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Mentoring in research-focused doctoral nursing programs and student perceptions of career readiness in the United States

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ABSTRACT

Background: Research-focused doctorate nursing programs are expanding and seek to double the number of doctoral-prepared nurses by 2020. There is little empirical evidence of the contributions of mentoring to doctoral nursing students' readiness for their desired careers.

Purpose: This study assessed characteristics and practices of nursing PhD students, the mentoring practices of their advisors, and the likelihood of self-reported career readiness.

Design: A nationwide descriptive, cross-sectional study of PhD students in the United States was conducted using an electronic survey platform. A sample of 380 PhD students representing 64 schools was surveyed from January to July 2016.

Methods: Descriptive statistics and ordered logistic regression were used to describe the sample and determine likelihood of career readiness by three readiness levels.

Findings: Results revealed greater likelihood of career readiness for students that: (1) perceived their proficiency in key scholarly skills as high, (2) were older, (3) worked a larger number of hours per week, (4) had more responsibilities outside of school, (5) had both advising and mentoring support, (6) had a co-advisor, and (7) attended a private university.

Conclusion: Enrollment targets should be based on a faculty-to-doctoral student ratio that optimizes advising and mentoring and schools should provide mentoring guidelines and training for faculty.

Introduction

Advancing nursing science requires academic institutions to train and launch nurse scientists that will develop successful programs of research and disseminate their findings. In 2014, there were 134 research-focused nursing doctoral programs (Doctor of Philosophy [PhD] and Doctor of Nursing Science [DNS]) in the United States (US) (American Association of Colleges of Nursing (AACN), 2015). The PhD and DNS degrees both focus on research in nursing science that is grounded in theory. The DNS is specific to nursing and is declining in use. The PhD is a more widely recognized degree and many universities now offer this research doctorate in nursing (Reid Ponte & Nicholas, 2015). Worldwide, the number of research-focused doctoral nursing programs increased 16.4% in the period from 2005 and 2012 (Kim et al., 2015). However, enrollment in research-focused doctoral nursing programs[1] is in decline. Following a peak in 2013 at 5122 enrollments, there has been a 9.6% decline to 4632 enrollments in 2017 in the US (AACN, 2018). Increasing the quantity of students in nursing PhD programs is essential to addressing the shortage of doctoral-prepared nurses and reaching the goal of doubling the number of doctoral-prepared nurses by 2020 (IOM, 2010). However, research-focused doctoral education in nursing must adequately prepare students for their nursing science careers. Faculty play a key role in ensuring high quality instruction. They create a scholarly environment that provides educational experiences, knowledge development, and cultivation of skills to prepare students as nurse scientists (Armstrong, McCurry, & Dluhy, 2017).

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[1] In this paper, research-focused doctoral nursing programs include Doctor of Philosophy (PhD), and Doctor of Nursing Science (DNS and DNSc) degree programs and exclude Doctor of Nursing Practice (DNP) degree programs.

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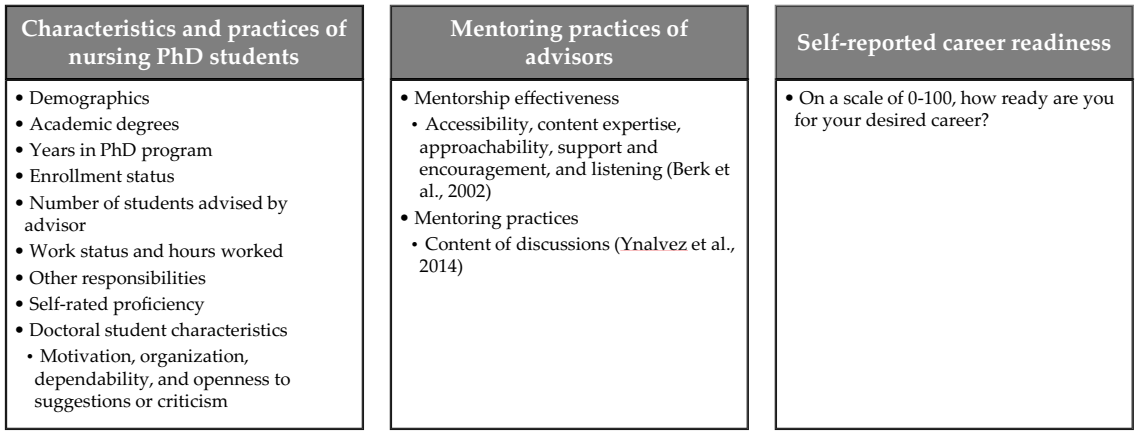

Fig. 1. Measures.

All doctoral students require advising from faculty members to monitor and facilitate progress in their programs. However, the nuanced role of mentoring is less prominent. Mentoring as an interpersonal relationship between a trained, experienced mentor and a novice mentee, which involves sharing knowledge and experience, providing emotional support, and giving professional guidance (Mijares, Baxley, & Bond, 2013) served as the theoretical definition of mentoring for our study. Ynalvez adds that mentors also provide opportunities that enable the mentee to become a full member of their profession (Ynalvez, Garza-Gongora, Ynalvez, & Hara, 2014). Despite these assertions, a review of the literature on mentoring stated that the construct lacks a precise definition and the authors suggested to more effectively study mentoring, research should include mentor-specific, mentee-specific, and relationship-specific data (Haggard, Dougherty, Turban, & Wilbanks, 2011).

The benefits of mentoring to students are well established in the literature. Mentors contribute to leadership training and support professional and personal development (Delgado & Mitchell, 2016; Feldman, Greenberg, Jaffe-Ruiz, Kaufman, & Cignarale, 2015). However, few studies systematically explore mentoring practices within PhD and DNS programs and the role mentoring plays in career readiness. As master's and doctoral degrees in nursing were gradually increasing from 1984 to the late 1990s (Buerhaus, Auerbach, Skinner, & Staiger, 2017), mentoring in nursing doctoral education was critically examined in the peer-reviewed literature (Lin, Chew, Toh, & Krishna, 2018; Mijares et al., 2013). However, these articles explored the role of mentoring conceptually; they did not offer empirical evidence on characteristics of mentoring in nursing PhD and DNS programs or the impact of mentoring from the student perspective. Findings from a qualitative study of students entering a nursing doctoral program affirmed the importance of faculty mentors for student progress and satisfaction, as well as preparation for success in the nurse researcher role (Nehls, Barber, & Rice, 2016). However, we cannot generalize findings from one US-based university.

Evidence-based mentoring guidelines could support faculty and doctoral students in selecting and undertaking learning experiences and preparing students for success in the expanding career options for doctoral-prepared nurses. However, there are no standardized guidelines describing mentoring practices for research doctorate nursing education. Likewise, key mentor and mentee characteristics that could effectively prepare students for nursing science careers have not been documented. While it may be reasonable to assume that mentoring positively impacts doctoral students' career readiness, this relationship has not been specifically examined, particularly in the context of research-focused doctoral education in nursing. Thus, among a nationwide sample of research-focused doctoral nursing programs and students in the US, this study aimed to assess characteristics and practices of nursing PhD students, the mentoring practices of their advisors, and the likelihood of self-reported career readiness.

Methods

Design, sample, and setting

A descriptive, cross-sectional survey design was used. Data were collected using a voluntary convenience sample. Sample size was computed using G*Power version 3.1.9.2 (Faul, Erdfelder, Lang, & Buchner, 2007). With an alpha of 0.05, power of 0.90, and an effect size of 0.05, the required sample size for statistical analysis was 336 participants. Schools eligible for inclusion in the study were identified using an AACN 2014 report that lists all US-based institutions offering doctoral programs in nursing and the degrees they confer (AACN, 2014). Schools conferring PhD or DNS degrees were eligible and 129 schools were invited to participate. From them, 380 PhD students participated, but no DNS students elected to participate. This study was reviewed and approved by the Johns Hopkins Medicine Institutional Review Board.

Data collection

Standardized email messages were sent to the dean or director of each of the 129 eligible PhD or DNS programs. The recipient was requested to share a link to an online survey with students currently enrolled in their programs. Three follow-up emails were sent at two-week intervals if no responses were received. Recipients could opt-out of further communication at any time. Data were collected from January 25, 2016 to July 3, 2016. Qualtrics® survey software was used for data collection (qualtrics.com, Provo, Utah).

Measures

Characteristics and practices of nursing PhD students

Demographic information (age, sex, and race) was self-reported (Figure 1). Data were collected on previously completed academic degrees, number of years the student was enrolled in the doctoral program, enrollment status (full-time or part-time), total number of advisees assigned to the respondent's advisor, whether the student had more than one academic advisor, whether the student worked (and number of hours worked per week), and whether the student had responsibilities in addition to their doctoral studies.

Self-rated proficiency within the context of a doctoral program in nursing was measured using questions inspired by and adapted from the American Association for the Advancement of Science (AAAS) Scientific Skills Assessment from the myIDP website (Fuhrmann, Lindstaedt, Hobin, & Clifford, 2015). Our 20-question instrument measuring self-

rated proficiency used a Likert-type scale ranging from highly deficient (1) to highly proficient (6). It included subscales examining: research knowledge; scholarly writing, professional presenting, and teaching; ethics knowledge; and professional skills. Higher scores indicate higher self-rated proficiency. The internal consistency of the self-rated proficiency instrument for this sample was 0.84.

Doctoral student characteristics (motivation, organization, dependability, and openness to suggestions or criticism) were assessed using an investigator-developed measure that asked, "To what degree would your advisor agree or disagree that you possess the following characteristics?" The characteristics were ranked using a 6-point Likert-type scale ranging from strongly disagree to strongly agree, which resulted in scores from 4 to 24. Higher scores indicate higher standing in the characteristic. The Cronbach's alpha of this instrument for this sample was 0.90.

Advisor characteristics and mentoring practices of the advisor

The terms advisor and mentor and advising and mentoring are often conflated. Despite some overlap, the roles of advisors and mentors and the actions of advising and mentoring differ (Bird, 2001; Titus & Ballou, 2013; Zamboanga et al., 2017). A recent review of mentoring in nursing broadly describes mentoring as "a guided process between a more experienced person and a less experienced professional" (Lin et al., 2018, p. E2) which aligns with our theoretical definition of mentoring for this study. Advising in educational programs, on the other hand, is the process of guiding a student through an academic program and achieving requirements (Zamboanga et al., 2017); this serves as the theoretical definition of advising for the present study. For many students launching into academia through a research-focused doctoral nursing program, their advisor is likely to be their only source of mentoring. Acknowledging this reality, we identified the student's advisor as the person most likely to provide mentoring and thus, we queried students about the mentoring practices of their advisors. To broadly understand student perceptions of their advisor, we asked students if they perceived their advisor more as an advisor, more as a mentor, or both.

We used Berk's Mentorship Effectiveness Scale (Berk, Berg, Mortimer, Walton-Moss, & Yeo, 2005) to measure the advisor's mentoring characteristics from the student's perspective. This 5-item instrument provides a 6-level Likert-type scale for responses ranging from strongly disagree to strongly agree; scores ranged from 5 to 30. The five mentoring characteristics assessed by students of their advisors were accessibility, content expertise, approachability, support and encouragement, and listening. Higher scores indicate a positive rating of the characteristic. This instrument's Cronbach's alpha for this sample was 0.91.

Students were also asked to respond to ten items from Ynalvez's Doctoral Mentoring Practices Questionnaire (Ynalvez et al., 2014) to determine the extent of mentoring-type discussions between advisor and student on professional and personal matters and activities. This 6-level Likert-type scale ranging from strongly disagree to strongly agree has a score range of 10 to 60. Higher scores are indicative of greater support for professional and personal matters and activities that are consistent with mentoring. This instrument had a Cronbach's alpha of 0.93 for this sample.

Self-reported career readiness

Perceived career readiness was assessed using a single item: "On a scale of 0-100, how ready are you for your desired career?" Students were also asked to identify their desired career setting post-graduation.

Characteristics of the school

The type of institution, public or private, was reported. Each school's ranking was determined according to U.S. News and World Report education rankings for nursing schools (U.S. News & World Report, 2016). This measure was included to determine if differences in career readiness could be explained by the performance of the school.

Data analysis

Data were downloaded from Qualtrics to a Microsoft Excel® spreadsheet and imported into Stata® version 14 statistical software for analysis (StataCorp LLC, College Station, Texas). Data were reviewed for accuracy and missing values.

Characteristics and practices of nursing PhD students, mentoring practices of advisors, self-reported career readiness, and school characteristics were examined using descriptive statistics. Differences in student characteristics were compared using *t*-tests for continuous variables and Pearson's Chi-square tests for categorical variables.

Generalized ordered logistic regression was used to examine which characteristics and practices of nursing PhD students and mentoring practices of advisors contributed to likelihood of self-reported career readiness. The continuous variable for perceived career readiness was ordered into tertiles based on the distribution of the data: minimally (score of 0–62), moderately (score of 63–84), and highly career-ready (score of 85–100). Covariates found to be significant at a level of $p < 0.05$ in simple ordered logistic regression were included in a generalized ordered logistic regression model to determine the odds of career readiness. Generalized ordered logistic regression provides a more parsimonious model than multinomial logistic regression while adjusting for violations of the proportional odds/parallel lines assumption (Williams, 2016). It also provides results that can be more easily operationalized in practice settings.

Results

Descriptive results

Among the 129 schools that were contacted, 126 were PhD programs and 3 were DNS programs. Sixty-four of the 129 schools participated in the study reflecting a 50% response rate. Of the 380 students who participated in the survey, 372 records were included in the analysis. Eight participant responses were excluded (< 5% of the total respondents) due to missing data on key mentoring-related or career readiness questions. Six of the respondents who were excluded opened the survey without answering any questions. The remaining two only answered demographic questions without answering any items pertaining to mentor/mentee characteristics, mentoring, or career-readiness. All respondents were in PhD programs. Aside from no DNS program participation, schools that participated and those that did not were not significantly different by: 1) public versus private or 2) US News & World Report, 2016 ranking (top 20 versus non-top 20 graduate nursing programs).

Characteristics and practices of nursing PhD students

A summary of respondent characteristics is shown in Table 1. The majority of respondents were White females that possessed an average of two degrees. Most student respondents had a bachelor's degree in nursing (71%) and a majority had a graduate degree (74% had a Master of Science in Nursing, 16% had a master's degree in another specialty, and < 1% had a doctorate in another field). Most respondents had responsibilities in addition to school and employment including: caring for a spouse (74%), dependents (47%), or older adult relatives (33%); performing volunteer work (31%); or attending to religious obligations (24%). The mean self-rated scientific proficiency score was 87.9 ± 13.4 (range: 20–120). Table 2 shows percent of students self-rating as proficient or highly proficient in research knowledge, scholarly writing, presentation skills, teaching, ethics knowledge, and professional skills.

A high percentage of students had positive reports of how they thought their advisors perceived them regarding motivation (93%), openness to suggestions or criticism (93%), dependability (92%), and

Table 1
Summary of sample student characteristics and comparison of student characteristics based on career readiness status.

	Study sample n = 372		Minimally career-ready n = 124		Moderately career-ready n = 134		Highly career-ready n = 114		*p*
	M (SD)	N (%)	M (SD)	N (%)	M (SD)	N (%)	M (SD)	N (%)	
Demographic characteristics									
Age (years)	40.49 (10.07)		37.56 (9.49)		39.50 (10.25)		44.85 (9.01)		< 0.001
Female		337 (90.59)		113 (91.13)		120 (89.55)		104 (91.23)	0.88
Male		35 (9.41)		11 (8.87)		14 (10.45)		10 (8.77)	
Race									0.06
White		255 (68.55)		78 (62.90)		92 (68.66)		85 (74.56)	
Black/African American		33 (8.87)		15 (12.10)		7 (5.22)		11 (9.65)	
Asian		45 (12.10)		19 (15.32)		18 (13.43)		8 (7.02)	
Hispanic/Latinx		17 (4.57)		7 (5.65)		4 (2.99)		6 (5.26)	
Other		22 (5.91)		5 (4.03)		13 (9.70)		4 (3.51)	
Education									
Number of completed degree(s)	1.86 (0.74)		1.83 (0.74)		1.82 (0.74)		1.95 (0.74)		0.34
Current year in PhD program									< 0.001
First		79 (21.24)		45 (36.29)		22 (16.41)		12 (10.53)	
Second		71 (19.09)		29 (23.39)		27 (20.15)		15 (13.16)	
Third		83 (22.31)		17 (13.71)		36 (26.87)		30 (26.32)	
Fourth		71 (19.09)		20 (16.13)		23 (17.16)		28 (24.56)	
Fifth		40 (10.75)		7 (5.65)		14 (10.45)		19 (16.67)	
Sixth or more		28 (7.53)		6 (4.84)		12 (8.96)		10 (8.77)	
Enrollment status									0.003
Full-time		280 (75.27)		98 (79.03)		109 (81.34)		73 (64.04)	
Part-time		92 (24.73)		26 (20.97)		25 (18.66)		41 (35.96)	
Work status									
Works in addition to doctoral studies		303 (81.45)		94 (75.81)		105 (78.36)		104 (91.23)	0.005
Does not work		69 (18.55)		30 (24.19)		29 (21.64)		10 (8.77)	
Number of hours worked per week (n = 303)	31.90 (13.28)		23.47 (17.40)		21.87 (16.82)		33.57 (15.16)		< 0.001

organization (90%). A high percentage of students also had positive reports of mentorship characteristics of their advisors: approachable (92%), supportive (92%), content expert (87%), good listener (87%), and accessible (86%).

Mentoring practices of advisors

Five percent of respondents reported their advisor was more like a mentor, and 45% reported that the advisor filled both roles of advisor and mentor. Among those who reported having access to both advising and mentoring (n = 168), 93% said it was the same person. Of those who reported having a different advisor and mentor (n = 12), 83% reported the mentor was another faculty member.

Figure 2 summarizes student reports of mentoring practices exhibited by their advisor. Overall, advisors were most likely to mentor students by discussing research concerns, monitoring program progress, and discussing career plans with the student. Advisors were least likely to mentor students on drafting their curriculum vitae and preparing for interviews.

Self-reported career readiness and desired careers

About half of respondents (50.7%) reported a desired career post-graduation in a combined academic research and teaching position. The next two highest proportion categories of desired careers were tied. One focused on research in a non-academic setting and the other had teaching as their primary responsibility (n = 49; 13.2% of respondents for each). The smallest proportion reflected an interest in administrative positions (n = 23; 6.2%).

Table 3 shows the results of generalized ordered logistic regression as odds ratios. Compared to students who rated themselves as minimally career-ready, students who rated themselves moderately and highly career-ready have a greater likelihood of having higher self-rated proficiency, more hours worked per week, more responsibilities outside the PhD program, a co-advisor, access to both advising and mentoring, and attending a private school. Students who are Black/African American were 85% less likely to rate themselves as moderately or highly career ready compared to their White counterparts. Similarly, compared to students who rated themselves minimally and moderately career-ready, students who rated themselves highly career-ready have a greater likelihood of having higher-rated self-proficiency, more hours worked per week, more responsibilities outside of the PhD program, a co-advisor, and attending a private school. Students who reported being highly career-ready had a greater likelihood of being older compared to students who were minimally and moderately career-ready.

Discussion

This nationwide survey revealed seven factors that increased the odds of a research-focused doctoral student perceiving they are

Table 2
Students' self-rated proficiency scores in research knowledge, scholarly writing, professional presenting, teaching, ethics, and professional skills (n = 372).

Students' self-rated proficiency subscale	Subscale number of items	Subscale score range	Subscale score M (SD)	Percent self-rating as proficient or highly proficient
Research knowledge	5	5–30	22 (10.07)	26.1
Scholarly writing, professional presenting, and teaching	7	7–42	28.6 (5.8)	20.5
Ethics knowledge	3	3–18	14.3 (2.8)	55.0
Professional skills	5	5–30	22.6 (4.2)	35.3

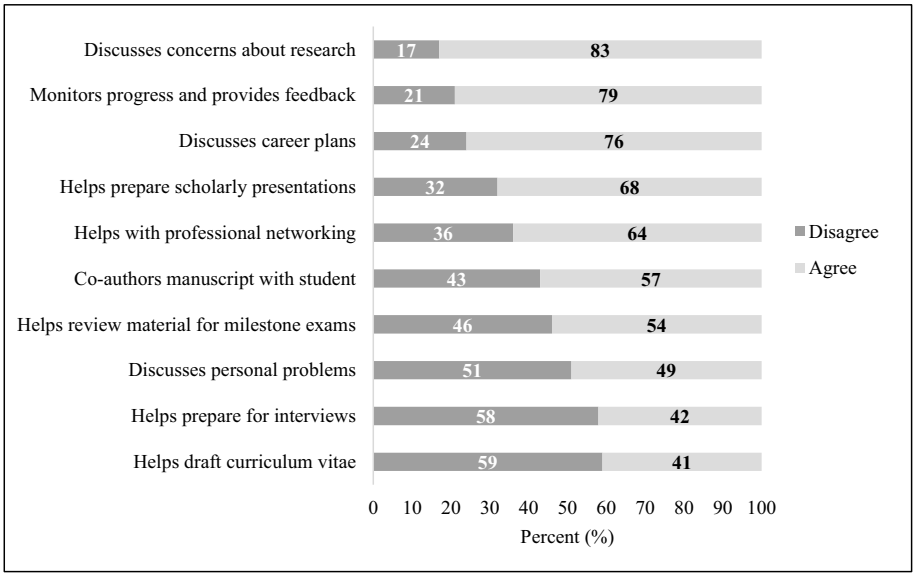

Fig. 2. Summary of Mentoring Practices exhibited by the Advisor (n = 372).

Table 3
Generalized ordered logistic regression of odds of career readiness.

	Minimally career ready compared to moderately + highly career ready		Minimally + moderately career ready compared to highly career-ready	
	Adjusted odds ratio (95% CI)	*p*	Adjusted odds ratio (95% CI)	*p*
Self-rated proficiency	**1.07 (1.05–1.10)**	**< 0.001**	**1.07 (1.05–1.10)**	**< 0.001**
Age	1.00 (0.96–1.03)	0.929	**1.06 (1.02–1.10)**	**0.002**
Race/ethnicity				
White	Reference		Reference	
Black/African American	**0.15 (0.05–0.44)**	**0.001**	0.79 (0.24–2.64)	0.707
Asian	0.86 (0.38–1.90)	0.702	0.86 (0.38–1.90)	0.702
Hispanic/Latinx	2.93 (0.69–12.43)	0.143	2.94 (0.69–12.43)	0.143
Other	1.83 (0.59–5.70)	0.300	1.83 (0.59–5.70)	0.300
Year in PhD program	1.20 (0.98–1.47)	0.072	1.20 (0.98–1.47)	0.072
Enrollment status				
Full-time	Reference		Reference	
Part-time	1.12 (0.50–2.49)	0.780	1.12 (0.50–2.49)	0.780
Work status				
Currently working	Reference		Reference	
Not currently working	1.05 (0.40–2.75)	0.920	1.05 (0.40–2.75)	0.920
Hours worked per week among students reporting currently working (n = 303)	**1.03 (1.01–1.06)**	**0.037**	**1.03 (1.01–1.06)**	**0.037**
Number of other responsibilities	**1.40 (1.12–1.76)**	**0.003**	**1.40 (1.12–1.76)**	**0.003**
Co-advisor	**1.89 (1.03–3.48)**	**0.040**	**1.89 (1.03–3.48)**	**0.040**
Type of advisor support received				
Advising	Reference		Reference	
Mentoring	2.09 (0.65–6.76)	0.219	2.09 (0.65–6.76)	0.219
Both	**2.52 (1.17–5.44)**	**0.018**	0.51 (0.23–1.13)	0.095
Number of students advised by advisor	1.35 (0.87–2.09)	0.175	1.35 (0.87–2.09)	0.175
School type				
Public	Reference		Reference	
Private	**3.81 (1.93–7.50)**	**< 0.001**	**3.81 (1.93–7.50)**	**< 0.001**
School ranking				
Top 20 school	Reference		Reference	
Non-top 20 school	1.33 (0.69–2.53)	0.392	1.33 (0.69–2.53)	0.392

Bolded items delineate statistically significant values.

moderately or highly ready to undertake their desired career: high self-rated proficiency in key scholarly skills, older age, larger number of hours worked per week, larger number of responsibilities outside of school, having a co-advisor, having access to both advising and mentoring, and attending a private versus public university. Students who self-reported as Black/African American had a lower likelihood of being moderately or highly career ready compared to students who self-reported as White. Mentoring practices were not found to be significant predictors of career readiness. However, having one or more person fulfilling the roles of advisor and mentor, and having more than one advisor were shown to predict higher levels of career readiness.

This study found that most students viewed their own mentee characteristics and their advisor's mentoring characteristics favorably. A majority of the students reported that their advisors perceived them

as motivated, open to criticism, dependable, and organized. Similarly, over 85% of the students reported that their advisors were approachable, supportive, accessible, good listeners, and expert in their field. However, there was wide variation in student perceptions of mentoring practices by their advisors (see Figure 1). The variation is important given established knowledge of the purposes and benefits of mentoring (Delgado & Mitchell, 2016; Feldman et al., 2015; Records & Emerson, 2003). Mentorship in PhD nursing education should cultivate academic and professional skills to enhance career readiness through the interpersonal relationship between student and advisor. Ample support should be provided to doctoral nursing students by providing a co-advisor when appropriate and ensuring the student has access to both advising and mentoring. Mentoring can help students develop proficiency in scholarly writing and presenting, teaching, ethics competency, and development of professional skills. Given the results of our analysis identifying substantial demands outside students' doctoral studies, students may benefit from mentorship that considers how personal responsibilities affect academic performance. We found that students who manage a greater number of responsibilities in addition to school had increased odds of being highly or moderately career-ready. We also found that as students worked more hours per week, they rated themselves more career ready. Many institutions discourage students from working during their doctoral program to facilitate full-time focus on their studies. Our findings provide evidence to counter this argument. In line with this finding, we also saw that students who were older reported feeling greater readiness for their new career. This may be due to the development of productive work habits. And while not specifically examined in our study, older students may have experience in managing more responsibilities in their lives outside of school which may then translate to managing the responsibilities of their academic role.

To ensure a good match between students and their advisors and mentors, a comprehensive approach might include an intake assessment followed by a discussion between student and advisor about preferred mentoring styles and learning styles as opposed to the more common approach of matching based on topic alone. An understanding of the student's openness to feedback in the mentoring relationship may be important for mentors when framing how to deliver feedback, as has been documented in other studies (Lester, Hannah, Harms, Vogelgesang, & Avolio, 2011). Trust in the mentor-mentee relationship has also been shown to be a crucial element for openness to feedback and development of essential leadership skills (Lester et al., 2011). Mentors that exemplify “ability, benevolence, and integrity” have the greatest likelihood of building trust with their mentees (Lester et al., 2011, p. 424). To facilitate openness to feedback and development of a trusting relationship, it may be helpful to introduce mentoring topics in student orientation and revisit them in required seminars. Raising awareness of standard mentoring practices and receiving encouragement from their peers may facilitate a more productive mentor-mentee relationship. Another approach is to provide a roadmap with benchmarks for mentors and students that include topics to address as students progress in their program. This may help both parties prompt discussion of topics proactively. Without such guidance, interactions might exclusively focus on urgent matters instead of longer-term objectives that the mentor is uniquely suited to address.

As schools of nursing and funding mechanisms seek to increase enrollees and shorten the duration of nursing PhD programs, providing thorough mentoring for students may be even more difficult to achieve. Preparing students for the responsibilities of faculty positions and other career paths involving research takes time. While there are benefits to growing PhD programs and reducing program duration, nursing schools should consider establishing quality standards for mentoring practices. This may include providing an effort allocation for every student a faculty member advises to accommodate frequent meetings so that advising and mentoring objectives can be attained.

While Nursing PhD programs have increased enrollment of racial and ethnic minority students from 21% in 2007 to 32.8% in 2017, diversity lags the US population where 39.7% identify as non-White (AACN, 2017; US Census, 2016). Hispanic and Latinx (Latino and Latina) students are most affected. In 2016, 5.8% of students were Hispanic or Latinx compared to 17.8% of the general population (AACN, 2017; US Census, 2016). Furthermore, our study finding that Black/African American doctoral students have a lower likelihood of being moderately or highly career-ready compared to White students may foreshadow challenges minority students face early in the faculty pipeline. Further research is needed to understand why Black/African American students were less likely to rate themselves as moderately or highly career-ready.

Diversity is also a challenge among the full-time nurse faculty workforce where only 14.1% are from minority backgrounds (AACN, 2015). A recent survey of nursing faculty found that minorities perceive hiring bias due to their physical appearance and speech patterns, and the main challenges to retention are lack of mentorship and financial assistance, including their compensation package and funding for further training and certifications (Salvucci & Lawless, 2016). Mentoring may be more effective when mentors reflect students' racial, ethnic, linguistic, gender, and sexual orientation.

The 2011 IOM report calls for the preparation of more doctoral-prepared nurses to fill the nurse faculty gap. Our study found a substantial proportion of students plan to seek a research and teaching position in an academic setting. Schools of nursing should provide explicit guidance to students and faculty on how to proactively and specifically address the domains of mentorship that will support student transition into careers as faculty members.

Global application

This study is globally applicable despite its US sample given that effective mentoring is required in research-focused doctoral nursing programs worldwide. Terminology may vary; for example, in Europe, the supervisor approximates the advisor in the US. Nevertheless, students in research-focused doctoral programs require support from one or more senior researchers designated to guide, aide, and support the student as they develop their research skills and prepare to launch in their desired career. Standards for health sciences PhD programs in Europe (ORPHEUS/AMSE/WFME Task Force, 2012) and reforms established by the Salzburg Principles (European University Association, 2010), include activities considered mentoring practices in this study. These include considering workload when determining the number of students managed by a supervisor, shared responsibilities and contributions from both student and supervisor, co-supervision when relevant, support for career development, and flexibility in the selection of a supervisor.

Limitations

The nationwide sample of mostly White females, was a convenience sample, which limits generalizability of the findings. Respondents may have been international students or people with disabilities that have unique mentoring needs (e.g., need for role models with similar backgrounds and research interests) (The Regents of the University of Michigan, 2015), but we did not capture this data. In addition, information on the total number of research-focused doctoral students enrolled during the study period was not collected; hence student-level response rate could not be calculated. The self-reported data may be biased if respondents felt compelled to answer survey items in a socially desirable way, but anonymity of the survey may have countered this potential limitation. Although mentoring is reciprocal, this study focused on the student perspective; future studies may benefit from linking students and faculty as dyads.

Conclusion

The findings of this study support the importance of mentoring, and in particular, mentoring provided by advisors. Enrollment targets should consider an advisor-to-student ratio that optimizes the student's opportunity to obtain mentoring from their advisor, in addition to academic advising. Developing, disseminating, and promoting guidelines on mentoring may help faculty understand the importance, characteristics, and practices of mentoring while establishing mentoring norms for faculty and students. Our findings suggesting that students who are Black/African American are less likely to be moderately or highly career ready requires that these students' mentoring needs be addressed in a more intentional manner to increase their potential for success as nurse scientists. Programming decisions, such as faculty recruitment plans including faculty diversity, program growth targets, and budget projections should consider mentoring effort.

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