RESEARCH PAPER

The intersection of disability and healthcare disparities: a conceptual framework

Michelle A. Meade¹, Elham Mahmoudi², and Shouu-Yih Lee³

¹Department of Physical Medicine and Rehabilitation, University of Michigan School of Medicine, Ann Arbor, MI, USA; ²Division of Plastic Surgery, Department of Surgery, University of Michigan School of Medicine, Ann Arbor, MI, USA, and ³Department of Health Management and Policy, University of Michigan School of Public Health, Ann Arbor, MI, USA

Abstract

Purpose: This article provides a conceptual framework for understanding healthcare disparities experienced by individuals with disabilities. While health disparities are the result of factors deeply rooted in culture, life style, socioeconomic status, and accessibility of resources, healthcare disparities are a subset of health disparities that reflect differences in access to and quality of healthcare and can be viewed as the inability of the healthcare system to adequately address the needs of specific population groups. Methods: This article uses a narrative method to identify and critique the main conceptual frameworks that have been used in analyzing disparities in healthcare access and quality, and evaluating those frameworks in the context of healthcare for individuals with disabilities. Specific models that are examined include the Aday and Anderson Model, the Grossman Utility Model, the Institute of Medicine (IOM)'s models of Access to Healthcare Services and Healthcare Disparities, and the Cultural Competency model. Results: While existing frameworks advance understandings of disparities in healthcare access and quality, they fall short when applied to individuals with disabilities. Specific deficits include a lack of attention to cultural and contextual factors (Aday and Andersen framework), unrealistic assumptions regarding equal access to resources (Grossman’s utility model), lack of recognition or inclusion of concepts of structural accessibility (IOM model of Healthcare Disparities) and exclusive emphasis on supply side of the healthcare equation to improve healthcare disparities (Cultural Competency model). In response to identified gaps in the literature and short-comings of current conceptualizations, an integrated model of disability and healthcare disparities is put forth. Conclusion: We analyzed models of access to care and disparities in healthcare to be able to have an integrated and cohesive conceptual framework that could potentially address issues related to access to healthcare among individuals with disabilities. The Model of Healthcare Disparities and Disability (MHDD) provides a framework for conceptualizing how healthcare disparities impact disability and specifically, how a mismatch between personal and environmental factors may result in reduced healthcare access and quality, which in turn may lead to reduced functioning, activity and participation among individuals with impairments and chronic health conditions. Researchers, health providers, policy makers and community advocate groups who are engaged in devising interventions aimed at reducing healthcare disparities would benefit from the discussions.

Keywords

Access to care, disability, healthcare access, healthcare disparities, healthcare quality, quality of care

History

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Introduction

Health disparities, as defined by the National Institute of Health (NIH) workgroup in 1999, are: differences in the incidence, prevalence, mortality, and burden of diseases and other adverse health conditions that exist among specific population groups in
USA [1]. In contrast, healthcare disparities refer to differences in the quality and outcomes of health services that are not due to access-related factors or clinical needs, preferences, and appropriateness of interventions [2]. Healthcare disparities are a component of health disparities and a factor that affects health outcomes. This article focuses on examining existing models of healthcare access, healthcare disparities and disability, and proposing an integrated conceptual framework that addresses disparities in healthcare among individuals with disabilities.

Numerous reports now conclude that people with disabilities are one of the largest and most underserved subpopulations in USA [3], consisting of >54 million Americans [4]. Mounting evidence demonstrates differences in incidence, prevalence, mortality, and burden of disease between people with disabilities and those without, as well as differences in access to, quality of, and outcomes from the healthcare services that are provided among people with disabilities [5–7].

The objective of this article is to provide a theoretical framework to conceptualize how personal factors – such as gender, race, culture, motivation and education – interact with environmental factors to produce differences and disparities in access to healthcare and healthcare quality, both between individuals with and without disabilities, as well as among individuals with disabilities. We used a narrative review approach as our method of identifying and critiquing the existing models and conceptual frameworks.

In the following section, we will review a selection of current research associated with healthcare disparities among individuals with disabilities. Next, we will present predominant conceptual models of healthcare access and utilization, models of healthcare disparities and models of disability. For each, the strengths and shortcomings will be identified, particularly as they apply to individuals with disabilities. Finally, we propose an integrated model that more comprehensively explains the experience of healthcare disparities for individuals with disabilities. This integrated model can be used by policy makers, healthcare providers and administrators, researchers, advocacy organizations, and individuals with disabilities to begin to identify and address modifiable factors that may lead to more equitable access to healthcare.

Health and healthcare disparities among individuals with disabilities

While disparities associated with race and ethnicity are well known, those related to disability have received relatively little attention. Nonetheless, existing evidence consistently indicates that people with disabilities experience significantly higher rates of early death, preventable chronic conditions, and oral diseases [5–7] and are more likely to undergo severe medical complications and to experience hospitalizations than those without disabilities. A recent report by the Institute on Disability at the University of New Hampshire, Health Disparities Chart Book on Disability and Racial and Ethnic Status in USA [3] compared the health experiences of people with disabilities with those of ethnic minorities and showed that people with disabilities had less desirable experiences for a wide range of outcomes, including health status, health behaviors, obesity, diabetes and cardiovascular diseases.

Research also reveals that people with disabilities are more likely to have unmet healthcare needs [8,9] and use fewer medical services associated with preventive care or health maintenance [3,10–15]. Medicaid beneficiaries with disabilities, for example, have a higher prevalence of smoking-related cancers [16–18] and women with disabilities are less likely to have regular mammograms and more likely to have cancer detected at a later stage [16].

There has been an increasing public effort to address the health and wellbeing of individuals with disabilities [9], yet only a limited number of studies have investigated the determinants of disparities in healthcare among this population. Disparities in access to primary care and preventive services are particularly important because they are the main modifiable factors associated with an individual’s health.

It is important to note that individuals with disabilities are not a homogenous group. They are as diverse as their peers without disabilities and have varying backgrounds, risk factors, strengths, resources and needs. While previous studies reveal that individuals with disabilities are statistically more likely than those without disabilities to be female, from racial and ethnic minority backgrounds, older, and living in poverty [19], the implications of these factors remain largely unknown. Although the impact of ‘multiple minority status’ has been discussed in the literature [20] and supported by research findings, there is relatively a small body of research that examines racial/ethnic or gender disparities among people with disabilities [21–23]. Women and minorities with disabilities have been found to report significantly less access to care and to receive far fewer preventive services than white males with disabilities [21–23]. Furthermore, individuals with disabilities who are also members of historically marginalized groups tend to experience vulnerabilities due to less access to or lower quality of care. Previous studies show these vulnerabilities are particularly salient for individuals with disabilities who are poor, lack health insurance, are from racial/ethnic background, or are geographically vulnerable [24,25].

Key concepts and models in access to healthcare

Access to healthcare incorporates a variety of nuanced definitions. It has been defined as timely, sufficient and appropriate healthcare of adequate quality such that health outcomes are maximized [26]. Penchansky and Thomas [27] operationalized the concept in terms of ‘five A’s’: affordability, availability, accessibility, accommodation and acceptability. Affordability is how the provider’s charges relate to the client’s ability and willingness to pay for services. Availability is the extent to which the provider has the requisite resources (i.e. personnel and technology) to meet the needs of the client. Accessibility, as currently conceptualized in health policy research, refers to geographic proximity and is determined by how easily the client can physically reach the provider’s location. Accommodation reflects the extent to which the healthcare service is provided in a way that meets the needs, constraints and preferences of the client. Factors such as hours of operation, need for appointments, and telephone and telehealth services can be relevant aspects of this factor. Finally, acceptability refers to the reciprocal relationship between the provider and client and their level of comfort as related to fixed characteristics (i.e. age, sex, race/ethnicity), as well as the diagnosis and type of coverage of the client [28].

Later definitions of healthcare access have incorporated notions of the fit among personal, sociocultural, economic and system-related factors that enable individuals, families and communities to have timely, needed, necessary, continuous and satisfactory health services [29]. Of course, these conceptualizations do not specifically address disability, though the interaction between the two is an implicit part of health and healthcare disparities and will be addressed later.

Models of access to healthcare focus on the interaction between individual and environmental factors. The seminal work in the area was conducted >30 years ago, when Aday et al. [30–33] presented a framework for health access.
This model is still relevant today, though it has been modified by multiple researchers to explain how changes in today’s system—particularly, managed care—influence health access [28,29,34].

In brief, the Aday and Andersen model of access to care considers use of medical services as a function of predisposing, enabling, and need-related factors. Within this model (Figure 1), health policy influences both the characteristics of the delivery system and characteristics of “at risk” populations. Health policy also affects the resources and organization of health delivery systems by supporting or ignoring issues such as health insurance, education of healthcare professionals, patients’ bill of rights and support for healthcare services in underserved areas. Both health policy and the health delivery systems influence who is seen as at risk. The influence is unidirectional, as the individual characteristics of patients are perceived as having little direct influence on the delivery system itself, though advocacy by or on behalf of those populations can lead to changes [34].

Utilization of health services within the Aday and Andersen model is related to the availability of those services and the needs (both perceived and evaluated) of the consumer. Consumer satisfaction with services is only relevant to the extent that there is interaction with utilization of those services and is a factor of how well the system fits with consumer needs, resources and concerns. Satisfaction with services then influences future healthcare utilization [27,35,36].

Although this model is widely used and has evolved over time to better capture the factors that influence the use of healthcare systems, it has several shortcomings. Among these are its emphasis on need factors and individual characteristics as opposed to consideration for cultural and contextual factors [37]; also notable is its failure to address differences in healthcare quality. Because of these, the Aday and Andersen model does not foresee a need for interventions tailored for vulnerable subpopulations such as minorities, older adults and individuals with disabilities [38].

Another model that is worth considering when discussing issues of access to healthcare is Grossman’s Utility-Based Model of Demand for Health and Healthcare [39]. According to this model, which is based on the theory of human capital, individuals invest in themselves through education, healthy behaviors and other resources to increase their wellbeing over their life course. This model articulates that it is not medical care that individuals seek, but rather health itself; individuals demand healthcare in order to be healthy and productive. Health, then, is seen as being produced by individuals via health investment efforts and purchase of healthcare services. As a result, health can be considered a capital good that is durable and leveraged to allow for production of other important outcomes [39]. Within the Grossman model, then, health is considered both a consumption good (individuals demand health because it makes them feel better) and a capital good (healthier individuals are more productive and can earn more over time). While this model has been widely used by health economists for over 40 years, it includes unrealistic assumptions. In particular, it is based on an assumption that all consumers have equal access to resources – in particular, equal access to perfect and complete information – to make optimal decisions about health-related issues [40–42]. In addition, it fails to recognize or account for uncertainties and unforeseeable fluctuations in health, economics and all areas of life [40].

Models of healthcare disparities

The IOM Model of Access to Healthcare Services [36,43] (Figure 2) extends the Aday and Andersen Model to specifically address the issue of equitable versus disparate healthcare. In this IOM Model, health outcomes (including health status and equity of services) result from the process by which personal and family characteristics influence the structural and financial factors to either support or serve as barriers in utilization of healthcare services [34,36]. Once an individual has accessed or interacted with the healthcare system, health outcomes are mediated by the quality of providers, the appropriateness of the care, the efficacy of a treatment, and an individual’s adherence to that treatment [32,34,36]. Thus, the IOM model begins to illustrate how both individual and system factors can either support or hinder healthcare utilization and how health and access to healthcare are both influenced by healthcare systems and individual’s own life style, culture and health behavior.

In the 2003 report, “Unequal Treatment: Confronting Racial and Ethnic Disparities in Healthcare [2]” the IOM expanded on how the disparities in the quality of treatment were perpetuated. This report provides substantial evidence on how the quality of healthcare differs not because of factors outside of the healthcare
system that affect access to care, but rather because of factors associated with the design of healthcare systems and health policies as well as discrimination that happens at the level of the provider. These factors influence how information about health is taken in, how that information is interpreted and what options are provided for treatment based on those interpretations (Figure 3). In considering this model, it is important to recognize that differences in the quality of care result from differences in decision making. To the extent that decision making is evidence-based and based on standardized protocols, disparities can sometimes be minimized [2]. However, when the decision making protocol includes assessment instruments or standardized interventions that have not been validated for use with the population with which it is being used, it may in fact wind up perpetuating or exacerbating disparities.

While the IOM model of Healthcare Disparities does not include those differences that are due to access-related factors, clinical needs, preferences, and appropriateness of interventions [2], these issues must be considered in the context of healthcare for individuals with disabilities. Therefore, in our integrated model, we define healthcare disparities as the relative ability of healthcare systems to address the specific needs and concerns of various populations of individuals with disabilities through provision of appropriate and relevant services.

The Cultural Competency model is another model that discusses how healthcare disparities arise. This model...
acknowledges the existence of disparities in health and healthcare and explains healthcare disparities as arising from cultural differences that often exist between providers and patients. Cross et al. [44] defines culture as the ‘‘integrated pattern of human behavior that includes thoughts, communications, actions, customs, beliefs, values and institutions of a racial, ethnic, religious or social group’, and cultural competence as a ‘‘set of congruent behaviors, attitudes and policies that come together in a system, agency or amongst professionals and enables that system, agency or those professionals to work effectively in cross-cultural situations’’. In extension, this model suggests specific techniques to reduce racial/ethnic disparities in health and health care. However, while the Cultural Competency model recognizes that racial/ethnic disparities in healthcare are associated with factors such as low socioeconomic status or lack of adequate health insurance coverage, the interventions suggested to remedy these disparities focus only on the supply side of the equation, primarily by increasing the number of healthcare providers from racial and ethnic minority backgrounds.

Definitions and models of disability

There is no universal definition for disability in the literature. It is most commonly defined as limitations or impairments in major daily life activities, though the exact types of limitations or activities often depend on the context. For example, in Title I of the Americans with Disability Act (ADA), Congress defines disability as a physical or mental impairment that substantially limits a major life activity; a record of such an impairment; or being regarded as having such an impairment [45]. In Census 2000, individuals were classified as having a disability if they endorsed having any of the following: (i) a long-lasting condition such as blindness or impairments in vision or hearing, (ii) a condition that substantially limited one or more basic physical activity (e.g. walking, climbing stairs, reaching) or (iii) a physical, mental or emotional condition for at least 6 months duration that caused difficulty with learning, concentration or memory, dressing, bathing or getting around the house, going outside the home alone, and/or working at a job or business [46].

Models of disability [47–51] have increasingly recognized the role of contextual factors and have explicitly incorporated contingencies in the pathways between pathology and disability. One of the earliest models of disability had its origins in the early 1960’s when Nagi [48] developed the Disablement Model that differentiated disability from three other distinct yet related concepts: active pathology, impairment and functional limitations.

The main pathway in the model starts with pathology (e.g. disease, injury), which in turn influences impairments (e.g. dysfunctions in specific body systems), which lead to functional limitations (restrictions in basic physical and mental actions), which ultimately influence the ability to perform everyday activities, or disability. Verbrugge and Jette [50] expanded on this conceptualization by emphasizing the intervening factors that ‘‘speed up and slow down’’ the pathway between pathology and disability. Their model dichotomized modifying factors into intra-individual (e.g. psychosocial attributes, coping styles, activity accommodations) and extra-individual (e.g. rehabilitation, external supports, and the built physical and social environment) [50].

The International Classification of Functioning, Disability and Health (known as the ICF) is currently the most widely accepted model of disability. It was developed by the World Health Organization (WHO) [51] and endorsed by the Institute of Medicine [51], the World Health Assembly, the National Center for Health Statistics (NCHS) at the Centers for Disease Control and Prevention (CDC), and the North American Collaborating Center (NACC) for use in research, surveillance and reporting [52]. While health conditions are classified primarily through the International Statistical Classification of Diseases and Related Health Problems, 10th revision (ICD-10), the ICF classifies functioning and health (including impairment and disability) to describe how people live with their health condition [51–53]. Functioning is described at three levels (Figure 4): the level of the body (functions and structures), the level of the person (activities) and the level of society (participation in life situations). Negative functioning at these three levels is represented by impairments, activity limitations (or disability) and participation restrictions. For example, an individual with arthritis may experience pain (impairments in body functions and structures) that leads to severe difficulty in walking (mobility disability), which may restrict his or her involvement in life situations, such as meeting with close friends (participation restriction) [51].

The ICF model acknowledges the importance of environmental and personal factors in modifying the consequences of impairments for activities or participation. Specifically, in the ICF, environmental factors make up ‘‘the physical, social and attitudinal environment in which people live and conduct their lives’’ [51]. These factors are classified under five broad headings: products and technology, supports and relationships, attitudes and stereotypes, public/private services or policies, and natural and human-made environments. A complete review of the specific factors is beyond the scope of this article; however, relevant
factors in each category and their interactions are addressed later in the narrative.

While the ICF provides brief descriptions of relevant environmental factors, additional information and research is required about the personal factors that are relevant to disability as well as about the interaction between personal and environmental characteristics [52]. Personal factors are not currently classified in the ICF [51] but are often discussed in related articles and models [20,53–57]. In our integrated model of disability and disparity in health and healthcare, we imbred the factors from other models and conceptualizations within the ICF framework and extend it to enhance understanding of this important construct.

Conceptualizing healthcare disparities among individuals with disabilities

By overlaying the models of healthcare quality and access provided earlier onto models of disability, we have developed the Model of Healthcare Disparities and Disability (MHDD). This an integrated conceptual model that views health and healthcare disparities among individuals with impairments and chronic health conditions as a result of the dynamic interaction of personal and environmental factors. Within this context, the term disability is used as defined by the WHO as ‘an umbrella term for impairments, activity limitations and participation restrictions’ [58] (WHO, page 2), each of which can be impacted by differing levels of healthcare quality, access and utilization.

Table 1 provides a summary of the variables and factors that are addressed in each of the models and frameworks already discussed. The variables from the models of disability, healthcare access and health disparities are classified into one of four categories: individual factors, environmental factors, interactions (between individual and environmental factors) and health outcomes. These categories partially correspond with the ICF model and allow for better conceptualization of the interaction between environmental and personal factors and define how disparities in healthcare quality, healthcare access and health outcomes can occur. In particular, it is the match or fit between characteristics in the environment and personal factors that appear related to healthcare disparities for various populations or groups.

For example, individuals with spinal cord injury (SCI) typically have higher rates of diabetes, heart disease and depression than the general population [59–61]. However, health status among those individuals will depend on a variety of factors including accessibility of medical care, proper diagnosis and treatment by healthcare professionals, and adherence to health recommendations. These factors are influenced by both characteristics of the individual (i.e. health literacy, health behaviors, resources) and those within the environment (i.e. social support, availability of public transportation, insurance, or public health policies).

However, it is the interaction between these factors that is truly important for healthcare disparities. Policies and other ‘environmental factors’ designed and developed for one particular group of individuals may not meet the needs of another group. For example, an individual with SCI may be given the recommendations for activity and exercise that are developed for the general population; the efficacy and relevance of these recommendations, however, may be limited if the patient is unable to ambulate or cannot find or afford a fitness facility with accessible equipment. Similarly, health professionals who are used to working with individuals with higher levels of education or health literacy may have a communication style that does not match the needs, assumptions or expectations of other groups; as a result, there may be miscommunications that lead to disparate outcomes.

This interaction between personal factors and factors within the healthcare system is articulated in both Table 1 and Figure 5. As evident in both, health systems and health policies are considered as environmental factors. These factors then interact with personal factors (i.e. race/ethnicity, gender, income, insurance status/type) to influence healthcare access. Healthcare access can then modify disability and health status. That is, the affordability, availability, accessibility, accommodation and acceptability of (e.g. satisfaction with) services may influence the extent to which an individual is able to manage their impairment and maintain their health as well as future utilization of service. In this model, availability of resources would include the extent to which the health system/provider has both trained personnel and equipment to accommodate an individual with a disability (or with a particular type of disability) and accessibility would include the structural accessibility of the office/facility as well as the extent to which the location of the health system and clinic hours were feasible for the patient to assess.

In the case of the physical environment, concepts of universal design and visitability were created to promote inclusion of individuals with disabilities. The ADA was created to allow for inclusion of individuals with disabilities into society as a whole – particularly as associated with employment. Despite this, numerous buildings remain inaccessible, limiting the ability of individuals with disabilities to be employed in these settings, or in jobs that require access to these settings, which in turn limits access to private insurance and stable income. In addition, a significant number of healthcare offices remain both inaccessible to individuals with disabilities with regard to physical barriers as well as the training provided to office staff [62–65]. Finally, several studies note that the majority of primary care physicians, dentists and psychologists continue to work out of offices that are minimally accessible to those with disabilities [62–65].

Attitudes of healthcare providers and their interaction with personal characteristics of patients are particularly salient when identifying provider-level factors that can result in healthcare disparities. In particular, the general or specific opinions and beliefs of health professionals about the person (in this case, the individual with a disability) or about other matters (e.g. social, political and economic issues) that influence individual behaviors and actions (of the health care provider) [51], which, in turn can result in differences in the quality of care provided and healthcare disparities. In other words, the individual attitudes of healthcare professionals (e.g. about women, African Americans, individuals with gunshot wounds, people with disabilities or individuals who are obese) influence their behavior and actions, particularly when there are no clear guidelines or standards available [2].

It is important to recognize that many of these attitudes are the result of unconscious biases and stereotypes rather than conscious processes [2]. More conscious beliefs of the healthcare provider, such as moral or religious beliefs about the appropriateness of abortion or birth control, may also influence access to care and health outcomes for individuals with disabilities [2,66]. In particular, while physicians cannot refuse to care for patients based on race, gender, sexual orientation, gender identity or any other criteria that would constitute invidious discrimination, a physician may be able to decline a potential patient if a specific treatment sought by an individual is incompatible with the physician’s personal, religious or moral beliefs [67, section E10.05].

A poor fit between services, systems and policies and the personal factors of individuals with disabilities can also result in differential access and healthcare disparities. For example, an individual with a disability who only speaks Spanish will
Table 1. Summary of factors associated with health and healthcare disparities.

<table>
<thead>
<tr>
<th>Individual (patient) level</th>
<th>Environmental</th>
<th>Interactions between individual and environment</th>
<th>Health outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biologic factors(^4)</td>
<td>Products and technology (P&amp;T)(^7)</td>
<td>Design, construction and building P&amp;T for public use</td>
<td>Health behaviors(^3)</td>
</tr>
<tr>
<td>- Genetics/genetic predisposition</td>
<td>- For personal use in daily living</td>
<td>- P&amp;T for private use</td>
<td>- Preventative care</td>
</tr>
<tr>
<td>- Race/ethnicity</td>
<td>- For personal indoor and outdoor mobility and transportation</td>
<td>- P&amp;T of land development</td>
<td>- Nutrition/diet</td>
</tr>
<tr>
<td>- Gender</td>
<td>- For communication</td>
<td>- Assets</td>
<td>- Exercise/physical activity</td>
</tr>
<tr>
<td>- Injury/impairment</td>
<td>- For education</td>
<td>- Products or substances for personal consumption</td>
<td>- Oral healthcare</td>
</tr>
<tr>
<td>- Age</td>
<td>- For employment</td>
<td></td>
<td>- Stress management/coping</td>
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<tr>
<td></td>
<td>- For culture, recreation and sport</td>
<td></td>
<td>- Tobacco, alcohol and drug use</td>
</tr>
<tr>
<td></td>
<td>- For the practice of religion and spirituality</td>
<td></td>
<td>- Adherence to medical recommendations(^6)</td>
</tr>
<tr>
<td>Social and cultural factors(^4)</td>
<td>Natural and human-made changes to environment(^7)</td>
<td>Natural events</td>
<td>Quality of care(^5)</td>
</tr>
<tr>
<td>- Language/acculturation</td>
<td>- Physical geography</td>
<td>- Human-caused events</td>
<td>- Appropriate intake procedures(^5)</td>
</tr>
<tr>
<td>- Health literacy</td>
<td>- Population</td>
<td>- Sound</td>
<td>- Appropriate norms(^5)</td>
</tr>
<tr>
<td>- Education</td>
<td>- Climate</td>
<td>- Air quality/pollution</td>
<td>- Tests valid and reliable for population(^5)</td>
</tr>
<tr>
<td>- Acculturation</td>
<td></td>
<td></td>
<td>- Interventions reliable, valid and effective with given conditions(^4,5)</td>
</tr>
<tr>
<td>- Preferences</td>
<td>Support and relationships(^7)</td>
<td>People in subordinate positions</td>
<td>- Interventions reliable, valid and effective with given populations(^4,2)</td>
</tr>
<tr>
<td>- Religion/spirituality</td>
<td>- Immediate family</td>
<td>Personal care providers/personal assistants</td>
<td>Satisfaction with care(^2,4,5)</td>
</tr>
<tr>
<td>- Social support</td>
<td>- Extended family</td>
<td>- Health professions(^5,6)</td>
<td></td>
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<tr>
<td>- awareness(^5)</td>
<td>- Friends</td>
<td>- Other professionals</td>
<td></td>
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<tr>
<td>- Socioeconomic status</td>
<td>- Acquaintances, peers</td>
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<tr>
<td>- Marital status</td>
<td>- Community members</td>
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<tr>
<td>- Insurance</td>
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<tr>
<td>Impairment related factors(^7)</td>
<td>People in positions of authority</td>
<td></td>
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<tr>
<td>- Injury/impairment</td>
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<tr>
<td>- Severity of injury</td>
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<td>- Time since injury</td>
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<tr>
<td>- Functional limitations</td>
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<tr>
<td>Psychological factors(^4)</td>
<td>Health delivery system(^2,5)</td>
<td>Policies of health care system</td>
<td>Health access(^1,2,4)</td>
</tr>
<tr>
<td>- Communication skills</td>
<td>- Social norms, practices and ideologies(^6)</td>
<td>Social norms, practices and ideologies(^6)</td>
<td>- Ability to get to healthcare facility(^1)</td>
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<tr>
<td>- Self-esteem</td>
<td>- Geographic location of services</td>
<td></td>
<td>- Cost of services(^4)</td>
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<td>- Self-efficacy</td>
<td>- Resources</td>
<td></td>
<td>- Appropriate assessment of problem/condition(^4,5)</td>
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<tr>
<td>- Personality</td>
<td>- Education and quality of healthcare providers(^4,6)</td>
<td></td>
<td>- Specialist care available(^1)</td>
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<tr>
<td>- Motivation</td>
<td>Services, systems and policies(^2,7) as related to:</td>
<td></td>
<td>- Medical equipment that facilitates assessment and treatment of patient(^1)</td>
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<tr>
<td>- Health beliefs</td>
<td>- Media services</td>
<td></td>
<td>- Accessibility of durable medical equipment (DME)(^7)</td>
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<td>- Trust/mistrust of healthcare system</td>
<td>- Economic</td>
<td></td>
<td>- Timeliness of care(^1)</td>
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<td>- Stress/distress</td>
<td>- Social security</td>
<td></td>
<td>- Accessibility of buildings and equipment(^1)</td>
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<td>- Coping mechanisms</td>
<td>- Health policy</td>
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<tr>
<td></td>
<td>- Education and training</td>
<td></td>
<td>- Availability of medications (able to find and pay for)(^2)</td>
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<td>- Labor and employment</td>
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<td>- Legal</td>
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</table>

\(^1\)Penchansky and Thomas definition; \(^2\)Aday and Anderson model; \(^3\)Grossman’s Utility Model; \(^4\)IOM Model of Access to Personal Healthcare Services; \(^5\)IOM Model of Health Disparities; \(^6\)Cultural Competency Model; \(^7\)ICF Model.
experience significantly reduced access to healthcare if the provider or healthcare system does not have the capacity to communicate in the same language. Moreover, architectural designs and equipment that may be adequate for individuals with visual impairments may not equally accessible for individuals with mobility impairment, particularly if they use power wheelchairs [68].

Government policies related to healthcare are critical in shaping the ways that services are conceptualized and delivered. In particular, policies focused on increasing the racial and ethnic diversity of healthcare providers have expanded the recognition of the role of cultural factors within the medical system as well as potential concordance between providers and patients [2,43,66,69,70]. Policies may also prioritize research agendas that are more or less inclusive of minority populations, including women, individuals from racial and ethnic minority backgrounds, and individuals with disabilities.

In brief, MHDD provides a way of conceptualizing and understanding the findings that we see in both the research literature and people’s lives. More importantly, it allows for the recognition of a wealth of modifiable factors to improve healthcare access, quality and outcomes for individuals with disabilities, which exist in both the personal and environmental domains. However, it is only when the personal and environmental factors are linked and considered within the context of one another that improvements can be optimized. This has been repeatedly demonstrated in research and public health programs [71–73], but not previously integrated into conceptualizations of healthcare disparities or the functioning of individuals with disabilities.

Conclusions

This article has articulated how existing models can be integrated to conceptualize health and healthcare disparities for individuals with disabilities. The purpose is not merely to promote a theoretical interest. Rather, providing a framework for understanding how disparities occur also provides options that may begin to address those issues. In particular, clinicians, researchers, educators, administrators, policy makers and advocates who are aware of the contextual factors in which healthcare disparities occur for individuals with disabilities can begin to target modifiable factors for intervention. In addition, by understanding disability as a personal characteristics, similar to race and culture, we can better translate existing research on health and healthcare disparities to apply to this large, but often unrecognized population.

Declaration of interest

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