



Intersectionality and risk for ischemic heart disease in Sweden: Categorical and anti-categorical approaches



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ARTICLE INFO

Article history:

Received 10 November 2016

Received in revised form

17 January 2017

Accepted 23 January 2017

Available online 24 January 2017

Keywords:

Socioeconomic factors

Health inequalities

Cardiovascular disease

Sweden

Intersectionality

Categorical

Anti-Categorical

Discriminatory accuracy

ABSTRACT

Intersectionality theory can contribute to epidemiology and public health by furthering understanding of power dynamics driving production of health disparities, and increasing knowledge about heterogeneities within, and overlap between, social categories. Drawing on McCall, we relate the first of these potential contributions to categorical intersectionality and the second to anti-categorical intersectionality. Both approaches are used in study of risk of ischemic heart disease (IHD), based on register data on 3.6 million adults residing in Sweden by 2010, followed for three years. Categorical intersectionality is here coupled with between-group differences in average risk calculation, as we use intersectional categorizations while estimating odds ratios through logistic regressions. The anti-categorical approach is operationalized through measurement of discriminatory accuracy (DA), i.e., capacity to accurately categorize individuals with or without a certain outcome, through computation of the area under the curve (AUC). Our results show substantial differences in average risk between intersectional groupings. The DA of social categorizations is found to be low, however, due to outcome variability within and overlap between categories. We argue that measures of DA should be used for proper interpretation of differences in average risk between social (or any other) categories. Tension between average between-group risk and the DA of categorizations, which can be related to categorical and anti-categorical intersectional analyses, should be made explicit and discussed to a larger degree in epidemiology and public health.

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1. Introduction

1.1. Background

At least since the 1990s, researchers have argued that epidemiology needs to give increased attention to social power dynamics and structural forces in the study of cause and distribution of disease on the population level (Krieger, 2011; O'Campo and Dunn, 2012; Susser and Susser, 1996; Wemrell et al., 2016). A growing and now gigantic amount of social epidemiological research looks toward socioeconomic risk factors as determinants of disease (Commission on Social Determinants of Health, 2008) not least regarding cardiovascular disease (Manrique-Garcia et al., 2011), and

today it would likely be hard to find an epidemiologist claiming that social factors are not relevant to disease causation (Galea and Link, 2013). However, limitations remain. The majority of social epidemiological studies of health disparities have consisted of identification of inequalities and connections between these and various risk factors, and while such studies have underpinned efforts to address disparities, knowledge about risk factors provides an insufficient basis for effective action toward health equity (O'Campo and Dunn, 2012). Productive analytic attention toward structural dynamics of power needs to be developed further. In Ng and Muntaner's words (2014), we not only need studies of unequal average distribution of health and disease between groups defined according to race, gender or class, but also analyses of relational mechanisms like sexism and racism.

Study of relational mechanisms and social dynamics is buttressed by social theory. Attendance to theory has however been weak, although long called for, in epidemiology (Krieger, 1994; Ng and Muntaner, 2014; O'Campo and Dunn, 2012). Krieger (2011)

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notes that absence of explicit theory does not equate to non-existence of underlying assumptions or values, but merely means that these are not made visible, or fully conscious. With reference to dominance of implicit, rather than explicit, use of theory to inform epidemiologic research, Krieger notes that this typically rests on ontologies and epistemologies tied to biomedical and so-called lifestyle approaches. Central traits in both are individualism and reductionism, as primary causes of disease at both individual and population level are typically assumed to be genes or risk factors to which exposure is largely determined by the individual's characteristics or behaviors. This is despite the fact that epidemiology has long distinguished between causes of disease at individual and population levels (Rose, 1992).

The above applies no less to research on cardiovascular disease. Studies continually replicate affirmation of the relevance of socioeconomic factors to cardiovascular risk. Shim (2014) argues, however, that in cardiovascular epidemiology, handling of population categories such as race/ethnicity, sex/gender and class/socioeconomic position construe these in terms of risk factors on the individual level, rather than as functions of dynamics between individuals or groups (Krieger, 2011; O'Campo and Dunn, 2012). As public health interventions tend to be formed according to the same principle, Shim argues that epidemiological knowledge can contribute to reproduction or even creation of social differences and inequalities. Along similar lines, Lofters and O'Campo (2012) observe that the framing of health inequities as individual-level issues, resolvable through individual-level intervention or behavioral change, can result in practices of "blaming the victim" rather than actual amelioration of existing disparities.

Against this background, intersectionality is a concept and a theory which has been advocated and to a certain degree integrated by authors including Shim (2014) in studies of population health and risk during past decades (Girtli Nygren and Olofsson, 2014). The basic feature of intersectionality theory, which first gained influence through Crenshaw's (1989) analysis of positionings of colored women, is conceptualization of categories such as race/ethnicity, sex/gender, class and sexual orientation not as separate but as interacting. Power structures are set in the center of analysis; focus is directed to what social categories and their interactions disclose about power, and social change is an explicit and overarching goal (Hankivsky, 2012). Intersectionality thereby offers a theoretical framework, write Kapilashrami et al. (2015), which can help epidemiologists look toward social dynamics rather than social categories and thus investigate structural motors for inequalities rather than individual-level behaviors and risk factors.

Bauer (2014) observes that potential contributions of intersectional analysis to epidemiology include increased specificity in mappings of health disparities. We agree, while issuing a word of caution that intersectionality theory is not adequately applied through mere efforts toward fractioning the population into smaller taxonomic units through the combination of more than one major axis of social differentiation. To intersectionality research on health disparities, the object of interest is how interacting systems of power drive disease incidence. A second potential contribution noted by Bauer (2014) is added knowledge about variability within, and overlaps between, social categories. In the present study, we integrate intersectional analysis for both these purposes, in inquiry into risk of ischemic heart disease (IHD) in Sweden. Drawing on McCall (2005) we relate these two aims to two forms of intersectional analysis.

McCall (2005) famously distinguishes between categorical (or inter-categorical) and anti-categorical orientations toward intersectionality. Categorical analysis aims to analyze how interlocking systems of oppression, such as racism and sexism, interact to produce inequalities between social groups in society, expressed for

example in distribution of income, education and health outcomes. Here, traditional social categories such as ethnicity and gender may be used in analyses of patterns of interaction, dominance and subordination. Anti-categorical inquiry, on the other hand, directs critique toward categorization itself. Emphasis is placed on the inherent fluidity and malleability of social categories, as these are socially contingent constructions rather than mirrorings of fixed realities. It is here argued that categorization *per se* can lead to creation, perpetuation or essentialization of differences and inequalities between groups. Power-implicated categorizations of gender and race, for example, should therefore be carefully used or deconstructed as a central part of social change.

While intersectionality research has to a large degree been pursued through use of qualitative methods, McCall (2005) notes that the categorical perspective is compatible with quantitative research. Intersectionality has been integrated in quantitative study explicitly (Hinze et al., 2012; Veenstra, 2011) and more implicitly through analysis of outcome heterogeneity within and between social categories (Mulinari et al., 2015a), but in epidemiological research this is still relatively uncommon. Intersectionality remains absent, for example, in handbooks on measurement of inequality and socioeconomic position (Shaw et al., 2007).

Categorical intersectionality can lend itself to integration into conventional statistical measurement of between-group differences in average risk, thus potentially fulfilling the capacity to increase understanding of power dynamics through mappings of health disparities. Efforts toward increasing knowledge validity through attendance to outcome variability within and overlap between social groups (Bauer, 2014) relates more readily to anti-categorical approaches. We argue that anti-categorical intersectionality, aiming to demonstrate intra-group heterogeneity of and overlap between social categories regarding individual risk, can be operationalized in quantitative study through measurement of discriminatory accuracy (DA).

1.2. Discriminatory accuracy

DA measures the ability of a certain diagnostic tool, marker or category to correctly discriminate between people with or without an outcome of interest, often used to evaluate predictive validity (Page et al., 1995) in epidemiology and other medical sciences (Merlo, 2014; Pepe et al., 2004). In principle, the tool, biomarker or category needs to have high DA to be deemed valid for diagnostic or prognostic assessment of individuals. In the epidemiological study of risk factors, whether social or biological, inclusion and especially interpretation of DA has, however, so far been relatively rare (Merlo, 2014; Merlo and Mulinari, 2015; Merlo and Wagner, 2012).

Epidemiological knowledge on risk typically builds on investigation of difference between average risk computed for different population groups, categorized along various biological (e.g., blood pressure), social (e.g., socioeconomic status) or geographical (e.g., neighborhood) variables. It is well known that such probabilistic measures are typically not directly translatable to individuals, as averages can obscure major differences between people within the same group, and/or substantial overlaps between people in different groups (Rose, 1992). Application of average measures on individuals, which has been called "tyranny of the means" (Tabery, 2011), has long been criticized (Bernard and Greene, 1957; Hogben and Sim, 1953) not least by epidemiologists favoring "n-of-1" design (studies made on single individuals) (Guyatt et al., 1986) or personalized medicine (Lillie et al., 2011). Similar critique has been voiced in social science (Downs and Rocke, 1979) and biology (Gould, 1996; Kaplan and Winther, 2013). Still, average risk remains a major basis for assessment of individual risk in much clinical and preventive practice, not least regarding cardiovascular disease (Goff

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