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An Analysis of the Use of the Terms Sex and Gender in Research Reported in Nursing Journals

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Introduction and Background

Accurately measuring and reporting the demographic characteristics of research participants is imperative, to provide consumers of research with an understanding of who was included in a study.[1,2] A clear, precise description of a study sample allows readers to consider potential transferability and generalizability given the potential representativeness, biases, homogeneity, and/or heterogeneity of the sample.[1,2] Indeed, at the very basic level, if we do not know *who* was studied, we will have a hard time being able to interpret and/or apply the findings of a study. Additionally, accurately representing participants in research and research reports honors their individual identities[3] and upholds individual dignity and respect of persons, key ethical principles of the nursing profession.[4] Most research articles include information about study participants, including gender and/or sex.[5] However, the precision with which the terms gender and sex are used in research studies has been called into question,[5-7] including in nursing research.[3]

Sex and gender are two different variables, though they are not mutually exclusive.[5] Briefly, sex, often termed sex assigned at birth or birth sex, refers to genetic composition of a person's 23rd chromosome and is a biologically-determined variable.[8,9] The terms male, female, and intersex are often used when describing a person's sex.[3,8] While some may incorrectly think of sex as binary, that is male *or* female, up to 2% of individuals may have a sex chromosome

composition that is not strictly XX (female) or XY (male).[10-12] Further, it is important to recognize that sex assigned at birth is traditionally assigned on the basis of a newborn's genitals, rather than genetic testing. Gender, on the other hand, is a broad construct and is a socially-determined variable.[8] Gender as a whole may be manifested in an individual's gender identity, such as transgender, agender, man, woman, or non-binary, and gender identity may not be congruent with sex assigned at birth.[3,13] Further, some may have a gender that is fluid or expansive.[14] Individuals may express their gender in various ways, and a person's gender may not match the gender roles that were traditionally expected in a particular society.[15] Gender expression markers allow individuals to express their gender in the way that they choose. For example, gender markers on a passport or driver's license allow a person to select their gender, even when the gender may not match sex assigned at birth.[16] Those who have a gender that matches their sex are classified as cisgender.[13] Though precise estimates are difficult to establish, approximately 0.4 to 0.6% of individuals in the United States identify with a gender incongruent with their sex assigned at birth,[17,18] and the number of those who identify as transgender continues to grow.[18]

We have previously argued that measuring sex and gender precisely is imperative in nursing research and that a failure to attend to sex and gender leads to potentially flawed scholarship.[3] Indeed, sex and gender, as two distinct variables, are applicable to various areas of research, including some with the largest human and financial impact on the population. For example, sex- and gender-specific differences have been noted in research on diabetes,[19] cardiovascular disease,[3] sepsis,[20] cancer,[21] rehabilitation science,[22] and Coronavirus Disease 2019.[23,24] Further, sex differences in reproductive health may be some of the most notable. Moreover, individuals who are non-binary or transgender often experience significant barriers to

care[25] and more health disparities than cisgender individuals. For example, people who are non-binary or transgender often have increased cardiovascular disease risk,[26] more frequent childhood trauma and abuse, [27] and disparate breast cancer screening approaches.[28] Non-binary and gender nonconforming individuals also experience poorer mental health, including higher rates of anxiety and depression.[29,30,31]

Though sex and gender are both important variables and deserve careful attention in research studies, authors have documented needed improvement. In their systematic review of randomized controlled trials from across the globe, published in high impact factor journals, Phillips and Hamberg[32] pointed out that the majority of included studies did not adequately define sex and gender and often treated them as synonyms. Petkovic et al.[9] conducted a cross-sectional study of Campbell and Cochrane reviews, noting that many studies only addressed sex and gender in a descriptive sense and failed to consider differences. Similarly, Polit and Beck[33,34] have noted that in nursing research sub-analyses based on sex or gender are lacking, and there is an over-representation of women. Eliason[10] has criticized the nursing profession as a whole, noting that a focus on the gender binary has persisted and that the "nursing curriculum, nursing practice, and nursing policies" [p.1] have continued to uphold the false idea that there are only two genders. Further, in addition to issues with research studies themselves, Hankivsky and colleagues[35] have pointed out issues with funding agency guidelines pertinent to sex and gender. In their systematic examination of 45 funding agencies in 36 different countries, they found that there was little consistency in how sex and gender inclusion were required in studies, and most agencies treated sex and gender as synonyms or failed "to recognize the complexity of sex/gender."[35, p. 1]

For over a decade, there have been calls for the nursing profession to address sex and gender issues,[10,33,34] including in scholarly work.[3,36,37] While Polit and Beck[33,34] have studied the degree of gender bias in nursing research studies and how often sub-analyses have been conducted, to our knowledge, no investigators have reported specifically on sex and gender measurement in nursing, including how often sex and gender are reported and how these variables are measured. If we hope to correct sex- and gender-specific issues in nursing scholarship, we must first understand, from an empirical perspective, what is happening in nursing and where opportunities for improvement or refinement may exist.

Purpose and Research Questions

Recognizing the importance of the variables sex and gender, guidelines have been developed to support researchers in the conduct and reporting of research, including publications from the Williams Institute,[38,39] the *Essential Metrics for Assessing Sex and Gender Integration in Health Research Proposals Involving Human Subjects*[40] and the *Sex and Gender Equity in Research* (SAGER) guidelines.[7] These guidelines emphasize key aspects of the design of and reporting of research, including a recognition that sex and gender are different variables and that they should be clearly, precisely measured and reported.[7,38, 39, 40] Further, they emphasize the importance of considering sex and/or gender when conducting data analyses and/or sub-analyses and suggest that a careful review of the literature prior to conducting a study can provide researchers with additional information as to how sex and/or gender may be relevant for a given study.[7,40] We considered the contents of these guidelines as we developed the purpose and research questions for our study.

The purpose of this study was to describe how researchers use sex and gender in studies published in nursing journals and to identify opportunities that exist to improve clarity and

precision in measuring sex and gender in research. With this purpose in mind, we developed the following research questions:

1. With what frequency have researchers measured the variables sex, gender, or both?
2. How have researchers measured the variables of sex and gender?
3. What terms have researchers used to represent sex and gender (e.g., transgender, male, female, boy, girl)?
4. With what frequency have researchers reported the rationale for their selection of measuring sex, gender, or both?
5. To what extent have researchers conducted sub-analyses with sex, gender, or both, when applicable?
6. What areas of ambiguity or imprecision exist in the use of sex and gender in the studies?

Methods

We conducted a cross-sectional, descriptive study of research articles published in nursing journals, using content analysis as described by Krippendorff.[41]

Sampling Strategy

In July 2020, we identified a list of all journals classified as nursing journals using *Journal Citation Reports,*[42] a total of 123 titles. We then ordered these journals based on 2019 Journal Impact Factor[42] and selected the top half (62) from which we would retrieve articles. We decided to include articles from the top half of articles based on Journal Impact Factor, given that their higher impact factors would, theoretically, mean that these journals have more influence on the nursing profession and nursing scholarship. Further, we would expect that journals in this subset would have high publishing standards. We then developed a randomization protocol. To maintain a consistent temporal distance across all articles, a graduate research assistant located

the first issue of each of the 62 journals for each of the years 2017, 2018, 2019, and 2020. For each issue, the research assistant numerically listed all the research articles published in that issue. Finally, the assistant used a random number generator to select one of the articles in the list and then obtained that article.

To be included in this study, articles had to be published in English and report a human subjects research study. We excluded articles reporting quality improvement projects, editorials, commentary articles, methods articles, discursive articles, review articles, and other non-research articles. Because our purpose was to describe what is happening across research published in nursing journals as a whole, not any one particular type of nursing or patient population, we chose not to exclude any certain types of research, as long as the paper met inclusion criteria. We did not limit papers to those authored by nurses, given that all of the papers were published in nursing journals; thus, they were (and are) likely affecting the nursing profession and nursing scholarship and are pertinent to consider.

Data Extraction and Variables

Using Microsoft Excel, we developed a comprehensive literature audit tool, consistent with content analysis,[41] in the form of a data matrix, to capture pertinent study characteristics and variables needed to answer our research questions, using matrix suggestions from Garrard.[43] This audit matrix included the following demographic information: the full article citation, journal in which the paper was published, paper category (clinical/patient outcomes, professional, education), first author professional credential, the study purpose, type of funding received for the study, study setting, study design (non-experimental, quasi-experimental, experimental), overall study approach (quantitative, qualitative, mixed-methods), temporal design (cross-sectional, longitudinal/prospective, retrospective, pre/post), whether or not the purpose of the

paper was specifically sex or gender comparison, whether a publishing checklist was used, the total sample size, and whether children were included in the sample. Variables in the matrix specific to the research questions: whether terminology was used in the paper referencing sex and/or gender and whether or not the sample size was reported stratified by sex and/or gender, whether sex and/or gender were measured in the paper, whether sex and gender were used interchangeably (incorrectly), whether sex and gender were used as two distinct variables, whether a rationale was provided for the use of sex and/or gender, how sex and gender were measured, whether sub-analyses based on sex and/or gender were considered, and notes about potential imprecise or ambiguous use of the variables sex and/or gender. The complete, comprehensive data matrix used for this study is available as supplemental digital content.

After the audit tool was developed, the first and second author both independently conducted data extraction for three of the same papers using this tool, to pilot the instrument and identify any needed alterations. Additionally, the authors compared their entries, to ensure that the audit tool functioned consistently and that they interpreted the elements of the audit tool in the same way. After discussion and small adjustments, the first author extracted information from each article into this matrix. On three separate occasions during data extraction, the second author randomly verified 10 new entries, to ensure that information was being extracted consistently and accurately by the first author.

Analysis and Synthesis

Our analysis was based on recommendations from Krippendorff.[41] After data entry was complete, we re-coded some columns of data from text data to numeric/nominal data. We exported these re-coded data to IBM SPSS 26 to facilitate further data analysis. Using SPSS, the authors generated summary statistics for the characteristics of the included studies. We then used

summary statistics from SPSS to answer research questions 1, 2, 4, and 5. To answer research questions 3, we reviewed the entries for each paper and tabulated the various terms that were used to represent sex and gender. Answering research question 6 involved a more holistic approach. We considered the findings from the previous research questions and also repeatedly read the comments that we had added to the audit matrix about imprecision and ambiguity. We identified comments that we had repeated frequently in the matrix and developed overall themes regarding ambiguity based on this content analysis. For example, we often noted that terms used to describe sex or gender were used interchangeably throughout manuscripts, making it difficult to ascertain whether authors had truly measured sex or gender. We jointly discussed these findings and agreed on areas that scholars need to address regarding the imprecise and ambiguous use of the terms sex and gender.

Results

Study Characteristics

Table 1 summarizes key characteristics of the included studies, and Table 2 lists all journals from which study articles were retrieved. Out of a possible 248 studies, the final sample included 239 studies because nine journal issues did not contain any paper that met inclusion criteria for this study. The majority of studies were quantitative (66.9%), non-experimental (74.1%), and cross-sectional (64.9%) in nature. Investigators almost exclusively employed non-probability sampling (98.7%), and the median sample size was 108 (range 5 to 250,283). Almost all (91.6%) studies included adults (18 years of age or older) only, though 5.9% enrolled only minors (< 18 years of age), and 2.5% enrolled adults and minors. Most articles focused on clinical/patient outcomes (72.0%), while fewer reported on professional issues (18.8%) or education (9.2%). Most studies were conducted in North America (41.8%), Europe (22.2%), or

Asia (17.6%). The majority of first authors were registered nurses (72.0%). Funding was reported for 51.9% of the studies, with the most common funding sources being the government (26.8%), professional organizations (18.0%), or higher education institutions (9.2%).

Research Question 1: Frequency of Sex, Gender, and Both Used by Researchers

In all, 185 (77.4%) of the articles stratified their sample by sex or gender, though it was not always clear whether it was sex or gender that the researchers had measured. That is, authors may have reported the number of men and women enrolled in the study but did not specify whether they conceptualized "men and women" as sex or gender. For 27 (11.3%) of the articles, only one sex could conceptually be enrolled (e.g., articles on gestation or breastfeeding). The sample was not stratified by sex or gender in 27 (11.3%) of the articles.

Gender was reported in 97 (40.6%) of the articles, while sex was reported in 64 (26.8%) of the articles. Both sex and gender were used interchangeably, as proxies for each other, in 21 (8.8%) articles. In 30 (12.6%) articles, while investigators reported the number of males, females, men, and/or women, they did not specify whether they had measured sex or gender, and so it was not possible to tell whether it was sex or gender being reported. In none of the articles were sex and gender used as two distinct variables.

Research Question 2: Measurement of Sex and Gender

Of the 97 articles in which gender was reported, participant self-report was used to measure gender in 59 (60.8%) of the studies, while a database or medical record was used in 12 (12.4%), and self-report plus an instrument (the Bem Sex Role Inventory) were used together in 1 (1.0%) study.[44] The way that gender was measured was not clearly reported in 25 (25.8%) of the articles.

In the 64 articles in which sex was reported, participant self-report was used in 20 (31.3%). A database or medical record was used in 7 (10.9%), while the way sex was measured was not clearly reported in 12 (18.8%). For 25 (39.1%) of the articles, it was not specified how sex was measured, but the sample inclusion criteria (e.g., pregnant, breastfeeding) necessitated the participant being a particular sex. Sex was not measured using genetic testing in any of the included studies.

Research Question 3: Terms Used to Represent Sex and Gender

Table 3 summarizes the terms that were used to report sex and gender. Of the 64 studies in which sex was measured, researchers most often (n = 28, 43.8%) used the terms male and/or female to represent participants. In 21 studies (32.8%), the terms men and/or women were used to represent participants, while in 14 (21.9%), researchers used a combination of the terms male/female and men/women to represent sex. One study[45] used the terms boys and girls to represent the sex of participants. Sex was used as a binary variable in all studies that reported sex.

For the 97 articles in which gender was reported, researchers most often (n = 60, 61.9%) used the terms female and/or male to represent participants. The terms men and/or women were used in 4 studies (4.1%), while a combination of the terms women/men and/or female/male were used in 29 (29.9%). The terms girls and boys were used in one study,[46] as were the terms mother and father.[47] A combination of girls/boys and females/males were used in two studies.[48,49] In 89 of the articles (91.8%) reporting gender, this variable was used in a binary fashion. However, in 8 articles, more than two gender responses were reported. In 4 of these articles, it was indicated that participants chose not to report a gender, while in two, the data were reported as “missing.”

In one article[50] the third gender variable was reported as "other," while in another article,[51] the gender identities genderqueer and transgender were reported.

Research Question 4: Frequency of Reported Rationale for Selection of Measuring Sex, Gender or Both

Researchers from six studies provided information in the background that provided a conceptual basis for examining sex or gender factors within the study. In one study,[44] the researchers explicitly provided a rationale for measuring gender, stating that they measured gender with the Bem Sex Role Inventory, in addition to self-reported gender identity, because gender roles may not match a person's gender identity. A conceptual basis for measuring sex or gender was not explicitly mentioned in the other studies.

Research Question 5: Sub-Analyses with Sex, Gender, or Both

Overall, researchers from 54 studies (22.6%) conducted sub-analyses using sex or gender. In most cases, sex or gender were used as a control variable, or simple group comparisons were conducted. Sex and gender were not used simultaneously for sub-analyses by any researchers.

Research Question 6: Ambiguity and Imprecision in the Use of Sex and Gender

The answers to research question 6 are integrated into the discussion of this paper.

Discussion

In this study, we have described the ways that sex and gender have been used in articles published in nursing journals from 2017 to 2020. The findings from this research highlight that there is some ambiguity and imprecision in the use of the variables sex and gender and that areas for improvement exist. We did not exclude articles that were authored by non-nurses, given that

we wanted to represent the cross-section of work that is being in published in nursing journals, regardless of author credential and professional background. However, we did target nursing journals. Thus, we emphasize that we are not solely reporting on "nursing research," per se, but rather research published *in* nursing journals. We found that 26.8% of first authors were non-nurses, typically psychologists, social workers, or physicians. Thus, scholars from various backgrounds are publishing in nursing journals. Indeed, it has been shown that nurse scholars often cite work from non-nurses. Recently, in their analysis of exemplar articles from 79 different nursing journals, Chinn and colleagues[52] showed that only about one third of the sources cited in these nursing articles were from nursing sources. While a larger proportion of citations were from non-nursing sources, Chinn and colleagues[52] emphasized that nursing's values remained evident in the papers – even where opportunities existed to incorporate more nursing scholarship and represent the contribution of nursing as a profession.

Gender (n = 97; 40.6%) was reported by researchers almost twice as often as sex (n = 64; 26.8%). However, it was not possible to determine whether the authors were reporting sex or gender in 30 (12.6%) of the articles, given that researchers reported the number of men/women or males/females but did not report whether these terms were representing sex or gender. Further, in 27 (11.3%) of the articles, there was no stratification of the sample by sex nor gender, and in 21 articles (8.8%), researchers used the terms gender and sex interchangeably, as proxies for one another. In no case were the variables sex and gender both measured simultaneously, even though both sex- and gender-based differences may exist.[3] Polit and Beck[33,34] have previously shown that a differentiation of samples by sex or gender in nursing research was suboptimal, making it difficult to know who was included in a particular sample. Also, though dated now, using a systematic review design, Taylor and Green[53] explored the extent to which gender was

considered in nursing research involving children. They noted that of 23 studies that met inclusion criteria, only 8 considered gender when examining intervention outcomes, and about half of investigators did not clearly differentiate genders within their study reports. In the present study, 14 of the included articles enrolled only participants younger than 18, while 6 included some participants younger than age 18 and some age 18 or older.

Similar to previous findings from nursing research,[33.34] even if sex and gender were reported by researchers, sub-analyses based on sex or gender were only conducted by researchers in 54 (22.6%) of the 239 included studies. Further, it was difficult to determine whether sex or gender was the most applicable or appropriate variable to measure in many of the studies, given that researchers from only six articles included a discussion about sex or gender in the literature review or background section, and researchers from only one article explicitly provided a rationale for their selection. Thus, there was little theoretical/conceptual support provided for why sex or gender were chosen.

Even though sex and gender can be measured using a variety of approaches,[3] when they reported sex or gender, the majority (49.1%) of researchers relied upon participant self-report to measure these variables, while fewer (11.8%) used the medical record or a database. Notably, it is likely that the sex and/or gender listed in a medical record or database was, too, originally collected based on self-report. In the case of sex, while self-report is convenient and typically accurate, in a small number of cases, participants may report a sex that does not fully match their genetic composition,[5] given that individuals may not know that their 23rd chromosome does not match a strictly XX or XY configuration. We also found that in 37 (23.0%) of the articles that reported sex or gender of participants, the way that sex or gender was measured was not clearly reported, even though the International Committee of Medical Journal Editors[54] and others[3] have

emphasized the importance of clearly describing the way(s) that sex and gender are measured in research. If researchers have not clearly identified how these variables were measured, it makes it more difficult to determine whether this measurement was valid and reliable.

Of the 161 articles that clearly identified the sex or gender of participants, researchers most often (54.7%) used the terms "male" and "female" to represent their participants. Even though the terms female and male are most typically used to identify biologic sex,[3] researchers in the present study used these terms to represent participant gender in 61.9% of the articles that reported gender. On the contrary, the terms female and/or male were used in 43.8% of the articles reporting sex, with 32.8% of researchers using the terms men and/or women to represent the sex of participants. Still other researchers used a combination of the terms female/male and women/men to represent sex or gender or used other terms such as girls and boys. In short, there was not a consistent pattern with respect to the terms used to represent sex and gender. For example, the term "female" could just as easily have represented gender as it could have represented sex. This varied use of terminology makes it all the more important that scholars clearly identify whether they are measuring and reporting sex, gender, or both.

It is also concerning that a sex or gender outside the sex or gender binary (man/male and woman/female) was reported in only 8 of the 239 articles. In fact, in only 1 of those 8 articles did the authors identify participants using specific terminology ("genderqueer" and "transgender"). In the other 7, authors classified a gender other than man/woman as "other," "missing," "chose not to identify," or "did not identify." The number of individuals who were intersex was not reported in any article, and the lack of inclusion of those with a sex other than male or female has been identified in other areas, such as cancer research.[55] Thus, a binary conception of sex and gender was used in the majority of the included articles, inconsistent with recommendations from

professional organizations, such as the American Psychological Association[8] and research guidelines.[7,40] Further, the articles included in the present study represented over 540,000 participants; thus, it is highly likely that several participants had a gender and/or sex not captured or reported accurately, given that 0.4 to 0.6% of the population has a gender not congruent with their sex[17,18] and up to 2% has a chromosomal composition not fully consistent with male or female sex.[11,12] These findings are not entirely surprising, however, as Eliason and colleagues[36] have previously reported a lack of nursing publications related to transgender issues in general. As Pratt-Chapman and colleagues[55] have noted, it is important to enroll and accurately represent sex and gender minorities in studies, in order to conduct sub analyses with this population; however, these participants must be included in larger numbers, in order to ensure that these sub-analyses are sufficiently powered. Further, a recent review[56] has highlighted the health care inequities experienced by individuals who are transgender. Because there is little information available for those with fluid gender identities, it is difficult to know what health disparities may exist for this population. If the nursing profession hopes to improve health care delivery to and outcomes for those in a sex or gender minority,[57] researchers must ensure that they are recognizing, including, and precisely representing these individuals.

Taken together, the findings of this study are not consistent with the SAGER guidelines[7] that suggest sex and gender should be measured in clear, precise ways; that researchers should clearly describe why sex and/or gender were selected as appropriate variables; and that sub-analyses should be conducted where appropriate. Moreover, the findings are not in line with the American Nurses Association Ethics Advisory Board[58] position statement on advocacy for lesbian, gay, bisexual, transgender, queer, or questioning populations that emphasizes the nursing profession's needed leadership on issues related to these populations, including asking questions

that accurately identify a person's sex and gender. Certainly, the issues identified in the present study are not isolated to research published in nursing journals. Scholars[18,59,60] outside of nursing have also identified a lack of clarity in how sex and gender have been measured and reported. To resolve these issues, a number of recommendations may be helpful. These recommendations apply not only to researchers but also journal editors and reviewers, given that, as Heidari and colleagues[7] suggest, these entities "play an important role as gatekeepers of science." [p. 2] Eliason and colleagues[36] have similarly encouraged nurse researchers, funders, professional organizations, and journal editors to place more emphasis on sex and gender issues. Of note, researchers for over half of the included studies received funding support. Thus, funders may be in a position to require precise measurement and reporting of sex and gender.

Recommendations for Scholars

Based on the findings of our study, we believe several recommendations are in order. First, we suggest that authors familiarize themselves with the definitions of sex (biologic sex, sex assigned at birth) and gender (gender roles, gender identity, gender expression) and recognize how these two variables are similar and different. As we have already noted in this paper, many researchers seemed to have a misunderstanding of the variables sex and gender, at least in how they measured and/or reported on these two variables, and an improved understanding of these variables is needed. It is also advisable to increase the content on sex and gender issues in nursing education curricula, to ensure future nurses and nurse scholars have a better understanding of these terms and their importance. Once researchers have a solid understanding of these variables, at the outset of a study, researchers can refer to published guidelines[e.g., 7,40] related to the use of sex and gender to ensure they consider these variables at all stages of the study. Researchers must consider whether sex, gender, or other variables, such as gender

identity, gender expression, and sexuality, may be the most appropriate to measure for their study. We have listed in Table 4 a number of sample questions that researchers can consider when determining which variable(s) is/are most appropriate.

Prior to conducting a study, researchers should examine the published literature for potential sex and/or gender differences related to their phenomenon of study and consider the possibility of sex and/or gender differences based on previous empirical findings or theoretical considerations. A number of theoretical/conceptual frameworks take demographic variables into account in some form, and so researchers can also examine the framework(s) that they plan to use when considering how sex and/or gender may affect their phenomenon under study.

In designing a study, researchers must think about how the variables of sex and/or gender will be measured, taking into account a variety of identities, not just those on the sex/gender binary.[8,10] Generally, offering two options for sex (i.e., male and female) or gender (i.e. man and woman) is not enough, given the potential varied identities of participants. When creating demographic questionnaires, researchers should be careful to use the term that they truly want to measure (e.g., sex, gender) and to provide response options that allow participants to accurately identify themselves.[3,8,36] Of note, we have previously advised against using the term "other" in a demographic questionnaire, given that this term may emphasize being different or abnormal.[3] Researchers must also consider the needed sample size to ensure sub-analyses based on sex and/or gender are adequately powered,[3] as it has been shown that even when sub-analyses based on sex or gender have been conducted, they are often underpowered.[59]

Once a study is conducted, attention turns to the reporting of study findings in the form of posters, podium presentations, and manuscripts. Even if a study has been carefully designed and conducted, poor reporting could render the findings ambiguous or unclear. Sex and gender

should be reported precisely, using terms that make it possible to identify who was included. The American Psychological Association[8] has advocated the use of gender modifiers, such as "cisgender man" or "transgender man," to clearly report the gender of participants. Researchers should be careful not to use the terms sex and gender interchangeably, given that they are not proxies for one another. In the background or literature review section of a manuscript, it is helpful for authors to summarize why sex and/or gender were measured in a given study[7] and to provide a rationale for why one variable was chosen over the other (if both are not included). Any subgroup analyses that were conducted should be reported clearly, with consideration given to power analysis.[7] Even when a study may not be adequately powered for subgroup analysis, reporting findings differentiated by sex and/or gender may still be useful for meta-analyses in the future.[5]

Limitations

The majority of included studies were conducted in North America, Europe, and Asia, with fewer conducted in Australia, New Zealand, Africa, and South America. Thus, cultural norms and variations across geographical regions may have influenced the way sex and gender were measured and reported. We used the Journal Impact Factor[41] metric to identify the journals to include in our study, and we recognize that there are limitations to this measure and that others, such as the SCOPUS Cite Score or h5-index, exist.[61] However, the Journal Impact Factor metric is widely used, and it provided us with a consistent way to "rank" nursing journals that would, theoretically, have a considerable bearing on nursing research, policy, and practice. Still, we did not include every journal classified as "nursing." Because our aim was to provide a foundational description of the ways sex and gender are being used in articles published in nursing journals, we did not conduct any hypothesis testing to compare our outcomes of interest

based on any study characteristics. However, researchers in the future may consider differences based on these characteristics. Finally, we were limited by what was reported by authors in the included articles. Thus, researchers may have used or measured the variables sex and gender in ways not clearly reported in the articles.

Conclusions

Sex and gender have not been used with precision in research published in nursing journals, and areas of ambiguity exist. Gender (n = 97; 40.6%) was reported more often than sex (n = 64; 26.8%), though in 78 (32.6%) of the included studies, it was not clear whether sex or gender were measured. A variety of terms were used to label participants' gender and sex, with the terms female/male being used most often, regardless of whether sex and gender were measured. However, there was no consistent pattern with which these labels were used, and many researchers used terms like female and women interchangeably. Moreover, even when sex and gender were measured, these variables were most often used in a descriptive fashion, and sub-analyses were only conducted in 54 (22.6%) of the included studies. The precision with which sex and gender are measured and reported in studies published in nursing journals is lacking, and improvements are needed.

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Table Legends

Table 1 summarizes the characteristics of the articles included in this study.

Table 2 lists all of the journals that were in the top 62 based on 2019 Impact Factor and considered for this study. [a]Shown in parentheses after each journal is the number of articles retrieved from each journal that met inclusion criteria and were included in our analysis

Table 3 reports the various terms used to label the sex and gender of participants in the included articles.

Table 4 lists several potential questions for researchers to consider when deciding whether to measure sex, gender, or both in a study.