews include detailed risk of bias assessments of each article, but this methodical rating of study design characteristics is not part of the scoping review methodology that we used. Therefore, we did not rigorously assess quality using standard risk of bias metrics. However, among those articles reporting an outcome, 70% included participant-level outcomes, and 55% included program-level outcomes. A higher percentage of TTP programs for NPs and PAs (63%) and PAs only (70%) assessed for program-level outcomes, compared with NPs only (44%).

To inform policy, evaluation of TTP program outcomes requires the use of rigorous methods and an improved funding base because only one-quarter of studies reported a funding source. For organizations to decide whether to invest in TTP support, information beyond descriptions of program structure and early experiences is needed.

TABLE 3. Healthcare setting and practice specialty by program and clinician type (N = 216)

Variable	Total, n (%)	Fellowship/residency, n (%)			Onboarding, n (%)		
		NPs	PAs	Both	NPs	PAs	Both
Healthcare setting*	158 (73.2)	56 (64.4)	21 (60)	28 (93.3)	22 (84.6)	2 (100)	29 (80.6)
Hospital/inpatient	107 (67.7)	27 (48.2)	11 (52.4)	24 (85.7)	20 (90.9)	1 (50)	24 (82.8)
Office/outpatient	75 (47.5)	36 (64.3)	7 (33.3)	12 (42.9)	6 (27.3)	1 (50)	13 (44.8)
ED	17 (10.8)	2 (3.6)	11 (52.4)	3 (10.7)	1 (4.6)	0 (0)	0 (0)
Palliative care	6 (3.8)	4 (7.1)	0 (0)	2 (7.1)	0 (0)	0 (0)	0 (0)
Other**	5 (3.2)	3 (5.4)	0 (0)	1 (3.6)	1 (4.6)	0 (0)	0 (0)
Practice specialty*	167 (77.3)	62 (71.3)	21 (60)	29 (96.7)	23 (88.5)	2 (100)	30 (83.3)
Internal medicine	41 (24.6)	16 (25.8)	4 (19.1)	8 (27.6)	1 (4.4)	0 (0)	12 (40)
Primary care	34 (20.4)	22 (35.5)	1 (4.8)	2 (6.9)	3 (13)	2 (100)	4 (13.3)
Critical care	34 (20.4)	7 (11.3)	0 (0)	10 (34.5)	7 (30.4)	0 (0)	10 (33.3)
Surgical subspecialty	28 (16.8)	6 (9.7)	3 (14.3)	5 (17.2)	8 (34.8)	0 (0)	6 (20)
Pediatric subspecialty	19 (11.4)	7 (11.3)	3 (14.3)	3 (10.3)	5 (21.7)	0 (0)	1 (3.3)
Emergency medicine	13 (7.8)	2 (3.2)	9 (42.9)	2 (6.9)	0 (0)	0 (0)	0 (0)
Hospital medicine	12 (7.2)	3 (4.8)	2 (9.5)	5 (17.2)	0 (0)	0 (0)	2 (6.7)
General surgery	3 (1.8)	1 (1.6)	2 (9.5)	0 (0)	0 (0)	0 (0)	0 (0)
Other***	10 (6)	5 (8.1)	0 (0)	2 (6.9)	2 (8.7)	0 (0)	1 (3.3)

*Variable categories are not mutually exclusive.
**Other healthcare settings include community setting and birthing centers, home healthcare, retail settings, urgent care, and a school setting. Primary care includes primary care, family medicine, general internal medicine, and general pediatrics.
***Other practice specialties include palliative care, reproductive health, urgent care, pediatric mental health, nurse anesthesia, multispecialties, retail, nonprimary specialties, and geriatrics.

TABLE 4. Methods, outcomes, and funding by program and clinician type (N = 216)

Variable	Total, n (%)	Fellowship/residency, n (%)			Onboarding, n (%)		
		NPs	PAs	Both	NPs	PAs	Both
Methods*	216 (100)	87 (100)	35 (100)	30 (100)	26 (100)	2 (100)	36 (100)
Program description/case study	121 (56)	42 (48.3)	13 (37.1)	18 (60)	19 (73.1)	2 (100)	27 (75)
Opinion/editorial	40 (18.5)	16 (18.4)	13 (37.1)	4 (13.3)	3 (11.5)	0 (0)	4 (11.1)
Literature review	25 (11.6)	16 (18.4)	5 (14.3)	1 (3.3)	2 (7.7)	0 (0)	1 (2.8)
Quality improvement	13 (6)	4 (4.6)	1 (2.86)	0 (0)	5 (19.2)	0 (0)	3 (8.3)
Analyses conducted using:							
Surveys	82 (38)	33 (37.9)	12 (34.3)	13 (43.3)	11 (42.3)	2 (100)	11 (30.6)
Interviews/focus groups	21 (9.7)	6 (6.9)	3 (8.6)	1 (3.3)	3 (11.5)	1 (50)	7 (19.4)
Organizational data	22 (10.2)	4 (4.6)	1 (2.9)	7 (23.3)	3 (11.5)	1 (50)	6 (16.7)
Administrative data	19 (8.8)	5 (5.8)	4 (11.4)	6 (20)	1 (3.9)	0 (0)	3 (8.3)
Knowledge tests	18 (8.3)	1 (1.2)	3 (8.6)	5 (16.7)	2 (7.7)	0 (0)	7 (19.4)
Assessment of competencies	5 (2.3)	2 (2.3)	1 (2.9)	1 (3.3)	0 (0)	0 (0)	1 (2.8)
Other**	16 (7.4)	9 (10.3)	3 (8.6)	1 (3.3)	2 (7.7)	0 (0)	1 (2.8)
Outcomes*	130 (60.2)	46 (52.9)	18 (51.4)	24 (80)	16 (61.5)	2 (100)	24 (66.7)
Participant level							
Confidence	34 (26.2)	11 (23.9)	4 (22.2)	8 (33.3)	5 (31.3)	1 (50)	5 (20.8)
Satisfaction with program	34 (26.2)	9 (19.6)	6 (33.3)	3 (12.5)	8 (50)	2 (100)	6 (25)
Coworkers' surveys	30 (23.1)	11 (23.9)	5 (27.8)	6 (25)	4 (25)	1 (50)	3 (12.5)
Role transition	19 (14.6)	8 (17.4)	1 (5.6)	4 (16.7)	4 (25)	0 (0)	2 (8.3)
Knowledge tests	19 (14.6)	2 (4.4)	1 (5.6)	8 (33.3)	2 (12.5)	0 (0)	6 (25)
Job satisfaction	15 (11.5)	7 (15.2)	0 (0)	1 (4.2)	5 (31.3)	0 (0)	2 (8.3)
Commitment to organization	10 (7.7)	3 (6.5)	1 (5.6)	3 (12.5)	2 (12.5)	0 (0)	1 (4.2)
Attainment of competencies	9 (7)	5 (10.9)	1 (5.6)	1 (4.2)	1 (6.3)	0 (0)	1 (4.2)
Earnings	2 (1.5)	0 (0)	2 (11.1)	0 (0)	0 (0)	0 (0)	0 (0)
Burnout	1(0.8)	0 (0)	0 (0)	0 (0)	1 (6.3)	0 (0)	0 (0)
Program level							
Job placement	36 (27.7)	14 (30.4)	5 (27.8)	13 (54.2)	1 (6.3)	1 (50)	2 (8.3)
Turnover/retention	33 (26.2)	9 (19.6)	2 (11.1)	9 (37.5)	3 (18.8)	1 (50)	10 (41.7)
Productivity	23 (17.7)	6 (13)	3 (16.7)	5 (20.8)	2 (12.5)	0 (0)	7 (29.2)
Costs of program	19 (14.6)	7 (15.2)	6 (33.3)	5 (20.8)	1 (6.3)	0 (0)	0 (0)
Other***	39 (30)	18 (39.1)	8 (44.4)	8 (33.3)	1 (6.3)	0 (0)	4 (16.7)
Funding	216 (100)	87 (100)	35 (100)	30 (100)	26 (100)	2 (100)	36 (100)
No	163 (75.5)	54 (62.1)	29 (82.9)	24 (80)	22 (84.6)	1 (50)	33 (91.7)
Yes	53 (24.5)	33 (37.9)	6 (17.1)	6 (20)	4 (15.3)	1 (50)	3 (8.3)

*Variable categories are not mutually exclusive.
**Other method types include policy recommendations/analysis, competency tool development, fellowship guidelines, performance reviews, websites, chart audits, patient satisfaction scores, curriculum development, and secondary data analysis.
***Other outcomes types include fellowship diversity, admissions criteria, trainee stipend, professional values, systemic barriers to TTP, chart review, preparedness to practice, accreditation process experiences, simulation scores, developing/sustaining NP residency, hours worked per week, skill checkoffs residency descriptives, program characteristics, communication between NPs and PAs, successes/challenges, publications, time required for orientation, rates of graduates in nursing education, organization constraints, program feedback, interdisciplinary teamwork, effect of physician involvement in residencies, self-perception of strengths, patient safety, integration of onboarding program, and competitiveness in job market.

In addition, evidence from rigorous evaluations that address all components of the role transition experience can inform organizations of the expected benefits of these programs in terms of NP and PA successful role transition, improved organizational outcomes, and whether the benefits justify program costs. Information about the outcomes of TTP programs also will be useful to NP and PA educators for advising students about postgraduation plans.

LIMITATIONS

Although our search was designed by a medical librarian and tested for its ability to identify seminal articles in the field, relevant articles may have been omitted, especially because there are no agreed-upon search terms in the broader literature for the concepts we studied. Also, since scoping review methodology emphasizes comprehensive coverage rather than in-depth assessment of research quality, this project was not designed to provide a detailed risk of bias assessment of the articles reviewed.

CONCLUSIONS

Interest in TTP programs for new graduate NPs and PAs is growing, as evidenced by the increasing number of publications over the past 3 decades. In this scoping review, we found that articles about NPs are more prevalent than those about PAs, and articles about fellowships or residencies are more prevalent than those about onboarding programs. Furthermore, there is a notable focus on subspecialty and inpatient care in urban areas and academic health centers, demonstrating a mismatch with workforce supply and distribution problems in primary care, rural areas, safety-net, and nonacademic settings. Because onboarding programs might be scaled up more easily than fellowships or residencies in nonacademic settings, priority should be placed on researching onboarding programs in these settings. Additionally, as PAs are less often studied, as demonstrated by the results of this scoping review, inclusion of these clinicians in programs and subsequent evaluations is needed. Our scoping review was not designed to assess the risk of bias in outcome and cost evaluations, but the high proportion of abstracts and opinion articles in our sample does suggest that methodological rigor in this body of literature might be substandard. Our review also suggests a lack of funding to support publishable research in the area of TTP. Future research will need a stronger funding base to support rigorous outcome and cost evaluations of TTP programs for NPs and PAs, particularly in primary care, rural, safety-net, and nonacademic settings. To further develop and adequately support our healthcare workforce and improve care for patients, researchers must document whether and how TTP programs deliver on their intended purposes of improving outcomes for organizations, clinicians, and patients. **JAAPA**

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