Breakout Session

Ethnic and Gender Differences in Diabetic Foot Management and Amputations

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Abstract

Background Although the health status of all Americans has improved substantially in the past century, gender and ethnic disparities still persist. Gender and ethnic disparities in diabetic foot management and amputations are an important but largely ignored issue in musculoskeletal health care.

Questions/purposes Our purposes were to (1) clarify where we are now, (2) describe ways to get where we need to go, and (3) suggest solutions for how we get there, with respect to gender and ethnic disparities in diabetic foot management and amputations.

Where are we now? Studies investigating socioeconomic, cultural, racial, and biologic contributing factors on gender and ethnic musculoskeletal healthcare disparities have found no single root cause. Studies into disparities in diabetic foot management and amputation have discordant methodologies and most are retrospective. Effective intervention strategies to eliminate these disparities are nonexistent.

Where do we need to go? The orthopaedic leadership should lead the movement to create a clearly defined

strategy and assist young investigators to gain access to large datasets to study this problem. Orthopaedic specialty society leaders should help to create valid outcome tools, especially on peripheral vascular disease and amputations. *How do we get there?* The working group proposed a three-pronged strategy of education, research, and advocacy to help address this problem.

Introduction

The US Department of Health and Human Services Health Resources and Services Administration defines health disparities as “population-specific differences in the presence of disease, health outcomes, or access to health care” [1]. Historically, minorities have lagged behind white Americans in nearly all health indices [19]. Although the health status of all Americans has improved substantially in the past century, disparities still persist [19, 22]. The disparity between African Americans and whites has actually grown rather than decreased in the last 10 years [19]. While several institutions [7] have affirmed the existence of multiple ethnic- and racial-based health disparities not explained by socioeconomic, culture, and biology [11, 12, 14, 19, 26, 28], the literature is replete with studies that do support biologic, genetic, socioeconomic, and geographic factors in observed health disparities [3, 5–7, 10, 20, 21, 23, 25, 27, 32]. Given this, it is not surprising surveys suggest most Americans in general and most physicians do not believe ethnic and racial healthcare disparities exist [19].

In 2007, Pierce [22] used the Jenkins Model on Health Disparities [8] to investigate socioeconomic, cultural, and biology as contributing factors on healthcare disparities as they relate to musculoskeletal care. No single root cause was identified [22]. The role of women as a subpopulation

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susceptible to healthcare discrepancies has recently been studied with similar results [5, 25–27, 30]. Many advocate future studies of subgroup-specific interventions with consideration of all contributing factors [7, 13, 19, 25, 29]. A breakout session in the 2010 The AAOS/ORS/ABJS Musculoskeletal Healthcare Disparities Research Symposium met to define and outline gender and ethnic musculoskeletal healthcare disparities in diabetic foot management and amputation. We present the findings from this session.

Where Are We Now?

As a group, the medical profession has been largely inactive on the issue of gender and ethnic musculoskeletal healthcare disparities in diabetic foot management and amputations. Studies have discordant methodologies such that appropriate and effective intervention studies are nonexistent.

Patient education encourages foot care in diabetics regardless of ethnicity, but patients dependent on social support (especially with activities of daily living) are less likely to comply [2, 15, 21, 28]. Most of these studies fail to utilize multivariate analysis to assess the effects of ethnicity on patient education methods. Patients who are independent in self-care fare better [2], but comorbidities and economic status are not taken into account in this study. A great deal of information exists on diabetic education and its use is emphasized in the primary care literature with an emphasis on glucose monitoring/control and foot care. However, education of patients on peripheral vascular disease and neuropathy is lacking [7, 17, 21, 23].

The incidence of lower extremity amputations is consistently reported as being higher in racial and ethnic minority populations, even when controlled for severity of peripheral vascular disease, rate of infection, or income [4, 11, 12, 14, 16, 18–20, 22, 23, 29, 32]. Biology has been reported as a contributing factor to poor outcomes for African Americans with diabetes [9, 31]. African American women have a diminished bioavailability of nitrous oxide, and endothelium-dependent vasodilatation is impaired in patients with diabetes and may play a role in the production of diabetic ulcers [9]. However, Leggetter et al. [14] evaluated the rates of diabetic lower extremity amputations in the UK of patients of Afro-Caribbean decent versus patients of European decent. The rate of amputation was lower in Afro-Caribbean men than in white men in this study. Furthermore, there was no difference in the rate of diabetic amputations in Afro-Caribbean versus white women in the same study [14]. A similar study comparing lower extremity amputations in African and Mexican Americans versus white Americans showed Mexican

Americans were the most likely to receive amputations [12]. Since the decision to amputate is based on the stage of disease at presentation, the timing of treatment may be a key factor [23] that has been understudied to date.

The wide range of findings and conclusions from multiple studies on ethnic and gender differences in diabetic foot management and amputations support our conclusion that there currently exists no reliable large dataset to study this problem [7, 13, 24, 29]. Most studies rely on administrative datasets or are based on a single coding system. These datasets, although very large, are incomplete and lack meaningful patient-oriented outcome information. We also do not have a universally agreed upon set of definitions and study terms that cross specialties. Many articles using these datasets lump procedures and mix diagnoses. Even the more restrictive term below-knee amputation is problematic (as used by various specialties) as many of the known amputations described meet the definition of below-knee amputation, including transtibial, Syme, Chopart, or transmetatarsal amputations, metatarsal disarticulations, ray amputations, and toe amputations. Although the use of administrative databases provides some baseline useful information, expanding these results confuses the issues.

Where Do We Need to Go?

We propose making available to young investigators multiple currently existing datasets. These datasets are currently available within large insurance companies such as United and Blue Cross Blue Shield and not-for-profits such as Kaiser Permanente. The main criticism against databases and registries is that they can only provide for retrospective studies. However, retrospective studies can serve as pilot studies, help focus the research question, clarify the hypothesis, determine the scope and sample size, and identify any feasibility issues/limitations for prospective study. As such, databases (and the retrospective studies databases facilitate) can serve to facilitate the efforts of young investigators. Organizations such as the American Academy of Orthopaedic Surgeons (AAOS), the American Orthopaedic Association (AOA), or one of the subspecialties in orthopaedics or general surgery could lead the charge, requesting and storing the data (blinded as to the source) and making it available in a competitive fashion to investigators trying to answer the important questions. Feedback to the providers of the data would then be given to improve the data collection process.

In addition, to aid the young investigators, easier-to-use and validated outcome measures (especially specific to amputees) need to be developed to evaluate effective intervention strategies. Primary care practitioners need education to provide patient- and subgroup-specific

education to patients, especially on peripheral vascular disease [17, 28]. These educational interventions should be led by organizations such as the AAOS, the AOA, or one of the subspecialties in orthopaedics or general surgery.

How Do We Get There?

The orthopaedic leadership (AAOS) should lead the movement to start these programs. It should identify which organizations (ie, American Orthopaedic Foot and Ankle Society, American Orthopaedic Society for Sports Medicine, Orthopaedic Research Society) should approach the entities that own the currently existing databases (Kaiser Permanente, Veterans Affairs, Centers for Medicare and Medicaid Services, United, Blue Cross Blue Shield). They should then monitor the progress and inform the members as to the availability of the information. These organizations should also help the primary care providers (ie, American Academy of Physician Assistants, American Physical Therapy Association, American Academy of Nurse Practitioners, American Nursing Association, American Podiatric Medical Association, National Podiatric Medical Association, National Medical Association, National Hispanic Medical Association, American Academy of Family Physicians) develop a consensus program to educate patients on diabetic foot care management and specific to peripheral vascular disease.

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