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Barrier for BSN students to pursue a PhD in nursing and recommendations to address them: A scoping review

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Abstract

Background: Increasing the BSN-PhD pipeline could address the shortage of nursing faculty to conduct research, develop nursing science, and train new nurses and faculty.

Purpose: To identify barriers to BSN students' pursuit of PhD education, and to compile recommendations to increase their numbers.

Methods: This scoping review follows PRISMA guidelines, including articles in English that discussed barriers to BSN students' pursuit of PhD education and recommendations to address them.

Findings: Barriers to pursuing a PhD include misunderstanding PhD education and its impact on population-level health, insufficient funding for PhD studies, and perceived need for clinical experience. BSN program recommendations include education on doctoral and postdoctoral options, mentorship, and hands-on research experiences. PhD programs should be accessible, fully funded, and address students' perceived need for clinical experience.

Discussion: The nursing profession must take coordinated action across individual, interpersonal, program, policy, and cultural levels to increase the pipeline of well-prepared BSN-PhD students.

Keywords

Nursing education; PhD in nursing; nursing research; BSN-PhD; Doctoral study; Faculty shortage

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Background

Nurses with advanced education are needed in large numbers to serve as teachers, scientists, and leaders in the increasingly complex healthcare system in the U.S. (National League for Nursing, 2010). Unfortunately, less than 2% of nurses have their doctoral degree in nursing (American Association of Colleges of Nursing [AACN], 2019). To address this shortage, the Institute of Medicine (IOM) and Robert Wood Johnson Foundation recommended in 2010 that at least 10% of baccalaureate program graduates enter masters or doctoral degree programs within five years of graduation, and that the number of nurses who pursue doctoral education be doubled by 2020 (IOM, 2011). The goal to double the number of nurses who pursue doctoral education was achieved in 2017 (AACN, 2020a), due to the significant increase in the number of nurses who completed their Doctor of Nursing Practice (DNP) degree. Almost 40,000 nurses graduated with their DNP and only 7,000 graduated with their Doctor of Philosophy (PhD) since 2010.

While celebrating the increase in DNP enrolment, the flat PhD enrolment rate is of significant and urgent concern to the nursing profession, as many PhD-prepared faculty retire without sufficient incoming PhD graduates to replace them (AACN, 2020b). PhD-prepared nurse scientists are essential to develop an evidence base to inform clinical practice, evaluate and improve current nursing intervention, and innovate new ways to improve the lives of individuals across the lifespan (Grady & Gough, 2015). Autonomy in developing a rigorous body of research to inform practice is a necessary characteristic of a profession (Smith, 2019). Thus, not only is the health of patients at risk if nursing research is not sufficiently developed to inform clinical practice, but the field of nursing's identity as a profession is on the line.

Since the AACN's pivotal report on research-focused doctoral programs in nursing shed light on this crisis (2010), many leaders in the field have begun to devote concerted efforts towards expanding nurse enrolment in PhD programs. The number of data-based and discussion articles on facilitating Bachelor of Nursing Science (BSN) students' and graduates' pursuit of PhD education has now reached a critical mass. However, to our knowledge, the existing literature has not been subjected to organized review, precluding nursing professionals from using all available knowledge to increase the BSN-PhD pipeline. Thus, the purpose of this paper is to extract from existing literature the barriers for BSN students and graduates to pursue their PhDs, and to synthesize published recommendations for students, BSN mentors, BSN programs, BSN-PhD direct admit programs, PhD programs, and cultures at large.

Methods

Design

This is a scoping review, which is performed by systematically searching, selecting, and synthesizing existing literature to map key concepts in an area of research that has not been previously comprehensively reviewed (Arksey & O'Malley, 2005). Scoping reviews are useful in identifying knowledge gaps, setting research agendas, and identifying implications for decision-making (Tricco et al., 2016). The five stages of a scoping review developed

by Arksey & O'Malley (2005) guide our analysis: 1) identifying the research question, 2) identifying relevant studies, 3) study screening and selection, 4) charting the data, and 5) collating, summarizing, and reporting the results.

Identifying the Research Question

This study is guided by the research question, "What are barriers for BSN students and graduates to pursue their PhD, and what are data-based recommendations to address them?"

Identifying Relevant Studies

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) criteria guided the literature search and record-keeping strategies (Figure 1). Four electronic databases (PubMed, PsycInfo, Cumulative Index to Nursing and Allied Health Literature [CINAHL], and Embase) were searched to identify relevant articles as of 3/15/2021, updated by rerunning searches. Search terms were grouped into three key concepts of interest, separated by the Boolean operator 'AND.' These include:

- a. BSN Students (Terms: undergraduate, BSN, bachelor, bachelors & bachelor's)
 - b. Nursing profession (Term: nursing)
 - c. PhD or research doctorate (Terms: PhD, Ph.D., doctorate, doctoral, BSN-PhD)
- Controlled vocabulary mapped onto these three central constructs, and varied between databases. To capture all relevant studies, no timeframe restriction was applied, because to our knowledge such a review has never been conducted. No search filters were used. The reference sections of included articles were examined to hand-search additional articles. Duplicates were removed using EndNote X9 and visually checked by alphabetizing.

Study Screening and Selection

Inclusion and Exclusion Criteria

Articles included were those written in the English language that identified barriers for BSN students to pursue a PhD in Nursing. Additionally included were articles that made recommendations for approaches that individuals, programs, institutions, and wider cultures can implement to increase the number of BSN students who pursue their PhD. Articles about this topic from countries outside the U.S. were excluded.

Data Extraction

Both authors independently extracted the data using two steps. First, we read the articles for their overarching premise, study purpose, design, and data sources. Secondly, we extracted barriers for BSN students to pursue their PhD, followed by articles' overall recommendations for change. Any discrepancies between the analyses conducted by the two authors were revisited and resolved through discussion and returning to the articles in question.

Charting the Data

The results and discussion sections of this scoping review are guided by the Bronfenbrenner ecological framework. According to Bronfenbrenner, human beings create the environments that shape the course of human development (Bronfenbrenner, 2004). A person's development occurs within a complex environment with multiple levels of influence. These levels are described as microsystems, mesosystems, exosystems, and macrosystems (Bronfenbrenner, 1977, 1979, 1994, 2004).

The *microsystem* focuses on the individual-level factors that impact individuals' behaviors. The individual-level factors are unique to the person and based on their experiences within their environment. Microsystem experiences have cumulative effects on BSN students that eventually affect their graduate school decisions. The *mesosystem* is a set of microsystems; that is, a series of interactions between the individual and their families, schools, and social life. These include interactions between two students, students and nurses, students and mentors, etc., which influence their graduate school decision-making.

The *exosystem* refers to interactions between various settings that do not involve the individual as an active participant but in which events occur that affect processes within the microsystem (Ayoola, et al., 2017). Some of the factors at this level are programs, policies, and regulations that could affect graduate school decisions. The *macrosystems* are the cultures and subcultures that are embedded in each of the systems (Bronfenbrenner, 1994). Macrosystem factors include belief systems and patterns of social interactions within the nursing profession and academia that are deeply rooted in each of these systems (Bronfenbrenner, 1994).

The barriers for BSN students or graduates to pursue their PhD are presented based on identified individual (microsystems), interpersonal (mesosystem), program/policy factors (exosystem), and existing culture, subculture, or belief systems (macrosystem). These are discussed by considering how they impacts decisions to pursue a PhD degree in nursing the U.S.

Collating, Summarizing, and Reporting the Results

There were 24 articles included in this review (Table 1). Studies varied widely in design. Figure 2 shows the studies' designs, and Figure 3 places each study on the hierarchy of evidence, adapted to the purpose of this study.

Sample sizes reported in the reviewed studies (excluding discussion papers and case studies) ranged from $n=4$ (qualitative Delphi study; Xu et al., 2018) to $n=1078$ (cross-sectional internet survey; Bond, 2017). Across studies, the median sample size was $n=56$, and the mean was $n=268.2$. The total number of participants across studies was $n=3,621$. This included 1,421 BSN students, 272 masters' students, 1,569 PhD students, 54 students in BSN-PhD direct entry programs, 6 faculty members, and 299 students whose level of education was not specified by the authors (BSN, masters, DNP, or PhD). In addition, two studies evaluated a total of 81 BSN-PhD programs (Ellenbecker & Kazmi, 2014; Megginson, 2011).

Barriers to the Pursuit of PhD in Nursing

Table 2 summarizes the barriers to BSN students deciding to pursue a PhD in nursing.

Lack of Awareness or Understanding of PhD Education (Microsystem)—Lack of awareness or understanding of PhD education is a major problem that affects whether BSN students pursue their PhD or not. Many students have simply not heard of the PhD route (Nehls & Rice, 2014; Smith et al., 2016), or have only heard it mentioned in the periphery without considering it to be a real option. (Ellenbecker & Kazmi, 2014). Even if students have heard of the PhD, they often misunderstand what it means. Many lack clarity about the differences between the PhD and DNP degrees (Dreifuerst et al., 2016). Others are confused about the role of PhD nurse scientists and whether/how they impact society (Salerno et al., 2017; Stanfill et al., 2019). Still others do not understand the research process (Salerno et al., 2017), and this unknown is intimidating. Even students who desire to pursue a PhD often do not know that they can be admitted right out of their BSN program in time to apply (Squires et al., 2014). Overall, BSN students are often confused about the broad range of practice roles, specialties, career options, and educational paths available to them as nurses (Taylor & Terhaar, 2018). This lack of understanding likely prevents many promising students from pursuing doctoral degrees.

Limited Futuristic Thoughts or Plans (Microsystem)—BSN graduates often emerge from expensive undergraduate programs with significant debt. Even very bright students have not always thought beyond graduation except for getting a job and paying off student loans (Ayoola et al., 2017). Many BSN graduates are also young and may lack maturity and understanding of graduate education without significant outside guidance (Ellenbecker & Kazmi, 2014). In addition, the technical nursing skills and new professional language that BSN students must adopt is all-consuming. This memorizing and regurgitating mindset is often in direct opposition to becoming a questioner of the phenomena at hand as is needed for research (McGivern, 2003). Lastly, a common reason individuals become nurses is “to help people,” but nurses and BSN students often lack awareness of the large-scale impact they can have on health disparities as PhD-prepared researchers (Salerno et al., 2017).

Perception of Limited Time and Energy for PhD Education (Microsystem, Mesosystem, Exosystem)—During their BSN, many students perceive little extra time to engage in research (Abbot-Anderson et al., 2016) or think about pursuing graduate education (Ayoola et al., 2017). Some students who do consider graduate school believe it will take too much time and energy, and they need a break from school (Squires et al., 2014; Taylor & Terhaar, 2018). The significant academic challenge of PhD studies is perceived as too high of a barrier for some students (Peterson et al., 2015). In addition, many students deciding between a DNP and a PhD believe that a PhD will take several more years to complete than a DNP (Dreifuerst et al., 2016; Neuberger, 2016).

In graduate education, there is an ongoing concern about work-life balance. A general concern about rigor of graduate programs could affect graduate school decisions. The need to maintain good academic status in graduate school as well as ensure financial support increases the risk of graduate students being overstretched (Peterson et al., 2015; Joseph et

al., 2020). This increases the perception that the time and energy needed to complete PhD education are too high a barrier.

Family and Work Conflicts (Mesosystem)—Family responsibilities and conflicting priorities are a significant barrier to the pursuit of PhD study (Taylor & Terhaar, 2018). Women tend to take more responsibility for childcare than men do (Pleck & Masciadrelli, 2004), and often to make career decisions and sacrifices with family in mind. In the female-dominated profession of nursing, needs of children or plans to have children may override nurses' desires to pursue graduate study (Squires et al., 2014; Xu et al., 2018). Indeed, conflicts with work schedules and time spent away from family tend to interfere with the significant amount of studying and writing necessary to earn a PhD (Dreifuerst et al., 2016; Squires et al., 2014). Increasing family and work conflicts thus provide a plausible explanation for why older candidates are less likely to want to pursue doctoral education (Squires et al., 2014).

Desire or Perceived Need to Have a Clinical Practice (Microsystem, Mesosystem)—Some BSN students may desire to pursue a PhD at some point but feel that they are not ready to enter a PhD program immediately after their BSN. This can happen when students do not know their research interests (Smith et al., 2016), and hope that clinical practice will help them decide. More commonly, students believe that they need clinical experience before beginning a PhD. Bond (2017) found that even students who wanted to pursue a PhD planned to work an average of 5.8 years prior to pursuing a faculty role. This may be of concern because older candidates are less likely to want to progress to the PhD level compared to younger candidates (Squires et al., 2014). Students usually seek clinical experience prior to their PhD for one of three reasons. First, because they yearn to put into practice the skills and clinical knowledge they gleaned in their BSN (Nehls & Rice, 2014; Squires et al., 2014). Second, because they believe that clinical practice is required to enter a PhD program (Greene et al., 2020; Nehls et al., 2016; Peterson et al., 2015; Smith et al., 2016), or that it is required to hold the identity of a 'nurse' (Xu et al., 2018). Third, to establish themselves professionally, so that they can continue working part time during their PhD studies, which is usually impossible for new BSN graduates (Xu et al., 2018).

Expecting incoming PhD students to have clinical experience is an ingrained norm in the nursing profession on many levels. Institutions hold structural bias towards practicing before advancing in education (Ellenbecker & Kazmi, 2014; Taylor & Terhaar, 2018). Some faculty believe that lack of clinical experience will prevent emerging researchers from asking clinically important research questions (Greene et al., 2020), and thus encourage their mentees to gain as much clinical experience as possible before entering graduate studies (Vance et al., 2020).

Perceived Low Quality of Life for PhD Students and Researchers (Microsystem, Mesosystem)—Many BSN students believe that PhD students have low quality of life (Ellenbecker & Kazmi, 2014). This perception can be reinforced if students see their mentors feeling frequently overwhelmed by the demands of the faculty role (Nehls et al., 2016). The shortage of faculty members with PhDs and the increasing demand for their expertise in many programs could increase the possibility of being overstretched. The

need to maintain rigorous scholarship and continue streams of funding and publications could increase the perception of stress among PhD students and their mentors (Nehls et al., 2016).

Negative Beliefs and Misconceptions About Research (Microsystem, Mesosystem, Macrosystem)—Many students view research as boring, tedious and socially isolated (Ayoola et al., 2017; Peterson et al, 2015; Xu et al, 2018). Others believe that research is awful, overwhelming, and too hard (Smith et al., 2016). Some BSN students dislike the required research course, perform poorly on critiques of research reports, and feel that they will never understand the research process (McGivern, 2003). These feelings and attitudes are discouraging and steer many students away from careers in research. Some students also believe that careers in nursing research are limiting. For example, that research can only take place in a laboratory with Petri dishes (Ayoola et al., 2017), or that nursing research is limited to the hospital setting (Smith et al., 2016).

Faculty mentors play an important role in the decision-making process for BSN students. If faculty members are not enthusiastic about research or have negative beliefs or attitudes about research, it could negatively impact the students' decision to pursue a PhD program. The dominant culture in the institutions affects the beliefs expressed by faculty members and the programmatic practices in place. Some academic institutions would be described as teaching-intensive institutions while some others would be described as research-intensive institutions (McGivern, 2003), each with varying degrees of research. Whichever is the dominant culture in an institution could impact the desire of BSN students to pursue their PhD in nursing (Nehls et al., 2016).

Institutional Beliefs About Practice, Funding, and Mentoring (Macrosystem)—An institution's culture about the importance of practice versus research and a belief that places precedence on practice over research could also impact nursing students' perception of PhD degrees. The amount of priority placed on ensuring that new tenure track faculty members have time, funding, and mentoring needed to grow to be a role model to their students, especially in a non-research intensive institution, could also impact a BSN student's decision to pursue a PhD program in nursing (Stanfill, 2019).

Non-Competitive Salaries (Mesosystem, Exosystem)—Many potential applicants to PhD programs already hold nursing jobs with much higher salaries than PhD stipends (Ellenbecker & Kazmi, 2014; Xu et al., 2018), even assuming that they are offered a fully funded fellowship. Relatively lower starting salaries paid to PhD graduates as assistant professors and the need to sustain an established lifestyle could make it challenging for practicing nurses to go back for PhD education. Even after earning a PhD, starting salaries are lower for assistant professors compared to nurse practitioners (DeYoung et al., 2002; Neuberger, 2016; Xu et al., 2018), encouraging many to choose the DNP route. Indeed, Dreifufer et al. (2016) found that only 61% of their sample of PhD graduates (n = 43) reported receiving a raise after completing their PhD.

Funding and Finances for PhD Programs (Exosystem)—Financial reasons are one of the largest barriers for BSN students to pursue PhD education (Ellenbecker & Kazmi,

2014; Peterson et al., 2015; Taylor & Terhaar, 2018). Students nearly always endorse the huge impact of funding on their decision to proceed, forgo, or delay PhD study (Nehls et al., 2016). Financial concerns often involve high amounts of student debt, the financial impact on students' families of leaving work for school, and the uncertainty about job prospects after graduation (Squires et al., 2014). Thus, many students need to work full time while getting their doctoral degree (Dreifuerst et al., 2016), which is not always feasible. In addition, fellowship funding to support tuition, benefits, and cost of living is usually sparse (Greene et al., 2020; Stanfill et al., 2019; Vance et al., 2020). Nursing research, in general, is underfunded (Vance et al., 2020), and there is a limited number of well-funded mentors in nursing doctoral programs to support students and their research (Vance et al., 2020).

Insufficient Number or Quality of Research Mentors (Exosystem)—In BSN programs, there are not enough mentors to provide BSN students with mentorship, engaging research opportunities, role modeling of leadership in positions requiring a PhD, and guidance in seeking PhD education (Stanfill et al., 2019). This may be because programs lack extra funding for faculty to expend significant effort mentoring students (McGivern, 2003). Faculty rarely, if ever, receive time bought out, teaching credits, or even professional commendation for mentorship of undergraduate students. In addition, some faculty who identify strongly as researchers care more about their research than student mentorship (DeYoung et al., 2002), likely decreasing the availability of passionate and capable research mentors. Conversely, faculty who are passionate about teaching may be less enthusiastic about research, and thus less likely to pass on a strong interest in research to their mentees. Later, when BSN students apply to PhD programs, there are often insufficient research faculty and experienced advisors (Ellenbecker & Kazmi, 2014), such that students cannot always find a PhD advisor who is a good fit in terms of research interests and working style.

GRE Requirement (Exosystem)—Several potential applicants to PhD programs report that the requirement to take the GRE is a barrier to them even applying (Katz et al., 2009; Megginson, 2011). Older applicants may also struggle to perform well on the GRE (Squires et al., 2014), as many of the topics covered (i.e. algebra, geometry, physics, and English literature) are not included in BSN curricula. Students in BSN programs often have busy schedules and high levels of stress and exhaustion. Due to time and/or cost, many cannot take a GRE preparatory course, and may not be willing to invest over \$200 to take the examination relying only on self-guided preparation (Katz et al., 2009). In addition, Katz et al. (2009) found that GRE scores are not predictive of student GPA in nursing PhD programs. Schools of nursing very often use GRE scores to make admission decisions, but few programs have tested the validity of GRE scores as predictors of academic performance (Megginson, 2011).

Concerns About Unpreparedness to Teach (Mesosystem)—Many students who pursue PhDs are interested in future faculty roles, which generally include research, teaching, and service. However, many PhD programs are heavily focused on research, and offer little opportunity to gain formal instruction in pedagogy or teaching experience (Nehls et al., 2016). When considering PhD programs that include research only, some potential

applicants are thus concerned that they will emerge unprepared to take on a teaching faculty role (Dreifuerst et al., 2016; Nehls et al., 2016).

Recommendations from the Reviewed Studies

The studies reviewed presented recommendations across programs level (BSN, BSN-PhD, and PhD). A summary of the recommendations is presented in Figure 4. Most of the articles recommend that BSN, BSN-PhD, and PhD programs provide extensive mentorship and research funding for BSN students that could increase their desire to pursue a PhD degree in nursing (DeYoung et al., 2002; Fang et al., 2016; Nehls et al., 2016; Peterson et al., 2015; Squires et al., 2014; Taylor & Terhaar, 2018). Secondly, BSN students' faculty mentors, PhD programs, and institutional cultures should address perceived the need for clinical experience by changing cultures to accept researchers without clinical experience (Squires et al., 2014; Xu et al., 2018) and including a menu of clinical options (i.e. fellowships or residencies during PhD studies (Greene et al., 2020; Nehls & Rice, 2014; Smith et al., 2016). BSN mentors should provide meaningful research opportunities (Ayoola et al., 2017; Salerno et al., 2017; Vance et al., 2020) and plentiful unbiased career information (Nehls & Barber, 2012; Taylor & Terhaar, 2018; Xu et al., 2018), and single out promising students to encourage them in their pursuit of PhD nursing education (DeYoung et al., 2002; Stanfill et al., 2019). BSN mentors should also be trained to help BSN students with PhD program application (Peterson et al., 2015; Taylor & Terhaar, 2018).

National agencies and local institutions should design programs to raise the public status of nursing research and education ((DeYoung et al., 2002; Nehls & Rice, 2014; Xu et al., 2018), integrate research into all curricula (Stanfill et al., 2019; Vance et al., 2020), offer health disparities research opportunities (Salerno et al., 2017), facilitate interprofessional collaboration (Greene et al., 2020; Neuberger, 2016), and promote a supportive culture with passion for research (Ayoola et al., 2017; McGivern, 2003). It is also important for all doctoral programs to prepare future faculty to be good mentors (Abbot-Anderson et al., 2016; Dreifuerst et al., 2016), and to make PhD programs accessible via online and part-time options and family-friendly leave policies (Ellenbecker & Kazmi, 2014; Squires et al., 2014; Vance et al., 2020). Programs could also consider awarding an MSN halfway through the PhD (Peterson et al., 2015). BSN-PhD fast-track programs should evaluate student success across programs and increase student population diversity (Ellenbecker & Kazmi, 2014; Salerno et al., 2017).

Discussion

To our knowledge, this is the first review of barriers for BSN students to pursue a PhD in nursing and recommendations to address them. The barriers cut across all levels of influence as described by Bronfenbrenner (1977, 1979, 1994, 2004). The individual BSN student, faculty mentors, friends and family, the nursing programs in the U.S. (both undergraduate and graduate institutions), as well as national nursing agencies and the sub-culture in the educational setting (local and national), play significant roles as to whether an undergraduate student decides to pursue a graduate degree or not.

The major issues identified in this review as barriers are associated with limited information, poor knowledge and misconceptions about PhD programs and nursing research, financial concerns, and the relevance of perceived need for clinical practice in the nursing profession. Another significant problem is related to the availability of mentors who are passionate, actively involved in research, and available to mentor BSN programs to increase their understanding, interest, and desire to pursue PhD in nursing.

BSN students lack knowledge of PhD programs in nursing and have many misconceptions that could make a PhD in nursing unappealing. The inadequate knowledge about PhD programs and the misconceptions could be addressed at the individual, interpersonal and programmatic level. At the individual and programmatic level, it is important for all Baccalaureate nursing programs in the U.S. to incorporate into their curriculum plans to educate BSN students about the terminal degrees in nursing and graduate school options in nursing. In addition to general knowledge of research, which is currently part of the BSN essentials, there should be early introduction of BSN students to actual field research (Ayoola et al., 2017). Nursing programs should provide meaningful research experience beyond the classroom teaching.

To address individual funding concerns, it is important for undergraduate nursing programs to hold regular seminars to inform their nursing students about funding opportunities for PhD programs in nursing. Funding also becomes a concern when undergraduate students have high amounts of student debt or are concerned about the financial impact on their families if they leave work for school (Squires et al., 2014; Dreifuerst et al., 2016). Therefore, nursing programs will have to provide regular information for undergraduate students about loan forgiveness grants and other types of funding available for PhD students. In addition, graduate programs with national funding for PhD programs in nursing should partner with smaller BSN-only institutions to create a pipeline for BSN-PhD tracks. This would address the recommendation of The National Advisory Council on Nursing Education and Practice (2010) recommended that the US Department of Health and Human Services and/or the Department of Education to increase the number of fellowships for bachelor's- and masters'-prepared nurses to fund their PhD education.

With the ongoing shortage of nurses with PhD degrees in the nursing profession, it is essential for all stakeholders to actively address existing barriers. The main recommendations across all ecosocial levels of influence include quality mentorship, funding, provision of meaningful BSN research experiences, and education to address fears and misconceptions related to pursuing PhD education.

Some factors that could facilitate BSN students' decision to pursue a PhD need to be addressed at the program/policy level. At the national level, nursing organizations such as the Tricouncil of Nursing, American Academy of Nursing, AACN, and National Institute of Health (NIH) should focus on addressing some of the barriers concerning the development of faculty mentors in undergraduate nursing programs. Though many undergraduate nursing programs are not research-intensive, faculty members in such institutions should still have pathways to receive national funding to start off projects that would involve undergraduate students. For example, the R15 research mechanism through the National Institute of

Nursing Research (NINR) should offer realistic possibility for new investigators to receive funding to start research programs even in undergraduate institutions that are not research-intensive. New funding paths to support and develop undergraduate faculty members of research-intensive institutions should also be developed. In that way, the faculty mentors who are interacting with our undergraduate students during their early and formative period in nursing education would be engaged in research and be able to engage and inspire their BSN students.

Universities that offer both BSN and PhD education should intimately connect the two programs, through PhD mentorship of BSN students and formalized programs that fast-track promising and interested BSN students into PhD programs. The PhD component should be fully funded when possible. Student success can be enhanced by working with their future PhD faculty mentor as an undergraduate research assistant as early as possible in their BSN education. PhD students can also be utilized as mentors for BSN students, which has been shown to be mutually beneficial (Abbot-Anderson et al., 2016). This allows a much greater number of BSN students to be mentored by individuals who are passionate about research and gives PhD students valuable leadership and mentorship experiences.

Many masters'-prepared nurses would benefit from a PhD-completion program to help prepare nursing faculty teaching in BSN programs as mentors to educate and inspire students to pursue a PhD in nursing. Institutions with PhD programs should consider designing student-friendly PhD-completion programs for adult learners so as to afford future faculty mentors who would be interested in mentoring BSN students realistic opportunities to pursue PhD education.

Concerted efforts at all levels of influence are needed to make hands-on field research experience in nursing the norm in BSN education. At the programmatic/policy level, AACN should promote inclusion of actual conduct of research and not only conceptual teaching of research at the undergraduate level. Nursing programs should be encouraged to incorporate real-life, hands-on research experiences into the curriculum in a way that would not steer undergraduate students away from research but rather increase their zest in developing nursing knowledge and conducting research to answer these questions (Ayoola et al., 2017).

Due to the impending crisis of both the nurse and nurse faculty shortages, there has been much recent discussion in the nursing profession about ways to increase the BSN-PhD pipeline. This paper provides a timely review and consolidation of these discussions, which can be used to coordinate efforts across all levels of influence described by Bronfenbrenner—in this case, student, mentor, program, institution, national, and cultural levels. At each level of influence, there are actions to be taken to address the crisis by increasing the BSN-PhD pipeline, based on data from students and faculty members, reviewed in this paper. Members of the nursing profession should work both within their spheres of influence and combining efforts on a large scale to act with the urgency now needed to redress the worsening nurse and nurse faculty shortages.

Conclusion

BSN students' career decision-making is influenced by complex interactions of barriers at individual, interpersonal, programmatic, and cultural levels. At the BSN level, lack of awareness or understanding of PhD education, and lack of knowledge about the impact of nursing research on population health are significant barriers. At the PhD program level, barriers include lack of funding for PhD studies and the perceived need for clinical experience. Recommendations to address these barriers include family-friendly PhD program policies, clinical practice fellowships for direct admit BSN-PhD students, and clear education about PhD programs and postdoctoral employment prospects. In addition, new undergraduate faculty members should be provided with sufficient funding to start viable projects so that undergraduate students can be engaged in research in their early and formative decision-making years. The nurse and nurse faculty shortages are approaching a crisis, and nursing programs need to take action to increase the pipeline of well-prepared BSN-PhD students. Coordinated efforts should cut across all of Bronfenbrenner's ecological levels, including intervention at the individual, interpersonal, program, policy, and cultural levels.

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Highlights

1. Decision-making is influenced at individual, institutional, and cultural levels
2. Misunderstanding PhD education and its impact on population health is a barrier
3. Students are less likely pursue a PhD if advised to gain clinical experience first
4. Attractive PhD programs are accessible, funded, and offer clinical fellowships

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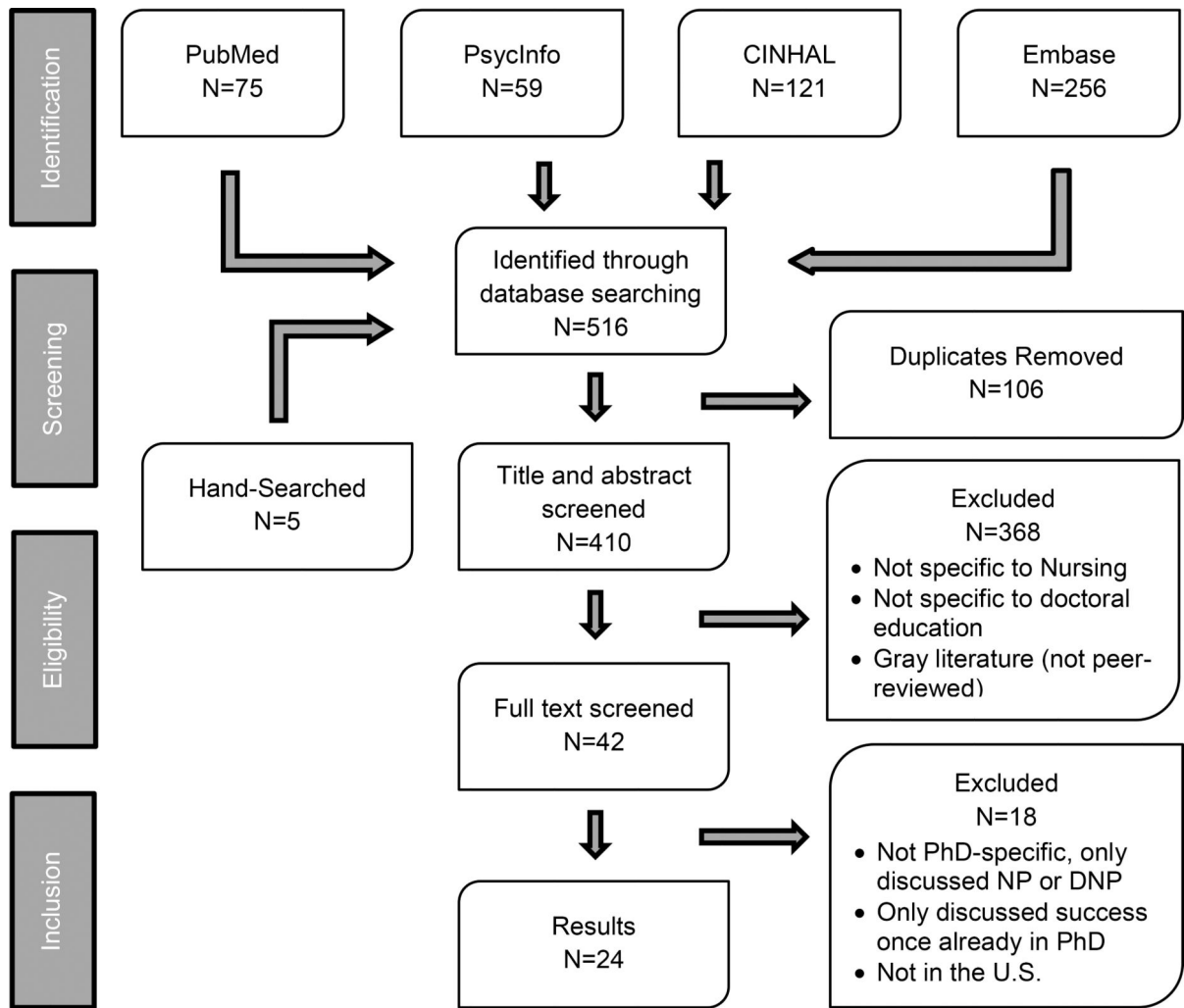


Figure 1. PRISMA diagram guiding structured review approach and record-keeping

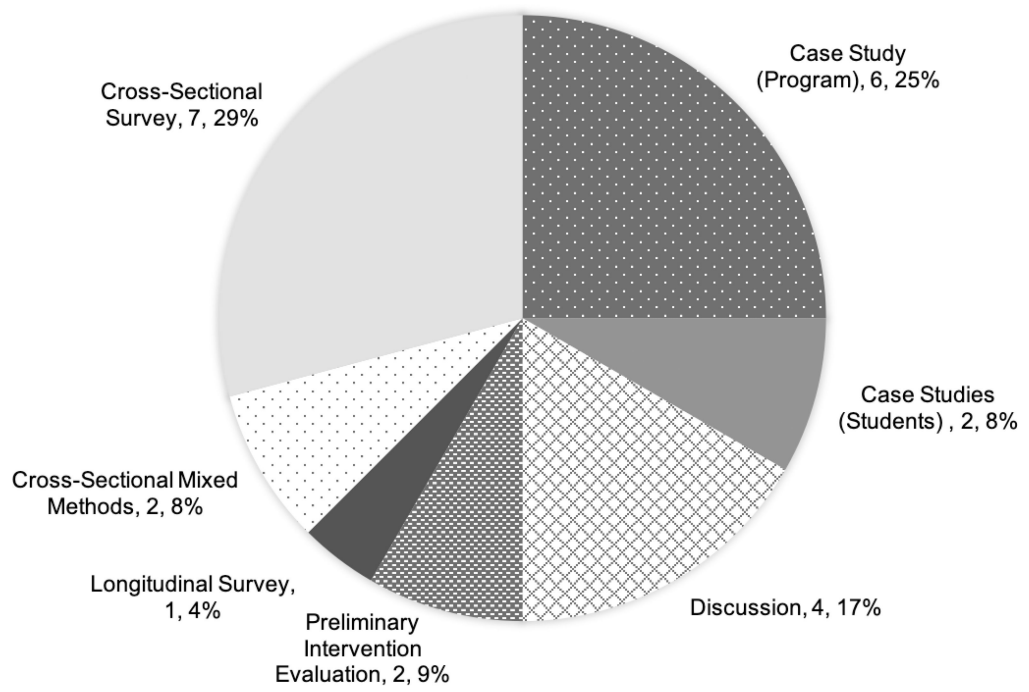


Figure 2.
Study Designs of Included Articles

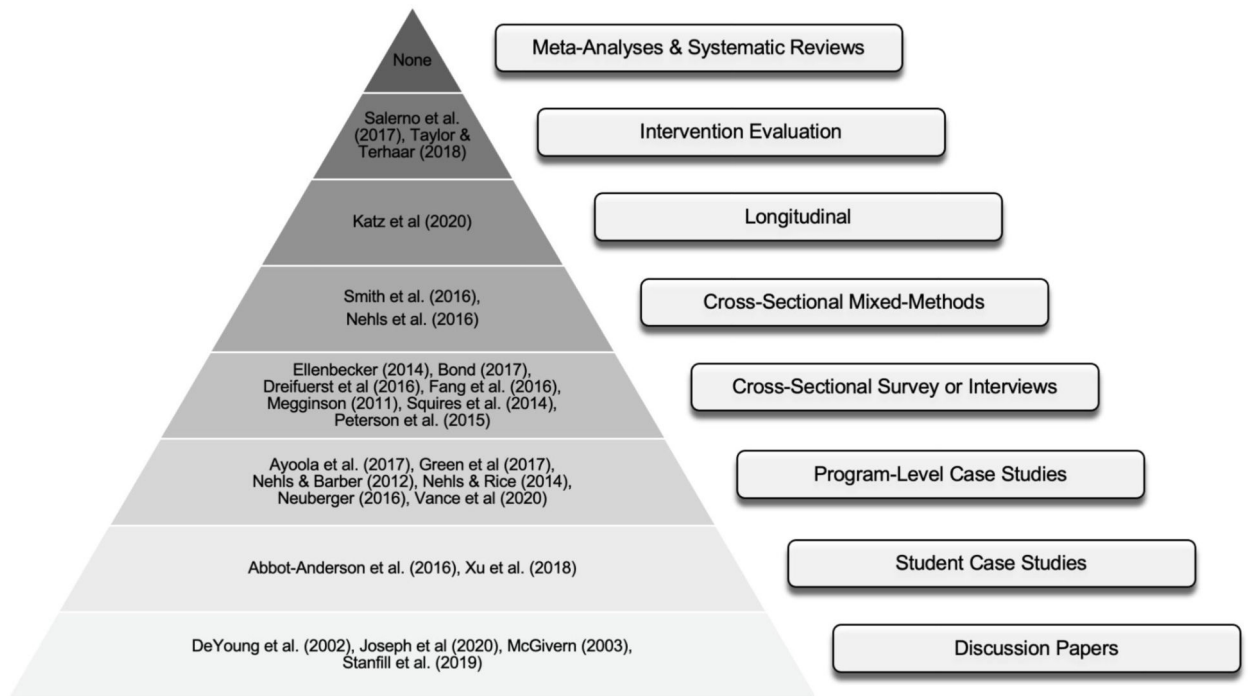
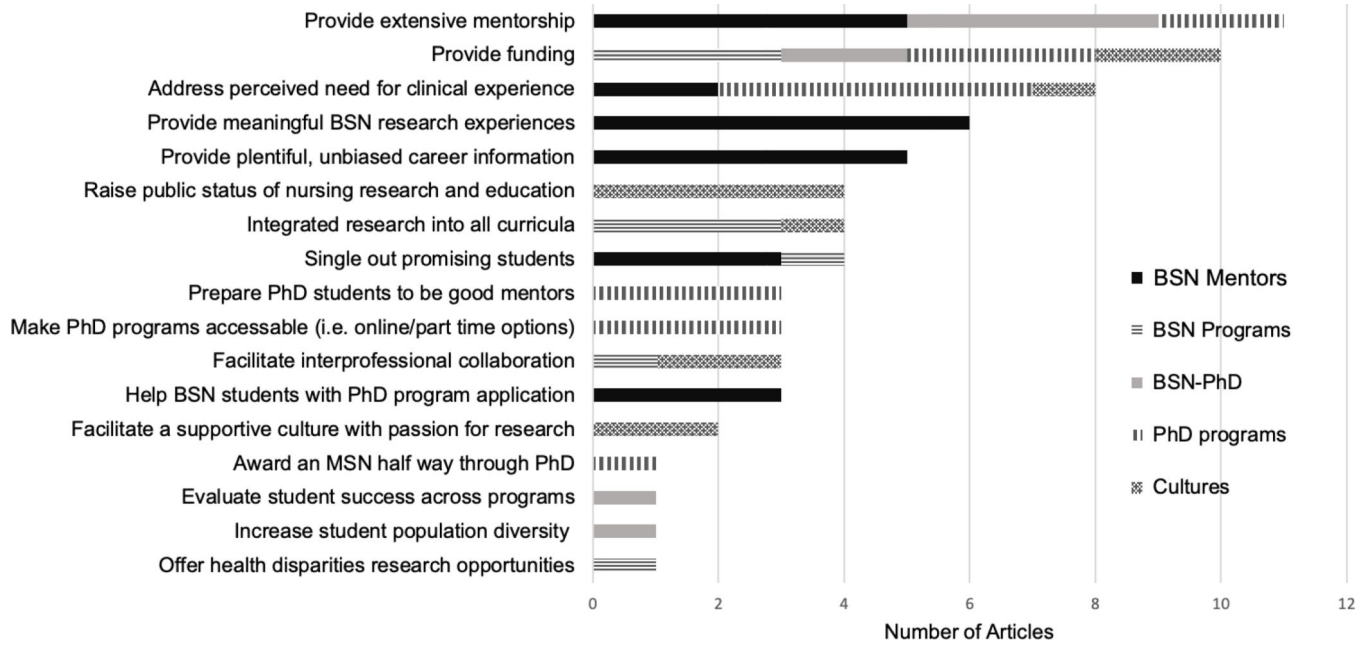


Figure 3.
Placement of Studies on the Evidence Hierarchy



Frequency of Recommendations Across Program Level

Figure 4.
Frequency of Recommendations Across Program Level

Table 1

Study Characteristics

Study	Purposes	Design	Data Sources	Key Points
Abbot-Anderson et al. (2016)	To examine and discuss the training experiences of 3 PhD students mentoring BSN students	Case studies (student-level)	3 PhD students mentoring 6 undergraduate students	PhD student mentorship of BSN students is beneficial because they are less intimidating than faculty, and role model what the next educational step may look like.
Ayoola et al. (2017)	To present strategies of a BSN program to promote zest in research and increase the pursuit of PhDs among BSN students	Case study (program-level)	4 faculty members and 2 previous BSN students now with PhDs	Multiple levels (i.e., individual, program, institution, etc.) work together to increase BSN students' zest for research through meaningful research experiences and high-quality mentorship.
Bond (2017)	To determine the intent of BSN nursing students to pursue a future nursing faculty role	Cross-sectional survey	1078 BSN students with at least one semester of a clinical nursing practicum.	Only one in four BSN students consider a future faculty role, and this is correlated with knowledge of the faculty role, teaching experiences, and encouragement from faculty.
DeYoung et al. (2002)	To examine the progress made on proposed solutions to the nurse faculty shortage	Discussion	Expert opinion	Progress has been made on proposed solutions to the nurse faculty shortage, but more funding is needed. Linking the nurse and nurse faculty shortages builds a case for funding initiatives.
Dreifuerst et al. (2016)	To describe factors that influence the pursuit of doctoral education by nurses seeking faculty roles.	Cross-sectional survey	548 current students or recent graduates of doctoral programs	Factors influencing nurses' pursuit of doctoral education focus on time, money, preparedness to assume a faculty role, and deciding between PhD and DNP.
Ellenbecker & Kazmi (2014)	To explore the characteristics of BS-PhD nursing programs.	Cross-sectional survey	25 universities currently offering BSN-PhD programs	BSN-PhD fast track programs are very new and have thus had a limited impact. They are not rigorously evaluated and vary significantly in terms of funding and program quality.
Fang et al. (2016)	To report factors influencing research-focused doctoral students' decisions to pursue faculty roles	Cross-sectional survey	933 PhD students randomly selected from U.S. nursing schools	Facilitators for PhD students to pursue a faculty role included interest in teaching and an appreciation of the impact of nursing research on patient care, while barriers were poor financial compensation and a negative perception of academia.
Greene et al (2017)	To describe a clinical fellowship program offered alongside a direct-entry BSN-PhD	Case study (program-level)	Authors' expert opinions	Clinical training during PhD is beneficial, facilitating connection between research and practice, effective interdisciplinary teamwork, and contribution to health care innovation.
Joseph et al (2020)	To strategize on developing nurse scientists and preparing them for a competitive funding environment.	Discussion	4 expert panelists and discussions with 70 audience members	Effective nurse scientists are developed through passion; supportive institutions, mentors, and sponsors; resilience and perseverance; work-life harmony; and institutional support.
Katz et al (2020)	To determine if GRE scores predict success in nursing PhD programs	Longitudinal survey	217 admitted to nursing masters or PhD programs	The is GRE an ineffective indicator of success in PhD programs and a significant barrier to application.
McGivern (2003)	To discuss how to develop younger, better-prepared nurse researchers in accelerated research-intensive tracks.	Discussion	Author's expert opinion	The nursing profession must create environments legitimizing scholars prepared by BSN-PhD programs. Changes in program structure, curricula, recruitment, and resources are needed.
Megginson (2011)	To identify current admission criteria and academic performance outcomes in nursing PhD programs	Cross-sectional survey	56 nursing PhD programs	PhD program admissions criteria include GPA, GRE scores, writing samples, letters of recommendation, interviews, and research match with faculty. However, these criteria largely lack predictive validity regarding performance outcomes.
Nehls & Barber (2012)	To describe the curriculum and early results of a pre-baccalaureate, research-focused PhD option	Case study (program-level)	Expert opinion	A pre-baccalaureate entry option to the PhD is a promising way to increase the number of successful nurse researchers. A key component of this option is early, intensive

Study	Purposes	Design	Data Sources	Key Points
				research training with an established nurse faculty researcher.
Nehls & Rice (2014)	To evaluate an early-entry PhD program in nursing	Case Study (program-level)	29 students admitted to a nursing PhD program	Early entry into PhD programs is facilitated by assurance of financial support, research involvement, and extensive mentorship. Efforts to improve recruitment, curriculum, and allocation of funds have been successful.
Nehls et al. (2016)	To compare outcomes between direct BSN-PhD students and those with work experience, and/or a masters' degree	Cross sectional mixed methods	84 PhD students admitted to a PhD program in a 10-year period	There were no significant differences in research productivity and postgraduation employment between three groups of PhD students: those who came straight from BSNs, had one or more years of clinical nursing experience, or had master's degrees.
Neuberger (2016)	To describe recruitment, application, mentor selection, and scholarly activities of an early entry PhD program	Case study (program-level)	Author's expert opinion	By providing mentorship and research engagement opportunities, honors research programs and early-entry PhD programs are a promising way to encourage the pursuit of PhD degrees.
Peterson et al. (2015)	To evaluate student perceptions of BSN-PhD programs, and to identify opportunities and challenges.	Qualitative internet survey	21 current BSN-PhD students or graduates from 7 U.S. universities	PhD students admitted directly from BSN identified that personal development, contribution to the profession, and a short time to degree completion motivated them to pursue their PhD. Barriers included academic challenge and limited funding.
Salerno et al. (2017)	To describe and evaluate a summer research program for minority BSN students	Preliminary intervention evaluation	6 minority BSN students	A summer research program for minority BSN students resulted in favorable trends in satisfaction, knowledge gains, attitudes toward research, and intent to pursue PhD education.
Smith et al. (2016)	To describe a PhD pipeline initiative to inspire a diverse pool of BSN students to consider pursuing a PhD.	Cross-sectional mixed methods	16 BSN students, 6 faculty, and 4 PhD students	Initiatives that engage BSN students as full team members at their identified level of research interest and offer meaningful research activities mentored by senior researchers resulted in positive student experiences that increased student interest in research and influenced their career decision-making.
Squires et al. (2014)	To evaluate BSN-PhD admission criteria, ascertain students' decision-making to pursue a PhD, and to develop a measure of intent.	Cross-sectional survey	606 current BSN, master's, and DNP students at a U.S. nursing program	Factors that influence students' intent to pursue a PhD include the availability of full tuition funding with a living stipend and current program track. Time, money, and desire to gain clinical experience prior to PhD study were the main barriers.
Stanfill et al. (2019)	To outline strategies to enhance the PhD nurse pipeline	Discussion	Authors' expert opinions	Strategies to enhance the PhD nurse pipeline include BSN recruitment and engagement in research opportunities, PhD student funding, quality mentorship to enhance graduation rates, and help establishing scholarly independence.
Taylor & Terhaar (2018)	To evaluate a program to educate nurses on roles filled by doctorally prepared nurses, help select a program, and prepare for success.	Preliminary intervention evaluation	70 nurses applying to graduate schools	A program to help nurses set career goals, generate action plans, and mobilize resources to promote success in application showed promising results. Transparency on program options enhanced student success.
Vance et al. (2020)	To describe changes in recruitment and curriculum necessary for the success of a BSN-PhD pathway and 3-year PhD program.	Case study (program-level)	Authors expert opinions	PhD programs could promote early entry by decreasing time to degree, revising curriculum, and providing research immersion experiences. To increase the BSN-PhD enrollment, students could be offered full funding. Their progress should then be evaluated.
Xu et al. (2018)	Explore the unique characteristics of the direct entry BSN-PhD student experience.	Qualitative case study (student-level)	Four students or recent graduates of direct-entry BSN-PhD programs	Directly admitted BSN-PhD students have unique perspectives, including ideas about commitment to science, nursing identity,

Study	Purposes	Design	Data Sources	Key Points
				exploring prospects, and balancing family and student expectations.

GRE = Graduate Record Examinations®; GPA = Grade Point Average

Note. There are many points discussed in all the studies reviewed. We presented only a brief summary of the main points.

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Table 2

Barriers for BSN Students to Pursue their PhD Across Levels of Influence

	Individual (Microsystem)	Interaction with Others (Mesosystem)	Programs and Policies (Exosystem)	Subcultures (Macrosystem)
Barriers				
Lack of awareness or understanding of PhD	x			
Limited futuristic thoughts or plans	x			
Perception of limited time and energy for PhD	x	x	x	
Family and work conflicts		x		
Desire or perceived need to have clinical experience	x	x		
Perceived low quality of life for PhD students and researcher	x	x		
Negative beliefs and misconceptions about research	x	x		x
Institutional Beliefs About Practice, Funding, and Mentoring				x
Non-competitive salaries		x	x	
Funding and finances for PhD programs			x	
Insufficient number or quality of research mentors			x	
GRE requirement			x	
Concerns about unpreparedness to teach		x		