

**Generational health improvement or decline? Exploring generational differences of British ethnic minorities in six physical health outcomes**

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**Objectives.** To explore ethnic and generational differences in six physical health outcomes and whether these differences can be explained by health-related behaviors and socio-economic status.

**Design.** Multivariate analyses using nationally representative data in 2010-2011 on self-assessed general health, activity-limiting illness, doctor-diagnosed diabetes, doctor-diagnosed high blood pressure, doctor-diagnosed asthma and body mass index from 21,651 White British, 997 Pakistanis, 695 Bangladeshis, 1,126 Indians, 573 Black Caribbeans and 873 Black Africans, adjusted for age, gender, health-related behaviors and socio-economic status.

**Results.** While ethnicity is of great importance in patterning health differences, we find that ethnic differences in activity-limiting illness, diabetes, asthma and body mass index vary across generations. Health-related behaviors and socio-economic status are shown to partly explain ethnic and generational differences in some health outcomes.

**Conclusions.** This study enables a better understanding of more nuanced patterns of ethnic and generational differences in health, highlighting the need to understand ethnicity as a fluid and changing characteristic, and the importance of socio-economic status and health-related behaviors in shaping ethnic differences in certain health outcomes.

**Keywords:** ethnic minorities, immigrants, minority generation, health, health-related behavior, socio-economic status

## **Introduction**

In Britain, it is well documented that ethnic minorities overall have poorer health than White British in terms of indicators of self-reported health, limiting longstanding illness, diabetes and cardiovascular diseases etc. (Karlsen and Nazroo 2010; Wohland et al. 2015). Also, research shows clear heterogeneity within ethnic minority groups with Pakistanis and Bangladeshis faring the worst, whereas Chinese reporting better health than White British in many of these indicators (Becares et al. 2015; Evandrou et al. 2016).

Despite substantial research on ethnic inequalities in health, ethnic minorities are often treated as homogeneous groups in which migration generations are seldom investigated. This assumption may be problematic, given substantial research suggesting clear differences between the first- and second-generation minorities in a wide range of areas (e.g. socio-economic status, lifestyles and cultural identity) (Heath et al. 2013, Smith et al. 2009). It is argued that these socio-demographic differences between first- and second-generation minorities could result in significant generational differences in health (Kobayashiet al. 2008; Kim et al. 2013; Maio and Kemp 2011). However, regarding how ethnic minorities' health changes over generations, there are two conflicting views with one suggesting that first-generation migrants are healthier than the second-generation, whereas the other claiming the opposite.

The first argument is referred as to the healthy migration paradox, which argues that although newly arrived migrants are healthier than their non-migrant

and host society counterparts due to self-selection effects, their health advantages tend to diminish over time and generations (Kobayashi et al. 2008; Heath et al. 2013). For example, Kobayashi et al. (2008) and Thomson et al. (2013) show that first-generation Black and French immigrants in Canada and first-generation Cuban and Mexican immigrants in the U.S. are significantly healthier than the second-generations who were born in the host countries in terms of self-rated health, functional limitations and disabilities. The similar phenomenon is also reported in other research from North America and Europe (Kim et al. 2013; Maio and Kemp 2011; see Laccetter and Callister, 2009 for a literature review).

There are several reasons for the generational deterioration of minorities' health. First, some second-generation minorities have assimilated into certain 'unhealthy' lifestyles in deprived urban ghettos of the host countries (e.g. substance use, excessive tobacco smoking and alcohol drink, and high-calorie food intake), which are harmful to their health (Portes et al. 2005; Smith et al. 2009). Moreover, as many first-generation immigrants often have relatively low socio-economic status and cluster in deprived neighborhoods (Heath et al. 2013), their children (i.e. the second-generation minorities) who grew up in these areas might have more exposure to pollution and poor access to health resources in their childhood. This could adversely affect their health in later life (Kobayashi et al. 2008).

By contrast, according to the classical assimilation theory, second-generation minorities may have better health than the first-generation. This theory predicts

that immigrants, after several generations in the host country, not only become more similar to the majority ethnic group in terms of language use, cultural identity and values, but also could achieve continuous upward mobility in socio-economic status, allowing them to access better health resources (Gordon 1964; Heath et al. 2013). Supporting this argument, recent research shows that second-generation South Asians (defined as Indians, Pakistanis and Sri Lankans) and Chinese in Canada (Kobayashi et al. 2008), second-generation immigrants in Sweden (Leao et al. 2009) and second-generation Turkish in Germany (Wengler, 2011) are significantly healthier than the first-generations in terms of self-rated health or activity-limiting disabilities. Moreover, cultural assimilation of the second-generation (e.g. better language proficiency) is shown to have significant positive effects on their general health by facilitating more effective communication with doctors and avoiding subtle discrimination in health care services (Lowth 2015; Kobayashi et al. 2008).

The contradicting views and inconsistency of previous studies highlight the complexity of the associations between ethnicity, generation and health, which warrant further attention. To the best of our knowledge, there are only two studies in Britain, which explore ethnic minority generational differences in health. Both studies yield inconsistent results with different health indicators. Dorsett et al. (2015) find that more recent migrants tend to report of having better mental health than established migrants and minorities born in Britain, whereas Smith et al. (2009) do not find any significant ethnic minority generational differences in

self-reported general health. However, as both studies only rely on subjective measures, they might suffer misclassification bias because people's self-assessed health is highly related to their expectations of health, which may differ across ethnic and generational groups (Kobayashi et al. 2008). Thus, this article contributes to the previous literature by providing more up-to-date evidence on ethnic and generational differences in six physical health outcomes (including both subjective and objective indicators), and exploring whether the generational differences (if any) can be explained by health-related behaviors and socio-economic status.

## **Methods**

### ***Data and sample***

The data used in this research come from the second wave (2010-2011) of United Kingdom Household Longitudinal Study (UKHLS), except for body mass index (BMI) from the first wave (2009-2010). The UKHLS provides high-quality longitudinal data in a variety of subjects (e.g. health, work, education, family), in order to help understand the long-term effects of socio-economic changes (Knies, 2016). The second wave is selected as it covers detailed information about respondents' health and health-related behaviors. UKHLS comprises a stratified and clustered General Population Sample (GPS) of around 40,000 households and an Ethnic Minority Boost Sample (EMBS), which was designed to yield around 1,000 respondents for five major ethnic minorities: Indian, Pakistani, Bangladeshi,

Black Caribbean and Black African (Knies 2016). The response rate is 61%. Cross-sectional weights provided by the UKHLS are used to adjust for the non-response rate and unequal selection probabilities.

## ***Measures***

### *Ethnicity*

Ethnicity is measured by ethnic self-identification based on 2011 Census. White British are defined as respondents who identify themselves as ‘White British/English/Scottish/Northern Irish’. Similarly, five ethnic minority groups are identified and further disaggregated into first- (born overseas) and second-generations (born in or arrived in the UK before the age of seven). Although this ethnic classification is widely used in health research, it should be noted that high levels of cultural and religious heterogeneity within certain ethnic categories (e.g. Indians, Black Caribbeans and Black Africans) may conceal important internal diversity and lead to inaccurate results (Aspinall and Chinouya, 2008; Heath et al. 2013). Thus, the results for these groups should be interpreted and generalized with caution.

Moreover, as second-generation minorities are much younger than the first-generations and White British, age censoring is conducted to ensure that each generation contains at least 15 individuals in five year age intervals. The age distribution for each ethnic group is as follows: Pakistanis aged 16-50, Bangladeshis aged 16-45, Indians aged 16-50, Black Caribbeans aged 20-55,

Black Africans aged 16-50, and White British aged 16-55.

### *Health outcomes*

There are six health outcomes, which are coded as binary variables for the purpose of easy comparability with previous studies (Karlsen and Nazroo, 2010; Smith et al. 2009). These include self-assessed general health ('excellent', 'very good' and 'good', 0; 'fair' and 'poor', 1); activity-limiting health problem measured by whether health limits typical activities ('limited a lot' and 'limited a little', 0; 'not limited at all', 1); and three doctor-diagnosed illnesses: diabetes, high blood pressure and asthma; and obesity, a direct measure of respondents' body mass index (BMI). Respondents who have BMI  $\geq 30$  are identified as 'obese'.

### *Control variables*

This study controls for a wide range of demographic characteristics (age, gender), health-related behaviors (HRB) and socio-economic status (SES) because these factors are shown to have a significant influence on people's health (Karlsen and Nazroo 2010; Smith et al. 2009). The HRB measures include: respondents' current smoking behaviors ('smoke', 'non-smoke'), drinking frequency ('4-7 times per week', '1-2 times per week', '1-2 times per month(s) or per year', 'none'), days per week to eat fruit and vegetables ('never', '1-3 days', '4-6 days' and 'everyday'). The SES measures include: respondents' highest education levels ('degree/other higher'; 'A-level/GCSE/other qualification' and 'no qualification'),



and logged equivalized household income (adjusted for the number of people in the household). As a large proportion of ethnic minorities is full-time students, we adjust the official National Statistics Socio-economic Classification (NS-SEC) by recoding employment status into five categories: ‘full-time students’, ‘inactive/unemployed’, ‘working class’, ‘intermediate class’ and ‘salariat class’ (Heath et al. 2013; ONS, 2010).

### ***Modeling strategy***

As all dependent variables are binary, logistic regression models are employed. We first compare the six health outcomes between ethnic minorities and White British, without distinguishing minority generations. We then compare each minority generation with White British in an age-censored sample. Next, we repeat the previous models but alter the reference category to first-generation minorities in order to explore generational differences in health *within* ethnic minorities. We add HRB and SES variables stepwise into these models to investigate whether these factors could explain the generational differences (if any). When analyzing the three doctor-diagnosed illnesses, Pakistanis and Bangladeshis are combined as few people of the second-generations suffer from these illnesses. Previous research shows that both groups not only share a similar cultural and religious identity, but also experience similar labor market and health disadvantages (Heath et al. 2013; Karlsen and Nazroo, 2010).

## **Descriptive statistics**

Table 1 reports the summary statistics of demographic characteristics, SES and HRB by ethnicity and generation. First, second-generation minorities are younger than the first-generation even after age-censuring. Moreover, we find significant generational differences within ethnic minorities in HRB and SES, with the second-generation minorities converging toward the White British population. Concerning SES, all second-generation minorities are more likely to have a degree (except Black Africans) and are less likely to not have any qualification than the first-generation. Also, the second-generation has overall higher household income and employment status (especially higher percentage in the salariat class and lower percentage in the inactive and unemployed category) than the first-generation. Regarding HRB, the second-generation minorities are more likely to smoke and consume alcohol, but are less likely to eat fruits and vegetables than the first-generations.

Table 1 Here

## **Regression Analysis**

### ***Self-assessed health***

After adjusting for age and gender, Models A1 in Table 2 show that Pakistanis and Black Caribbeans are significantly more likely to report fair and poor health than White British. After distinguishing minority generations, Models B1 show that

while second-generation Black Caribbeans report worse health than White British, first-generation Black Africans report better health than White British. However, we do not find any significant minority generational differences. Given that respondents' self-assessed health is related to their expectation of health that is not controlled for (Kobayashi et al. 2008), these results may be tentative.

### ***Activity-limiting illness***

Models A1 in Table 3 show that all ethnic minorities are significantly more likely to report an activity-limiting illness than White British. Comparing each minority generation to White British, Models B1 show that the health disadvantage remains significant for first-generation Pakistanis, Bangladeshis, Indians and Black Caribbeans, but is much less pronounced for all second-generation minorities especially Indians and Black Caribbeans. Concerning generational differences, second-generation Indians are significantly less likely to report an activity-limiting illness than the first-generation. After including SES variables, the generational difference within Indians and ethnic differences between first-generation Pakistanis, Bangladeshis, Indians and White British are partly attenuated, but remain significant.

Tables 2-3 Here

### ***Diabetes***

Models A1 in Table 4 show that all ethnic minorities are significantly more likely to report diabetes than White British. However, the health disadvantages are only significant for first-generation Pakistanis, Bangladeshis, Indians and Black Caribbeans, and not significant for all second-generation minorities. Concerning generational differences, although all second-generation minorities are less likely to have diabetes than the first-generation, the generational differences are not significant. Furthermore, Models C2-3 show that while both HRB and SES partly explain the differences between White British and first-generation Pakistanis, Bangladeshis, Indians, and the generational differences within the three South Asian groups, HRB play a more important role in mediating the generational differences.

### ***High blood pressure***

Models A1 in Table 5 show that Pakistanis/Bangladeshis and Black Caribbeans are significantly more likely to have high blood pressure than White British. After distinguishing minority generations, both first- and second-generation Black Caribbeans and first-generation Black Africans are more vulnerable to high blood pressure than White British. However, no significant minority generational differences are observed. It is worth noting that both HRB and SES variables to some extent reduce the ethnic differences between White British and first-generation Black Caribbeans and Black Africans.

Tables 4-6 Here

### ***Asthma***

Models A1 in Table 6 show that three South Asian groups and Black Africans are significantly less likely to have asthma than White British. Moreover, Models B1 show that the health advantages are only significant for the first-generation of these groups. Regarding generational differences, second-generation Pakistanis/Bangladeshis and Indians are significantly more likely to suffer from asthma than the first-generation. While these ethnic and generational differences are only slightly attenuated by HRB and SES variables, they remain significant.

### ***Body mass index (BMI)***

Models A1 in Table 7 show that Bangladeshis and Indians are significantly less likely to suffer from obesity than White British, whereas it is the opposite for Black Caribbeans and Black Africans. After distinguishing minority generations, the health advantages are only significant for first-generation Bangladeshis and Indians. By contrast, both first- and second-generation Black Caribbeans are more likely to suffer from obesity than White British. Comparing generational differences, Models C1 show that first-generation Bangladeshis and Indians have significantly lower rates of obesity than the second-generations. Importantly, HRB variables can partly explain the health advantages of first-generation Bangladeshis and Indians relative to White British and the second-generations.

## **Discussion and conclusions**

Ethnic inequalities in health have become increasingly an important concern of public policies in Britain. As Race Equality Scheme of the Department of Health states, ‘the NHS increasingly needs to take into account not only cultural and linguistic diversity but also needs to be able to cater for varying lifestyles and faiths’ (The Department of Health 2005, 12). Despite substantial research on ethnic disparities in health in Britain, these studies tend to regard ethnic minorities as homogeneous groups where minority generation has been seldom considered. This article contributes to previous research by showing that there are clear ethnic minority generational differences in some health outcomes, which can be partly explained by HRB and SES. However, whether there is a generational improvement or decline depends on specific health outcomes.

Regarding activity-limiting illness and diabetes (Tables 3-4), although most ethnic minorities fare worse than White British, the ethnic gap is generally more pronounced for the first-generations. We also find that SES can partly explain ethnic and generational in both health indicators. These results provide support for the classical assimilation theory (Gordon, 1964), highlighting the importance of upward social mobility of the second-generations in reducing the prevalence rates of activity-limiting illness and diabetes. The remaining unexplained ethnic gap for these groups may be due to their poor English language, distinctive cultural taboos and structural discrimination, which may impede their access to high-quality

health resources (Lowth 2015; Kobayashiet al. 2008). Moreover, HRB also partly explain the higher risk of diabetes among first-generation Pakistanis, Bangladeshis, Indians and Black Caribbeans. This is possibly because the first-generation migrants from South Asian and Caribbean regions often eat tropical fruits with high carbohydrate, which may lead to a higher risk of diabetes.

By contrast, with respect to asthma and obesity (Tables 6-7), first-generation migrants generally fare better than the second-generations (except for Black Caribbeans), partly supporting healthy migration effect theory (Kobayashi et al. 2008). However, the generational differences are only slightly explained by HRB and SES variables. The remaining significant differences may be due to healthy migration selection of the first-generation and assimilation of the second-generation into unhealthy behaviors such as excessive smoking and drug use (Kobayashi et al. 2008). By contrast, the lower rates of obesity for first-generation Bangladeshis and Indians than the second-generations can be partly explained by HRB, highlighting the detrimental impacts of lifestyle assimilation on minorities' health outcomes (Smith et al. 2009).

### **Strengths and limitations**

This article is the first study in Britain exploring ethnic generational differences in a wide range of health outcomes. It makes significant contributions to previous health literature by enabling a better understanding of more nuanced patterns of ethnic and generational differences in health, and highlighting the important and

potentially contradictory roles of ethnic assimilation in shaping minorities' health outcomes. Drawing on this study's results, public health sectors could reduce ethnic inequalities in health by providing more diverse health services taking into account the changing and fluid nature of ethnicity. However, there are several limitations in this study, which could be the focus of future research. First, current ethnic categorization used in this study might conceal important heterogeneity within certain ethnic groups (e.g. Indians, Black Caribbeans and Black Africans), undermining the accuracy of the results. Future research using different ethnic classifications could profitably explore more nuanced patterns of health inequalities between minority sub-groups, which have different religions, languages and country of origins. Moreover, this study only explores the role of HRB and SES in explaining minority generational differences in health. Future research could extend this article by investigating how ethnic assimilation in other aspects (e.g. language, cultural values) is linked to generational changes in health outcomes. Finally, using cross-sectional data this study is unable to explore the dynamic and causal relationships between ethnic generational assimilation and health. This requires future research using longitudinal data to model the long-term implications of HRB and SES for ethnic minority health outcomes.



## **Key messages**

In health literature, ethnic minorities are often treated as homogeneous groups with fixed characteristics. However, this article shows that ethnic differences in some health outcomes (e.g. activity-limiting illness, diabetes, asthma and obesity) do vary across minority generations. The minority generational differences are partly related to their different HRB and SES. Recognizing the fluid and changing nature of ethnicity, public health sectors could not only provide better health services that cater for ethnic/cultural diversity and various lifestyles, but also effectively reduce ethnic inequalities in health.

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