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The concepts of health inequality, disparities and equity in the era of population health



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1. Introduction

Unequal distribution of health and health care among groups of the U.S. population has been a national health problem at least since the founding of the country. The problem of differences in health status within the United States (U.S.). Population by factors such as race/ethnicity, gender, education, and geography (National Academies of Sciences, Engineering, and Medicine, 2017) direct our attention and perspectives away from individual risk factors and toward factors that influence population health.

The term, “population health” has evolved over last three decades in response to the questions, “What makes some people healthy and others unhealthy?” (Kindig, 2007; Robert Wood Johnson, 2017; Young, 2004) and “Why treat people’s illness without changing what makes them sick in the first place?” (WHO, 2008) These questions imply that there is an unequal distribution of health outcomes across populations as well as an unequal distribution of societal factors influencing health. Consequently, the concepts of disparity, inequity, inequality and their antecedents require our attention and should be incorporated as a guide for health policies and interventions targeted to populations. The purpose of this paper is to define health inequality, health disparity, and health inequity from a population health perspective and to illustrate the meaning of each term by presenting authentic real-world examples. This paper will extend our understanding of these concepts from an individual perspective to a population perspective (Fawcett, 2019).

2. Definitions of health inequality, health disparities, and health inequity in population health

2.1. Health inequality

Dictionaries define inequality as the “quality of being unequal or uneven” (Merriam-Webster, n.d.). The term, health inequality, used in most countries other than the U.S., is based on the seminal work of Margaret Whitehead in the United Kingdom (Whitehead, 2007), and refers not only to the quality of being unequal or uneven in health outcomes between groups but also to differences in social hierarchy. For the purposes of this paper, health inequality is defined as differences in the distribution of health status and achievement of health outcomes that exist among specific groups due to genetic or other factors that cannot be prevented or modified (Kawachi et al., 2002).

Example 1 illustrates an unequal distribution of health conditions. These conditions are the result of gender associated biological differences rather than to avoidable social conditions (Keyes & Galea, 2016). Women have a much higher incidence and mortality of breast cancer than do men. Prostate cancer may be a better example of inequality of health conditions as only men can have prostate cancer, inasmuch as women obviously do not have a prostate gland.

Example 1. An example of health inequalities: Differences in types of cancers by gender.

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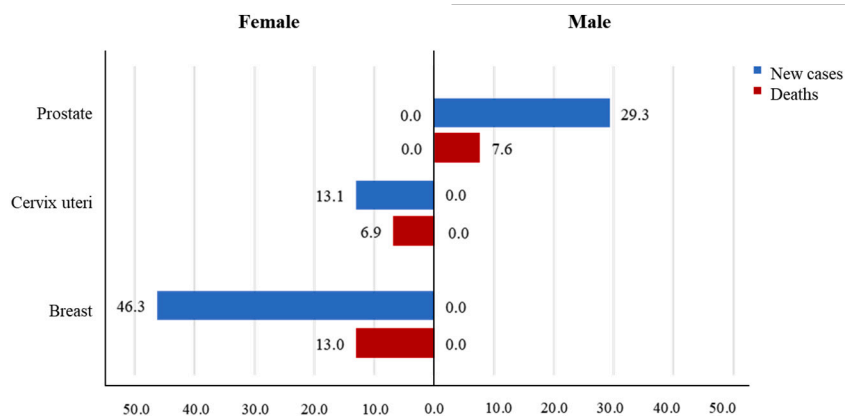


Fig. 1. Gender inequalities by type of cancer: incidence and mortality of cancers worldwide (GLOBOCAN, 2018 online analysis, <http://globocan.iarc.fr>). There is a higher incidence and mortality related to breast cancer among women than men.

2.2. Health disparities

Braveman et al. (2011) defined health disparities as systematic, plausibly avoidable health differences adversely affecting socially disadvantaged groups. In this definition, health disparities refer to both the different distribution of health outcomes as well as the different distribution of social determinants that are antecedents responsible for either promoting or decreasing the health of a population. Similarly,

type of health difference that is closely linked with economic, social, or environmental disadvantage (National Academics of Sciences, Engineering, and Medicine, 2019). Thus, health disparity refers to the systematic difference in any measurable aspect of health outcomes across populations due to the different distribution of social conditions across these populations.

Example 2 illustrates the meaning of health disparities.

Example 2. COVID-19 incident rates.

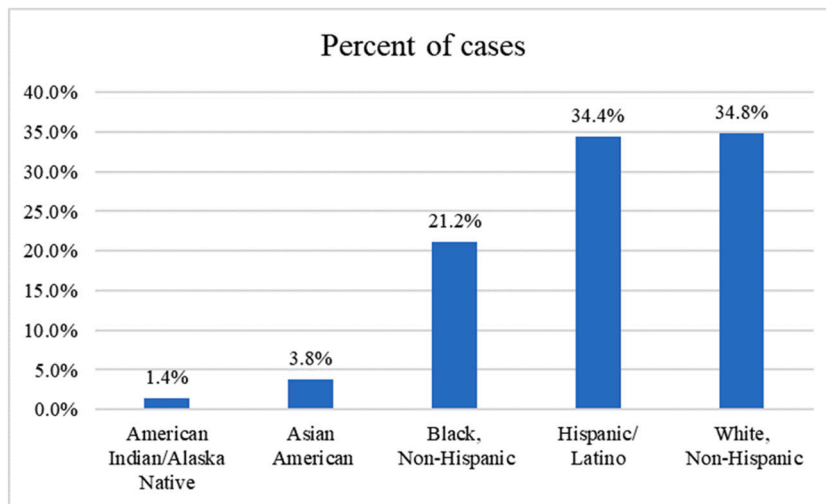


Fig. 2. COVID-19 incidence rates by race.

The graph based on the CDC weekly COVID-19 data by race, from January 22, 2020 to May 30, 2020 depicts disproportionately high infection rates among minority ethnicity. Among the 1,761,503 aggregate cases reported to CDC, individual case reports for 1,406,098 were submitted to CDC case surveillance. Among 599,636 cases with known race and ethnicity, 34% were Hispanic or Latino of any race (Hispanic), 21% were non-Hispanic black (black). These findings pointed out to the fact that these groups account for 18% and 13% of the U.S. population, respectively, are disproportionately affected by the COVID-19 pandemic.

the U.S. Centers for Disease Control and Prevention (CDC, 2018) defined health disparity as the preventable differences in the burden of disease, injury, violence, or the opportunities to achieve optimal health that are experienced by socially disadvantaged populations. These definitions refer to poor health outcomes among socially disadvantaged people without further specification. Healthy People 2010 had defined health disparities in very general terms as the differences in health among different population groups. It is interesting to note that one of the two overarching goals of Health People 2010 was “eliminating health disparities” which was a more aggressive change from “reducing health disparities” of Healthy People 2000. Recognizing the need for clarity, Healthy People 2020 defined health disparities as a particular

Example 2 focuses on COVID-19 infection incidence rates to illustrate differences in health outcomes due to the different distribution of social conditions of race, living conditions, occupations, and health care access which cause the deteriorating health outcomes of COVID-19 mortality (Stokes et al., 2020). Disaggregating data by race reveals that there are higher rates of COVID-19 infection among Blacks and Hispanics in all age groups. Thirty-three percent of those infected were Hispanic, and 22% were Black, whereas these groups account for only 18% and 13% of the U.S. population (U.S. Census Bureau, 2020), respectively. Physical risk factors such as CVD, diabetes, and chronic lung disease cannot fully explain why Blacks and Hispanics, especially, Hispanics are disproportionately infected with COVID-19 (Stokes et al.,

Table 1
Definitions of concepts.

Concepts	Definitions
Health inequality	Differences in the distribution of a health outcomes across populations
Health disparities	Systematic differences in any measurable aspect of health outcomes due to the different distribution of social conditions across these populations.
Health inequity	Disparities in metrics of health outcomes due to avoidable differences in social, economic, geographical or healthcare resources that are unfair and unjust

2020). Social determinants can help to explain this health disparity. The members of these ethnic minority groups are more likely to work in service industries that require interaction with the general public or close contact with co-workers, are not amendable to teleworking, and use public transportation (U.S. Bureau of Labor Statistic, 2019; Substance Abuse and Mental Health Services Administration [SAMHSA], 2020) that place them at risk for exposure to COVID-19. They are more likely to be uninsured or/and do not have a usual source of health care, which are barriers to accessing COVID-19 testing and treatment (Hayes et al., 2017; SAMHSA, 2020). Moreover, they are more likely to live in public, multigenerational, or multi-family housing where social distancing and self-isolation are impossible (Cohn & Passel, 2018; SAMHSA, 2020). Thus, the definition and measurement of disparities in COVID-19 infection requires greater emphasis on understanding the places where they live and where they work.

2.3. Health inequity

Healthy People 2020 defines equity to mean social justice or fairness; it is an ethical concept, grounded in principles of distributive justice. The Secretary's Advisory Committee for Healthy People 2030 (2018) recommended that achieving health equity require eliminating avoidable, unjust, and unfair health inequities and health disparities through short- and long-term actions. However, Lowe (2015) has pointed out that equity in health is considered a value judgment on the equal or unequal health status of individuals, families, communities, or whole populations.

The term of inequity has evolved over time starting from differences between groups of people, with a focus on the quality of being fair, impartial, and inequality (Oxford English Dictionary, n.d.) to the World Health Organization (WHO, 2020) definition of "the absence of avoidable or remediable differences among groups of people, whether those groups are defined socially, economically, demographically, or geographically". We posit that health inequity is the difference in health outcomes of populations due to avoidable antecedent factors, which is an unfair and social injustice.

Example 3 illustrates the health inequity of funding for sickle cell anemia (SCD) research. Approximately 70,000 to 100,000 Americans have sickle cell disease, the most common form of an inherited blood disorder. It is more common among people of African descent, about 1 in 13 carriers of the sickle cell gene are African American (CDC, 2019). The difference in sickle cell anemia incidence across populations can be considered an inequality because sickle cell anemia is a genetic disease, which is caused by a mutation in the hemoglobin-Beta gene found on chromosome 11 (Ashley-Koch et al., 2000; Steinberg & Sebastiani, 2012). This description sounds like health inequality because the difference is due to unavoidable biological factors. However, if this case is further unpacked we find that there are a number of avoidable factors including that life expectancy is 30 years shorter than people without sickle cell anemia, that the majority of the sickle cell anemia population are Medicaid beneficiaries, that these people experience longer waiting times to see a physician or get pain medication, and that the number of physicians trained and willing to treat sickle cell anemia patients is limited. Moreover, although this disease was discovered more than 100 years ago, there are only two medications that have been approved for treatment of the disease (see Example 3). This seems to indicate that this disease, which is most frequently found among Blacks, has received

little attention including the research and funding necessary for better treatment. The differences in health outcomes in this case are a result of systemic and unjust distribution of treatment and research opportunities.

Example 3. An example of health inequities in research funding: Sickle cell anemia disease and cystic fibrosis

Table 1
NIH research funding and private, nonprofit association support of SCD and cystic fibrosis.

Variable	SCD	Cystic fibrosis
US prevalence ^a	100,000	30,000
Federal support		
NIH fiscal-year 2018 funding, in millions, \$ ^b	104	83
NIH funding per person with disease, \$	1040	2767
No. of federal grants ^c		
No. of grants funded in 1968	22	65
No. of grants funded in 1972, after Sickle Cell Anemia Control Act	215	80
No. of grants funded in 2004	331	459
Private philanthropic support, \$		
Cystic Fibrosis Foundation 2018 annual revenue ^d		135,604,341
Sickle Cell Disease Association of America 2017 annual revenue ^e	3,876,938	
Revenue per person affected with disease	39	4520
Total NIH and private support, in millions, \$	107.9	218.6
Total support per person affected with disease, \$	1079	7187

^a Sources: National Human Genome Research Institute (2013). About sickle cell disease. Available at: <https://www.genome.gov/Genetic-Disorders/Sickle-Cell-Disease>; and National Institutes of Health (2018) and National Human Genome Research Institute (2016). About cystic fibrosis. Available at: <https://www.genome.gov/Genetic-Disorders/Cystic-Fibrosis>.

^b Sources: National Institutes of Health (2018). Estimates of funding for various research, conditions, and disease categories (RCDC). Available at: https://report.nih.gov/categorical_spending.aspx.

^c Sources: Smith et al. (2006) Sickle cell disease: a question of equity and quality.

^d Sources: Cystic Fibrosis Foundation. Annual Report 2018. Available at <https://www.cff.org/About-Us/Assets/2018-Annual-Report.pdf>.

^e Sources: Sickle Cell Disease Association of America (2018). Annual Report 2017. Available at <https://www.sicklecelldisease.org/files/sites/181/2019/08/SCDAA-2017-Annual-Report.pdf>.

Sickle cell anemia disease (SCD) is the world's most common genetic disease, occurring in 1 of every 16,300 Hispanic-Americans and Whites, 1 of 365 Blacks (including 1 in 13 Black infants) (CDC, 2019). However, National Institutes of Health research funding for cystic fibrosis, which occurs in only a third of the number affected by SCD, is 3.5 times than for SCD research, and private foundation funding is approximately 400 times higher for cystic fibrosis than for SCD.

3. Discussion

The terms inequality, disparity, and inequity are often used interchangeably in population health without clarification of their meanings, underlying values, and antecedents. For example, Healthy People's overarching goals increasingly recognize the differences in health outcomes of groups of the U.S. population and the importance of the

societal impact on health. Healthy People 2000 was the first to introduce the term focused on reducing disparities, and it was strengthened in 2010 with a call to eliminate disparities. Health People 2020 included achieving equity and recognized the need for improving social and physical environments that promote health for all. However, it is important to define terms before developing metrics about them and deciding what we would like to accomplish. Therefore, we propose the definitions of equality, disparity, and equity in health we have given in this paper (see the Table 1). Clarifying these concepts and having accurate and meaningful metrics to measure the socioeconomic and demographic factors of health, as well as measures that address disparities in health and health care, can have a major impact on population health. It seems that the definitions of health equity are more than ones simply reflecting differences in health outcomes or that are empirically measurable. Measuring health inequities requires consideration of how to define unfair inequalities, inasmuch as social justice and fairness can be interpreted differently from different ethical, legal, and technical perspectives, these values may generate different definitions of health inequity. However, the distinctions are important because they inform health strategies and health policies that guide priorities and resource distribution to improve population health more broadly or to reduce health inequities with a focus on fairness and justice.

Noteworthy is that health inequity is linked with health disparity, inasmuch as health inequity is measured by health disparities metrics. In particular, whereas health disparity is the metric for assessing health equity, health inequity includes the additional dimension of the human right to have good health and social justice. Furthermore, inequities in health care are a result of unfair, avoidable differences in access to the resources needed to improve and maintain health or health outcomes and offer policy relevant information, whereas health inequality simply refers to the uneven distribution of health conditions or health outcomes.

4. Clinical implications

The WHO Constitution declared in 1948 that, “The enjoyment of the highest attainable standard of health is one of the fundamental rights of every human being without distinction of race, religion, political belief, economic or social condition” (Meier, 2017). This statement constitutes a very powerful mandate of moving toward health equity as a human right. Health equity is a subset of health differences between countries and within countries. It is relevant to social justice because these differences are deeply rooted in social conditions related to systematic associations with avoidable health differences. Clear definitions will assist us to develop effective health policies and strategies and determine priorities for use of limited resources and to accurately measure the health of populations and determinants of health as well as assess progress in these areas. However, the notion of “avoidability” can be highly subjective. Clarifying the meaning of health inequality, disparity, and inequity, with an understanding of the philosophical value-laden subjectivity of health equity will enable nurse practitioners, educators, researchers, and health policy makers to be more effective in advocating for what conditions make health disparities unfair and unjust and in development strategies to move toward health equity. This, in turn, may lead to further clarification and consistency in our communication about population health and fairness in the distribution of health outcomes and health resources.

CRedit authorship contribution statement

Haeok Lee: Conceptualization, Methodology, Writing - original draft. **Deogwoon Kim:** Resources, Visualization, Validation. **Sanga Lee:** Resources, Visualization, Validation. **Jacqueline Fawcett:** Validation, Writing - review & editing.

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