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Journal of Clinical Epidemiology 67 (2014) 56–64

Journal of Clinical Epidemiology

Applying an equity lens to interventions: using PROGRESS ensures consideration of socially stratifying factors to illuminate inequities in health

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Accepted 14 August 2013; Published online 1 November 2013

Abstract

Objectives: To assess the utility of an acronym, place of residence, race/ethnicity/culture/language, occupation, gender/sex, religion, education, socioeconomic status, and social capital (''PROGRESS''), in identifying factors that stratify health opportunities and outcomes. We explored the value of PROGRESS as an equity lens to assess effects of interventions on health equity.

Study Design and Setting: We assessed the utility of PROGRESS by using it in 11 systematic reviews and methodological studies published between 2008 and 2013. To develop the justification for each of the PROGRESS elements, we consulted experts to identify examples of unfair differences in disease burden and an intervention that can effectively address these health inequities.

Results: Each PROGRESS factor can be justified on the basis of unfair differences in disease burden and the potential for interventions to reduce these differential effects. We have not provided a rationale for why the difference exists but have attempted to explain why these differences may contribute to disadvantage and argue for their consideration in new evaluations, systematic reviews, and intervention implementation.

Conclusion: The acronym PROGRESS is a framework and aide-memoire that is useful in ensuring that an equity lens is applied in the conduct, reporting, and use of research.

Keywords: Health equity; Vulnerable populations; Interventions; Social determinants of health; Inequity; Minorities; Subgroups

1. Introduction

Many factors contribute to whether a population is described as ''disadvantaged.'' Globally, populations are, on average, living longer and healthier lives than at any other time in history. The average life expectancy at birth in 1955 was 48 years. By 1995, it was 65 years, and by 2025, it is predicted to reach 73 years. There are now more than 5 billion people with life expectancy of more than 60 years [1]. However, these improvements do not reach all groups of the world's population equally. Just as there are inequalities in access to natural resources that affect well-being, there are also inequalities in health status, which are not coincidental. Rather, they are driven by socially stratifying forces that are systemic in societies.

Conflict of interest: None.
Financial disclosure: None.

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0895-4356/$ - see front matter
http://dx.doi.org/10.1016/j.jclinepi.2013.08.005

What is new?

- PROGRESS refers to place of residence, race/ethnicity/culture/language, occupation, gender/sex, religion, education, socioeconomic status, and social capital.
- This article provides examples of unfair differences in disease burden and an intervention that can effectively address these health inequities for each of the PROGRESS factors.
- The acronym PROGRESS can be used as an aide-memoire, a framework to guide data extraction, and a tool to guide equity analyses for researchers to ensure explicit consideration of equity in the design of new intervention studies and in systematic reviews.

The World Health Organization has defined health inequalities as "differences in health status or in the distribution of health determinants between different population groups" [2] (e.g., racial, ethnic, sexual orientation, or socioeconomic groups). Some health inequalities are attributable to biological variations or free choice and others are attributable to the external environment and conditions that are mainly outside of an individual's control. In the first case, it may be impossible, or in the second case, ethically unacceptable, to change the underlying factor that is driving the inequity, and thus, it can be deemed unavoidable. However, in the third case, the uneven distribution of health may be avoidable, as well as unjust and unfair [4]. These differences have been described as disparities [3] or as "health inequities" [4]. It is the context in which one is born, lives, and works that causes underlying inequities in health. These inequities may result in differences across a population in terms of incidence of disease, health outcomes, and access to health care. Inequities in health are therefore linked to income, occupation, place of residence, and gender among other factors. Unlike the individual behavioral-based determinants of health (downstream factors), these upstream factors are ones over which individuals have little or no direct control but which can only be altered through social and economic policies and political processes [5]. To understand and act on health inequities, both upstream and downstream factors must be considered [6]. Depending on the context, particular factors may be more or less important for a certain population.

Although much of the literature has focused on inequities between countries, unfair differences in health are prevalent within countries as well. For example, in China, rates of childhood stunting are three times higher in rural areas than in urban areas [7], and maternal mortality is higher in poorer provinces than in richer provinces [8]. In India, immunization rates vary by caste and certain castes have low rates [9]. These differential health outcomes are not coincidental but rather are grouped according to socially stratifying forces such as place of residence and level of income [10]. There are also many significant differences in health outcomes among countries, regions, or continents [5] such as differences in child mortality in high-income countries (HICs) compared with low- or middle-income countries (LMICs). In 2010, neonatal mortality in Africa was 34 per 1,000 live births compared with just 9 per 1,000 live births in the Americas [11].

2. Background

Programs and policies may be successful in reducing the gradient in health between the most and the least disadvantaged groups within a population. However, in some cases, these interventions inadvertently contribute to increasing inequities in health and ultimately may even increase the gap between the most and the least disadvantaged [12]. Increasing the availability of an effective intervention within a country or region is not necessarily enough to reduce inequities. The intervention has to be accessible, acceptable, effective in, and used by the most disadvantaged group within that population to be truly effective at reducing inequities in health. Barriers to successful implementation of an intervention may include gaps in knowledge about services; gaps in understanding of beliefs or practices between patients and local health systems or program providers; inability to use services due to low health literacy, language barriers, or lack of appropriateness; and not wanting to use existing services because of fear and distrust [13]. Failure to adequately anticipate and address these barriers will result in improvements in health outcomes for some of the population, most likely the least disadvantaged, while missing those most in need. Many new public health interventions initially benefit only those with higher socioeconomic status (SES) and therefore inadvertently increase inequities (the inverse equity hypothesis) [14]. Over time, this gap may be reduced, once the more disadvantaged groups within the population gain access to the intervention. Therefore, interventions need to be designed and implemented with an "equity lens" to ensure that benefits reach the most hard-to-reach segments of the population and to avoid intervention-generated inequalities [12].

The use of a list of factors associated with effects on equity helps one to consider equity explicitly in the design of new intervention studies and in systematic reviews. A number of frameworks have been proposed to ensure consideration of these factors. This article aims to justify one such list: PROGRESS, which is proposed as the framework for the PRISMA Equity Extension and from groups from both the Campbell and Cochrane Collaborations such as the Equity Methods Group and the Public Health and International Development Review Groups. PROGRESS

is already being increasingly used by systematic reviewers [12,15–23]. The purpose of this article is to explore the justification for each of these PROGRESS factors and provide examples of interventions that can effectively address these health inequities for each of the PROGRESS factors.

In 2003, Evans and Brown introduced the acronym PROGRESS to illuminate a sampling of socially stratifying factors that drive variations in health outcomes. Inequities in health exist beyond income and, in fact, are found across a number of socially stratifying factors, both within and between countries. Specifically, PROGRESS refers to place of residence (rural/urban/inner city, LMIC), race/ethnicity/culture/language, occupation, gender/sex, religion, education, SES, and social capital [24]. Although this is not meant to be an exhaustive list, it serves to illustrate the multidimensionality of the distribution of health within a population. Furthermore, identification of these factors produces opportunities to ensure that resources are directed at tackling health inequalities in an explicit and measurable way.

The PROGRESS framework has been cited by many as a reminder that equity issues go beyond SES [25–28]. The Campbell and Cochrane Equity Methods Group has chosen to endorse PROGRESS and has recommended it within the reporting guidelines for equity-focused systematic reviews [29]. It is more comprehensive than other frameworks, easy to remember, and its components have been selected based on evidence of their differential impact on health. Although not all the components of PROGRESS will apply to a particular intervention, the acronym provides an aide-memoire for deciding whether a particular factor should be considered when either designing or evaluating an intervention or research project. In systematic reviews, PROGRESS has been used as a framework to guide the conceptualization of disadvantage, for data extraction, and to inform equity analyses. The word "PROGRESS" is a reminder that considering these factors can lead to progress in addressing health inequities.

3. Exploration of the justification of the elements of PROGRESS

This article provides an explanation for each of the PROGRESS components. Each element of PROGRESS is justified on the basis of differences in effects. We have not described why the difference exists but have attempted to explain why these differences may contribute to disadvantage and argue for their consideration in new evaluations and systematic reviews. Variations in health are evident across a number of socially stratifying forces captured by PROGRESS.

The PROGRESS acronym has been tested through application in systematic reviews of health-care interventions [12,15,18,19,30] and studies/reviews of methodology [16,17].

For each PROGRESS factor, we interviewed experts for suggestions of examples demonstrating the importance of PROGRESS factors on health outcomes.

Table 1 includes examples for each PROGRESS factor that demonstrate differences in burden of disease and provides an example of an effective intervention that could reduce that burden.

3.1.  *Place of residence*

The place of residence is an important determinant of health. For example, green space is related to area deprivation and obesity [31]. This element of PROGRESS has often referred to rural, urban, and inner city places of residence [15] but also includes high-, middle-, or low-income countries [24]. The place of residence also includes the particular region, town, or community in which a person lives, for example, a disadvantaged community within a less disadvantaged city or town (e.g., an urban slum) [24]. In LMIC, off-road and remote communities are more likely to suffer from low service quality including absence of facilities and high rates of health worker absenteeism [32]. The role of the place of residence in determining health goes beyond SES. Other characteristics of a neighborhood, city, or region such as air pollution, deforestation, and water quality may also contribute to disadvantage.

Many of the differences in health outcomes related to the place of residence are avoidable if the necessary infrastructure is in place. When the difference is related to distribution of services such that services are not available to populations living within certain areas, this can be considered unfair. An example of a health inequity based on the place of residence and an intervention that can address it is provided in Table 1 for both an LMIC and an HIC.

3.2.  *Race, ethnicity, culture, and language*

This component refers to racial, ethnic, and cultural background [20,24]. We recommend the addition of language to this component because many definitions of ethnicity include shared culture and shared language [33–35]. There are many differences in health outcomes across different races, ethnicities, cultures, and languages. Table 1 provides an example of inequities in an LMIC and an HIC along with examples of effective interventions to address it.

Race is often used interchangeably with both ethnicity and culture [11]. Race is usually considered to be biologically determined, whereas culture and ethnicity include social aspects. However, the use of "race" within medical research is controversial because most categories of race are historical and not necessarily based on natural differences [36]. In regards to inequities, there are few that are directly related to race, or biology and genetics; however, most racial inequities stem from the social experiences of "racialized groups." There are important social and

Table 1. Examples of differences in health across PROGRESS factors

PROGRESS factor		LMIC/HIC	Burden of disease	Efficacious intervention
	**P**lace of Residence	LMIC	Most of the population in Ghana lives more than 8 km from the nearest health-care facility [56].	Initiation of the Community-based Health Planning and Services program in rural areas in Ghana has reduced child mortality by removing geographic barriers to health care through mobile community-based care with resident nurses [56].
		HIC	Rural areas have lower access to health care because of lower numbers of family physicians in these areas [57].	In Canada, incentives offered to medical school graduates are effective in increasing the number of family physicians working in rural and underserviced areas [57].
	**R**ace, ethnicity, culture, language	LMIC	In Nepal, child survival is lower among the lower castes [58].	Vitamin A supplementation for children reduces caste-related child mortality differentials [58].
			In India, children from certain castes are less likely to be immunized [9].	Mass polio immunization campaigns have reduced caste-based differentials in immunization rates [9].
		HIC	Type 2 diabetes is more common among people from certain ethnic backgrounds [59].	Culturally appropriate health education is effective in increasing adherence to lifestyle changes [59].
	**O**ccupation	LMIC	Migrant mining workers in South Africa have higher rates of sexually transmitted infections (STIs) [60].	Providing prevention and treatment services to women in the community reduces the rates of STDs [60].
		HIC	Workers in certain occupations such as coal mining are at higher risk of occupation-related injury or death [61].	Legislation to improve safety for coal miners has contributed to reduced frequency of coal mining disasters in the United States [61].
	**G**ender, sex	LMIC	In many cultures, having a son is preferable to a daughter, and over centuries, this has resulted in infanticide of baby girls, neglect, and, with diagnostic ultrasound, sex-selective abortions [62].	Incentives (i.e., pensions for parents of girls) and poster/media campaigns to promote daughters have helped reduce expressions of son preference [62].
		HIC	In Sweden, women from Arabic-speaking countries have lower levels of access to health care and a family physician [63].	Increasing the number of female doctors can improve access to health care for women from Arabic-speaking countries living in Sweden [63].
	**R**eligion	LMIC	In East Africa, uncircumcised Christian men are at increased risk of HIV infection [64].	Medical circumcision for men is effective at preventing heterosexual HIV transmission and has been shown to be acceptable to men from studies in Uganda, Kenya, and South Africa [65–67].
		HIC	Lower immunization rates among Amish populations lead to outbreaks of disease [68].	Vaccine information provided by trusted medical providers leads to increased immunization rates [69].
	**E**ducation	LMIC	Prevalence and length of childhood diarrhea episodes are inversely related to mothers' education [70].	Educating girls and mothers can improve food safety and reduces the risk of diarrhea for infants [71].
		HIC	Lower maternal and paternal education is associated with reduced rates of breast-feeding [72].	Education (for both boys and girls) leads to increased likelihood of breast-feeding initiation [72].
	**S**ocioeconomic status	LMIC	Ownership of malaria bednets decreases with decreasing household wealth [73].	Distribution of free bednets or vouchers for bednets increases ownership [74].
		HIC	People from lower income households are less likely to access health services.	Reducing user fees improves access to health services [75].
	**S**ocial capital	LMIC	Socially isolated people have two to three times higher death rates than those with a social network or social relationships and sources of support [76].	The Intervention with Microfinance for AIDS and Gender Equity study improved social capital among women in South Africa and led to a reduction in intimate partner violence [77].
		HIC	Low social capital is associated with increased mortality [78].	The Poder es Salud/Power for Health study resulted in an increased number of people available for support, improved self-reported health, and reductions in depressive symptoms [78].

Abbreviations: LMIC, low- or middle-income country; HIC, high-income country; STD, sexually transmitted disease; HIV, human immunodeficiency virus.

political impacts on health that may play a role in determining disadvantage and that require consideration of race [10]. A biological difference would not be considered inequitable (unfair or unjust) unless its expression is avoidable.

Ethnicity refers to relationships between groups of people whose members consider themselves distinctive within a society [37]. Ethnicity implies shared origin or background, shared culture or traditions that are distinctive and continued through generations, and/or shared language [38]. Ethnicity is socially constructed, and therefore, like race, it can have impacts on health depending on the context and setting.

Cultural beliefs and practices can disadvantage certain groups from accessing adequate health information and services. In many cases, adhering to cultural practices is not a choice but is imposed by the family or community. Cultural norms influence many behaviors such as dietary habits, consumption of alcohol or tobacco, and stress responses [39]. These behaviors and norms may impact health and may be considered unfair in certain contexts.

Language contributes to disadvantage, especially in situations in which the patient does not speak the same language as the health-care provider. This reduces access to health-care services, including both prevention and treatment [40]. Language on its own is not an indicator of disadvantage but it may be depending on the context in which the person accesses health services [41].

3.3.  *Occupation*

This factor encompasses different situations including out of work, underemployment, informal workers, and unsafe working environments. Occupational status in an organization is strongly related to mortality and a range of health outcomes [42]. In addition, certain occupations have been shown to be associated with higher mortality and morbidity rates than others. Employee benefits and employer-funded insurance systems are related to a person's occupation and will have an impact on their health [43]. An example of an occupation-related inequity in an LMIC and an HIC is provided in Table 1, along with an example of interventions that can reduce these inequities.

3.4.  *Gender and sex*

Biological and gender-based differences between men and women result in differential health risks, disease incidence, and health service needs. Sex, or biological differences between males and females, is not necessarily inequitable because differences exist between men and women that are unavoidable. For example, women's bodies are more susceptible to HIV and therefore are 1.2 times more likely to become infected than men; this is especially true for adolescent girls whose bodies are still developing [44]. Similarly, transgendered individuals are often victims of violence and experience discrimination that may lead to negative health outcomes [45,46].

Gender refers to socially constructed roles and other traits that society generally associates with the sexes. Examples of inequities in health that are driven by socially defined gender roles include differential exposure to household hazards and stagnant water. Specifically, because of women's role in the household, they may experience greater exposure to indoor air pollution, which increases rates of asthma. Similarly, in areas where women travel for water or to wash clothes, they experience greater exposure to stagnant water that breeds malaria-infected mosquitoes and puts them at greater risk for disease. Women might also be more affected by certain gender-related issues such as gender-based violence, discriminatory feeding patterns (whereby women and girls are not fed the same as men or boys in the family), and lack of decision-making power [47]. Gendered norms have implications for health-seeking behavior, health status, and access to health services. Examples of gender- and/or sex-related inequities in an LMIC and an HIC and interventions that can address them are provided in Table 1.

3.5.  *Religion*

Religion contributes to inequities when access to health services is limited for a subgroup of the population because of their religious affiliation (or lack of religion). Religion does not indicate inequity when, for example, a person declines health based on religious beliefs [4]. This would be considered neither unfair nor unjust if a person has had an opportunity to choose to refuse health services. However, this is difficult when considering children or others who do not have the opportunity to make choices about their religion. For example, children may not be given a choice to refuse health services because of religious beliefs, but their parents make the decision. As aforementioned for culture, in certain contexts, adhering to religious beliefs is not an individual choice but is imposed by the community or family. Table 1 provides an example of a religion-related inequity in health in both an LMIC and an HIC, along with an example of an effective intervention to address this disparity in disease burden.

3.6.  *Education*

Education is an important determinant of health status because it affects the type of employment a person is eligible for, which in turn is correlated with income [48]. Furthermore, people with a higher level of education are more likely to have healthier lifestyles, including being more physically active, receiving primary health care, and not smoking. Well-educated people are also more likely to have more knowledge about health and preventive health measures [48]. The availability and choice of education

may be determined by the context in which a person lives. For example, some people are able to make a choice regarding whether to attend university, whereas others may not have the opportunity to choose because of financial or other factors. An example of an inequity due to education in an LMIC and an HIC has been provided in Table 1, along with an example of an intervention that can address it.

3.7.  *Socioeconomic status*

SES is an important influence on a person's health status. Higher SES usually means improvements in many determinants of health such as better living conditions and access to fresh and nutritious foods. Inequalities in income impact a person's life chances [49] and therefore impact health. An example of an inequity due to SES in an LMIC and an HIC has been provided in Table 1, along with an example of an effective intervention to address it.

3.8.  *Social capital*

Social capital refers to social relationships and networks. It includes interpersonal trust between members of a community, civic participation, and the willingness of members of a community to assist each other and facilitate the realization of collective community goals and the strength of their political connections, which can facilitate access to services [50–52]. Social capital is interrelated with SES. As income inequality within a community increases, social capital decreases [50]. Table 1 provides an example of an inequity in health related to social capital in both an LMIC and an HIC along with an example of an effective intervention to address this disparity in disease burden.

4. Discussion

The aforementioned examples demonstrate the importance of applying an equity lens to interventions as a strategy for ameliorating the gap between the most and the least disadvantaged. We have indicated a difference in burden of disease and provided an example of an effective intervention to address each difference in health outcomes. Thus, the burden is avoidable, but without a concerted effort, the interventions may not always reach the most disadvantaged population, making these differences unnecessary and unfair and reducing our ability to redress these health inequities.

We are not suggesting that the PROGRESS factors will always indicate disadvantage; these are prompts, rather than absolute statements, about the risk of disadvantage. The context in which a person or population is situated influences whether the elements of PROGRESS indicate disadvantage. A certain level of judgment may be necessary in determining this relationship. Researchers need to consider the theoretical approaches to each of the PROGRESS factors, as well as their expected influence on outcomes. For example, different social exposures or sociocultural norms may create differences in outcomes that are related to one or more of the PROGRESS factors, but consideration of the underlying mechanism that influences these outcomes may be needed. Each PROGRESS factor can interact with the others to contribute to disadvantage. In almost all instances, disadvantage results from the effects of a combination of PROGRESS factors and not from any single factor alone. The degree of disadvantage will usually increase for populations or persons for whom multiple categories of PROGRESS apply.

Each of the PROGRESS factors requires careful consideration regarding their definition and classification, as well as their interaction with other contextual elements. For example, there is no agreed system for classifying race, ethnicity, and culture, and categorizations may differ depending on whether individuals self-classify or are classified by others [53]. The appropriateness of each element of PROGRESS will vary depending on the context.

In 2008, Oliver et al. [20] suggested that PROGRESS could be expanded to "PROGRESS-Plus" to include additional factors that may indicate disadvantage but are not included in the PROGRESS acronym. In 2012, Oliver et al. [54] proposed a framework for distinguishing populations indicating that PROGRESS includes the broad social determinants of health and "Plus" includes three additional categories. These include personal characteristics that attract discrimination (e.g., age, disability), features of relationships (e.g., smoking parents, excluded from school), and time-dependant relationships (e.g., leaving the hospital, respite care, other instances when a person may be temporarily at a disadvantage). The use of the "Plus" allows for consideration of additional context-specific factors. We have not elaborated on the "Plus" in this article because the purpose is to justify the PROGRESS elements themselves. However, we agree that any factor across which disadvantage may exist could be added within the "Plus" category. Any additions within "Plus" require the same consideration that we have given to the eight factors in PROGRESS. Depending on the context of an intervention, additional factors may have more relevance than those represented by the acronym. Systematic reviewers and other researchers should make efforts to identify these additional factors.

Equity considerations are often limited to a single social stratifier. The use of the acronym PROGRESS can help systematic reviewers and other researchers apply an equity lens through the use of a spectrum of social stratifiers across which there may be differences in effects on health equity. Using the acronym PROGRESS encourages the scientific community to include a spectrum of factors and avoid the assumption that any single measure is sufficient to assess inequities, just as it would be insufficient to use a single outcome measure when trying to assess impact

on health inequities. The use of PROGRESS can help avoid unintended intervention effects that may increase the gap between the most and the least disadvantaged; however, all interventions should be monitored to determine whether the gap in health outcomes is narrowing or widening.

PROGRESS can cover a wide range of health and nonhealth, upstream and downstream interventions and how they affect health equity. It helps ensure that the disadvantaged do not miss out on health benefits of interventions. The order of the factors within PROGRESS is driven by the acronym and not by their importance in consideration of disadvantage. The importance of the individual factors will vary across different contexts and may interact to influence health equity.

The use of the acronym PROGRESS is not intended to encourage data dredging but rather to identify the most important factors that drive inequities in health. An understanding of the potential effects of an intervention to reduce inequities is essential to choose those that are most likely to achieve this aim. Subgroup analyses conducted to examine the effect of the intervention according to PROGRESS factors should be specified pre-hoc, including an outline of the pathways between the intervention and the outcome (using, e.g., a logic model or an analytical framework) and the likely effects on the PROGRESS factor [55].

5. Conclusion

PROGRESS can be used as a tool to help ensure that socially stratifying factors are considered in the conduct, reporting, and the use of research and interventions as they may play a role in contributing to inequities in health outcomes. However, the degree to which the PROGRESS acronym represents disadvantage depends on the context and setting. The context is important in determining which inequalities are likely to drive inequities, remembering that the group at risk for disadvantage in health status can vary depending on the intervention, the context, or both.

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