# Non-communicable diseases in Greece: Inequality, gender and migration

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**Abstract**

The relationship between gender, migration status and non-communicable diseases (NCDs) is rarely examined. In this study, we rely on data from the MIGHEAL Survey on health inequalities in Greece collected in 2016 comprising 1,332 respondents of which 59.98 per cent identified themselves as Greek-born, 24.02 per cent as immigrants from Albania, and 15.99 per cent as immigrants from another country than Albania, to analyse this often neglected relationship. With the help of average risk ratios, this paper explores and explains gender inequalities in heart or circulation problems, high blood pressure, breathing problems, allergies, back or neck pain, muscular pain, stomach or digestion related problems, skin conditions, severe headaches, and diabetes in Greece among Greek-born individuals, Albanian immigrants and among immigrants of "other origin".

We found that both among Greek-born and among immigrant groups women report substantially higher rates of NCDs although gender inequalities are more pronounced among "other-origin" immigrants. Further, our findings show that the observed gender inequalities are fostered by occupational factors both among Greek-born and migrants.

Policies targeted at reducing the risk of NCDs need to consider not only gender and migration status but also how their intersection renders certain social groups more vulnerable than others. Moreover, specific attention should be paid to the underlying structural factors associated with NCD reporting, such as working conditions, labour market regulations and employment initiatives that have a differential health influence across diverse population groups.

**Introduction**

The relationship between the multiple intersecting dimensions of social positioning and non-communicable diseases (NCDs) is not adequately examined in the European context, and especially in countries that were hit hardest by the economic crisis, such as Greece. The ongoing epidemiological transition from infectious diseases to NCDs, which is strongly socially patterned, makes this an even more important task.

The limited number of existing studies highlight that Greek women report significantly higher levels of ill health than Greek men (1) and that they have been more severely affected in terms of physical and mental health by the peak in unemployment rates during the crisis. (2) At the same time, evidence from a quasi-experimental study has shown that trends of self-rated health have worsened both among men and among women as a direct result of the crisis. (3) In order to get a better understanding of women's health disadvantage in Greece, the current study examines inequalities in self-reported non-communicable diseases (NCDs) between men and women living in the country. Driving on arguments about the relevance of intersectionality in health inequalities research (4), we conduct an analysis that integrates migration status using data from the MIGHEAL survey on health inequalities in Greece collected in 2016.

Non-communicable diseases represent a form of epidemic across many European countries, with rates varying from 45% among Hungarian men to 92% among Finnish women, even after age adjustments. (5) At the same time, while evidence suggests that two in every three deaths among women are caused by NCDs each year, NCDs have been largely neglected as a leading factor for women's ill health. (6) Simultaneously, despite more than 50 years of gender equality policy, gender gaps in poverty and ill health rates are still prevalent across the EU. (7) Women earn less, are more often unemployed, perform more unpaid labour, and report worse health than men. (8-10) Social roles approaches attribute this gender gap to the increased burden of psychological distress that women face in balancing paid work and caregiving while more radical feminist approaches highlight the health impact of the power imbalance between men and women (re)produced within patriarchy. (11, 12)

However, gender is not the single dimension of inequality in ill health. Evidence shows that inequalities in NCDs disfavour people from low socioeconomic backgrounds and that there is significant cross-national heterogeneity concerning educational inequalities in the experience of NCDs. (13) Moreover, with the integration of 28 member states in the European Union and the introduction of free movement within its external borders, we have witnessed the emergence of new or the growth of established immigrant groups with different health needs that require

particular attention within scientific research and policy formation. In this climate, migration appears as an additional dimension shaping health inequalities. (14) Indeed, previous European studies have shown that immigrants often report worse health and are differentially affected by healthcare system characteristics than natives in their host country. (15, 16) Such findings are better understood, if we consider that immigrants generally face greater hardship than non-immigrants in terms of employment patterns, experiences of discrimination and higher risks of occupational exposure to health hazards and injury. (17)

In this respect, to document and understand gender inequalities in NCDs in Greece, we need to also integrate migration in our analysis. A significant number of immigrants from neighbouring countries, such as Albania and Bulgaria have settled in the country since the early 1990s, after the collapse of the Central Eastern European communist regimes, as well as from other European and non-European countries. (18) In both 2010 and 2016, 10.1% of the Greek population consisted of immigrants (15) with Albanians being the largest immigrant group comprising the 52.7% of the registered foreign population in 2011. (18, 19) Job opportunities and escaping poverty used to be among the key motivating factors for Albanians moving to Greece (20) as until the onset of the recession in 2008, migrants in Greece exhibited lower unemployment levels than natives, contrary to the experience of most EU countries. (18) However, recent estimates have shown that unemployment levels of migrants greatly exceed that of natives while the poverty gap between them has widened. (18, 21)

Hence, the current study explores and explains gender inequalities in NCDs among the native and immigrant population in Greece, driving on arguments about the relevance of intersectionality in health inequalities research. (4) Intersectionality stresses that social positioning is shaped through an interplay between multiple social categories within specific socio-historical contexts. (22, 23) In this light, individuals have both privileges and disadvantages deriving from the simultaneous impact of social categories like gender, race and social class and their intersections. (24) For instance, a Greek woman living in Greece enjoys the privileges associated with her national citizenship but she is simultaneously penalized by being a woman within a traditional patriarchal society. Therefore, we examine gender inequalities in different categories of self-reported NCDs between Greek-born individuals, Albanian immigrants, and immigrants of other origin (the distinction among immigrants was based on their reported citizenship), to understand how gender's intersection with migration status may render certain groups more vulnerable to NCDs than others. Moreover, we examine whether gender inequalities across the three groups are fostered or diminished by risky health behaviours, childhood and current financial conditions, and social factors (social contact and social integration) while adjusting for compositional differences in age, education and employment. In

general, one's likelihood to report NCDs has been found to highly depend on different educational backgrounds as well as one's age. (25) Although, education and employment are both indicators of individual socioeconomic status, we decided to control for education because previous research has shown that their association with health follows both a common and an independent path, while their salience varies across population groups. (26, 27) Moreover, given the excessive unemployment rates of the last eight years in Greece that have disproportionately affected highly educated women, (28) being unemployed in the current times does not necessarily imply low socioeconomic status for everyone. Our study contributes with significant evidence to explanations of health inequalities in Greece considering gender and immigration status as two interrelated and simultaneous dimensions of social positioning. Moreover, it pushes forward new insights on the relationship between gender, migration and NCDs more generally.

## Methods

### Data

We base our analysis on the MIGHEAL survey, which was fielded in 2016. The original aim of the survey was to capture health inequalities within the Greek society. (29) A main strength of the survey is that it oversampled the immigrant population in Greece, which allows us to study differences between groups of immigrant and non immigrant origin with comparable data. The MIGHEAL survey was established in line with the European Social Survey (ESS) 2014. (30) The MIGHEAL sample comprises of 1,332 respondents of which 59.98 per cent identified as Greek-born natives, 24.02 per cent identified as immigrants from Albania, and 15.99 per cent as immigrants from another country than Albania. Thus, the immigrant population makes up roughly 40 per cent of our sample. Immigrant status is defined according to country of birth rather than citizenship, as we want to capture the health impact of the migration experience. The gender distribution in the sample is modestly skewed for both the Greek-born and the immigrant population: women represent 55.5 per cent of the Greek-born group but only 43 per cent of the Albanian and other origin immigrant groups. This is in line with the distribution in the Greek population.

### Measures

Our main variable of interest is NCDs. Respondents were asked whether they experienced any of the following eleven types of NCD in the past twelve months (0=did not experience NCD, 1=did experience NCD): (a) heart or circulation problems, (b) high blood pressure, (c) breathing problems, (d) allergies, (e) back or neck pain, (f) muscular or joint pain in the hand or arm, (g) muscular or joint

pain in the foot or leg, (h) stomach or digestion related problems, (i) skin condition related problems, (j) severe headaches, (k) diabetes. Table 1 gives a first picture of the differences between men and women in each population group (Greek, Albanian, other origin).

First, we constructed a measure that indicated whether the respondents reported experiencing at least one of the eleven types of NCD. Overall, about 46 per cent of the total sample reported experiencing at least one of the examined diseases. However, the number of respondents per subgroup by disease type (e.g. immigrant women from Albania reporting high blood pressure) is in some cases too low to make reasonable statistical inferences. To overcome this obstacle, we classified the eleven types of NCD into four broader categories that resulted from a maximum-likelihood exploratory factor analysis based on a tetrachoric correlation matrix (results can be found in the appendix, Table A2). The categories are musculoskeletal disorders (including muscular or joint pain in the limbs and back or neck pain), cardiovascular and respiratory disorders (including heart or circulation problems, high blood pressure, diabetes and breathing problems), digestion problems and headaches in one category, and allergies and skin conditions in another. Each of the examined diseases appears only in one category. Each of the four categories takes the value 1, if the respondents reported suffering from at least one of the types of NCD classified in the particular category, or the value 0, if the respondents reported none of them. Finally, we use the gender gap in reporting NCDs as our dependent measure.

Respondents' age was measured in years and their educational attainment in three categories based on the ISCED classification. Respondents with less than upper secondary education (ISCED I and II) are contrasted with respondents with upper secondary education (ISCED IIIa, IIIb and IV) and with respondents with tertiary education (ISCED V and VI).

We use four sets of explanatory factors. The first set of factors concerns risky health behaviours and includes a person's smoking and drinking habits as well as their BMI. We acknowledge that an increased BMI is not necessarily the outcome of an unhealthy diet, still we treat it as a risk factor because it often associates with conditions like hypertension either directly or indirectly via the stressful stigmatisation experiences that obese people deal with. Occupational factors include both material and ergonomic hazards at work as well as one's occupational status. Childhood and current financial conditions refer to whether the respondent experienced any financial difficulties while growing up as well as how respondents feel about their current household income. The last set of factors summarise respondent's degree of social capital or integration. Here, we take into account one's social activity, the number of close confidants as well as the frequency of social contact. A more detailed description of the variables is given in the appendix (Table A3).

*Statistical Analysis*

To analyse the factors associated with gender inequalities in the three groups, we first estimate the means of adjusted rate differences (ARD) and the relative adjusted risk ratios (ARR) in reporting NCDs (in reporting at least one of the eleven NCDs and in reporting any of the four broad categories of NCDs) for men and women in each group (Greek-born; Albanian immigrants; immigrants of other origin) controlling for their age and educational level (baseline model). In a second step, we estimate logit regression models testing the impact of the different sets of influence factors in a stepwise procedure, similar to Balaj et al. (31), as the limited number of cases prevents us from testing the influences simultaneously. In detail, we add the four sets of explanatory factors separately to the baseline model. By comparing the adjusted and non-adjusted rate ratios, we can thereby assess the extent to which these selected factors explain the NCD-related gender gap in each of the three ethnic groups.

**Results**

Table 1 presents the mean differences in reporting at least one of the eleven NCDs and in reporting any of the four broad categories of NCDs for each of the three groups (see appendix Table A1 for overall NCD prevalences by gender and ethnic background). We find that women on average report at least one chronic condition more than men in the Greek born group and among immigrants of other origin. For the group of Greek-born individuals the gender gap is 10 percentage points, while for immigrants of other origin it is 15 percentage points. In contrast, for immigrants from Albania it appears that although women report at least one NCD more than men this difference is not statistically significant.

TABLE 1: Prevalence of reporting NCDs by gender ethnic background – descriptive overview

| | at least one NCD | | musculoskeletal disorders | | cardiovascular& respiratory disorders | | digestion & headaches | | allergies & skin conditions | |
|---|---|---|---|---|---|---|---|---|---|---|
| | women | men | women | men | women | men | women | men | women | men |
| **Greek** | 0.59 | 0.49 | 0.41 | 0.23 | 0.29 | 0.27 | 0.15 | 0.07 | 0.11 | 0.08 |
| **p-value** | 0.004 | | 0.000 | | 0.518 | | 0.001 | | 0.234 | |
| **Albanian** | 0.31 | 0.23 | 0.20 | 0.07 | 0.06 | 0.07 | 0.10 | 0.07 | 0.08 | 0.05 |
| **p-value** | 0.083 | | 0.001 | | 0.631 | | 0.251 | | 0.270 | |
| **Other** | 0.51 | 0.36 | 0.35 | 0.17 | 0.17 | 0.14 | 0.12 | 0.08 | 0.18 | 0.05 |
| **p-value** | 0.036 | | 0.003 | | 0.507 | | 0.384 | | 0.004 | |

*significant differences between women and men, 5%-level; significance tests based on ANOVA tests (multi-group comparison)

Regarding the prevalence of the four categories of the non communicable diseases, we observe differences both between men and women and between the native and immigrant groups. First, we see the largest statistically significant differences in reporting at least one musculoskeletal condition, that is foot, hand or back pain across all groups. The differences thereby are prominent: Greek-born as well as immigrant women of non Albanian origin have an 18 percentage points higher mean than men in reporting at least one of the musculoskeletal conditions while among Albanian immigrants the respective difference is 13 percentage points.

Moreover, there is a gender gap disfavouring women in reporting digestive problems or headaches only in the Greek-born group (8 percentage point difference), whereas the gender gap in allergies and skin conditions is significant only among immigrants of other origin (13 percentage points difference). In contrast, we do not find any significant gender differences in reporting cardiovascular or breathing disorders in any of the three groups.

*Drivers of the gender gap in reporting NCDs among Greek born and immigrant groups*

Where do the observed gender differences in NCD reporting stem from? Figure 1 presents our estimates on both the average risk ratios (ARR) (that is women's likelihood to report at least one NCD divided by men's respective likelihood) and adjusted rate differences (ARD) (that is the difference between the likelihood of reporting an NCD for females subtracted by the likelihood for males) for different migration status groups when controlling for sets of potential influences.
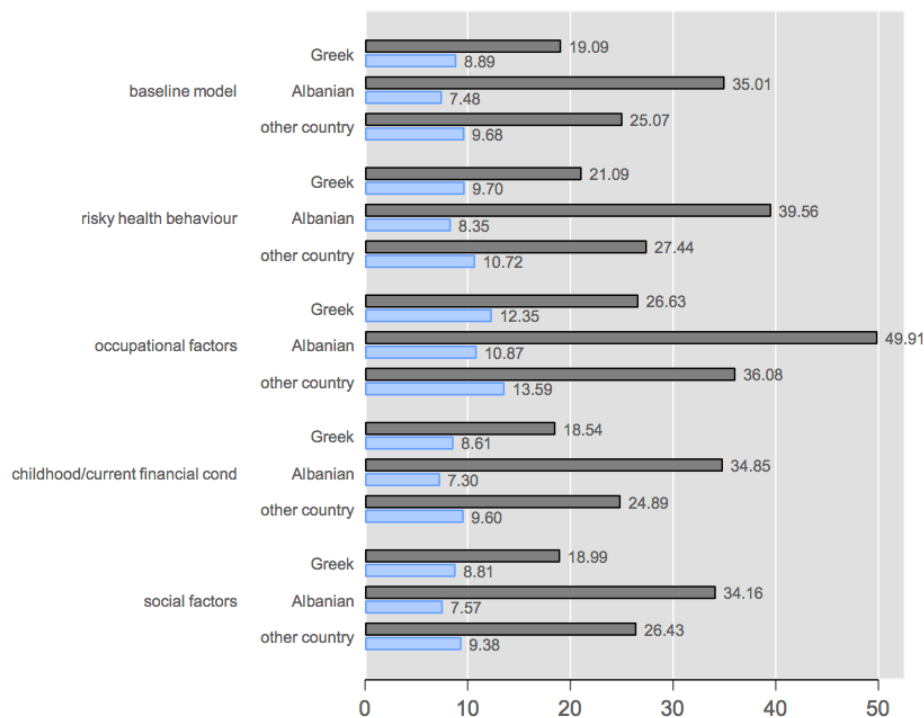


Figure 1: Differences between males and females in their ARR and ARD of reporting at least one NCD

*Notes: The dark grey bars represent the average risk ratio (ARR) and the light blue bars the adjusted risk difference (ARD). Significant tests are based on the implemented estimates in the adjrr command. Full results including confidence intervals are given in Table A4 in the Appendix.*

The baseline model (age and education adjusted) shows that women are more likely to report at least one of the examined NCDs across all groups with immigrant women of Albanian origin bearing the highest risk followed by immigrant women of other origin and then by Greek-born women. However, the smallest adjusted risk difference appears in the immigrant group of Albanian origin and the largest in the immigrant group of other origin. This means that while Albanian women are, on average, much more likely to report a NCD, the absolute difference between men and women is not greater than that emerging in the other two groups.

9

The rest of the models (each including one set of confounding factors) produce rather counterintuitive results as the examined confounding factors not only do not seem to explain the observed gender differences appearing in the baseline model but rather in certain cases seem to foster the gender gap. Starting with risky health behaviours we see that after controlling for them, both the average risk ratio for reporting at least one NCD and the adjusted risk difference increase for all groups. This pattern appears even stronger for occupational factors, since after controlling for them, women on average appear between 26 and 50 per cent more likely to report at least one chronic condition as indicated by the average risk ratio. This relationship is particularly prominent for Albanian immigrants. Regarding the adjusted risk differences they appear increased for both set of factors, however the pattern in terms of order (smaller - larger differences) are similar to those of the baseline model. Moreover, the influence of childhood and current financial conditions and social capital on the gender gap in reporting different sets of chronic conditions is rather negligible, i.e. they do not add any power compared to our baseline model as can be seen from Figure 1.

In addition to the gender inequality in reporting at least one chronic condition, we estimated further models including the four sets of influence factors to explain the gender gap in specific categories of NCDs. The results reveal an overall similar pattern as above (detailed results can be found in Figures A1-A4 in the appendix). Occupational factors foster gender differences for all conditions and particularly so for digestion problems and headaches. Risky health behaviour seems to foster gender differences again for all types of NCDs except for the category of digestion problems and headaches which seem to be explained by them and by economic conditions and social factors to a moderate extent. Although these factors cannot account for all the gender differences, women's average risk of reporting this particular category of conditions is reduced after adjustments across the three groups.

**Discussion**

Our findings have revealed a consistent pattern of gender inequalities disfavouring women in reporting NCDs both among Greek-born and among immigrant groups. Either looking at reporting at least one type of NCD or at reporting specifically musculoskeletal disorders, digestive problems and headaches or allergies and skin conditions, women bear a greater risk than men and this is particularly prominent for Albanian immigrant women. However, as indicated by the adjusted risk differences, despite this greatest risk, the largest absolute gender inequality in NCDs is found among immigrants of other origin followed by Greek- born individuals and then by immigrants of Albanian origin.

In order to explain these differences we have tested distinct sets of behavioural, occupational, economic and social factors. Our results indicate that none of these sets of factors alone can explain the gender inequalities in reporting at least one type of NCD, musculoskeletal disorders or allergies and skin conditions. Rather, differences in risky health behaviour, economic and social factors seem to partially explain gender inequalities in reporting digestive problems and serious headaches. In contrast, risky health behaviour and particularly occupational factors foster gender inequalities across all groups, increasing women's risk as well as the adjusted risk differences between men and women. The impact of occupational factors may be explained by the fact that in Greece, women are less often employed than men and when employed they work in less regulated sectors where they experience increased precarity and have less access to social security. These conditions apply even further for migrant women (Karamessini, 2013). Our findings are also in line with previous research in the Greek context that shows that women in Greece are more negatively affected by unemployment in relation to health and mental health status than men. (Drydakis) Marmot et al. (7) state that participation in the labour market determines a wide range of life chances, mainly through regular salaries and social status. They also suggest that threats to social status and identity due to job instability or loss could affect health and wellbeing as one is exposed to economic and social stressors.(7, 32). If we consider also that women in Greece face high levels of gender inequality within and outside the labour market (karamessini, 2013), we can both assume that such experiences of instability are more common among women and that their impact on women's health may be exacerbated by their overall disempowered social position.

Another interesting finding is that although Albanian women bear the greatest risk to report a non-communicable disease among women, the gender inequalities in this group are the smallest. One potential explanation is that Albanian men mainly work in construction and farming, where they experience particularly poor working conditions and increased occupational hazards. (33) Moreover, it has been found that immigrant men of Albanian origin are less integrated in the Greek society than women (34) and this implies that they may deal with more experiences of discrimination. Finally, research shows that Albanian men living in Greece, experience less intimacy and close relationships within the family than Albanian women and Greek women and men. (35) This means that the particular group may have less emotional and psychosocial resources that promote good health and well-being.

Further, we observe that gender inequalities in reported NCDs are the greatest among migrants of non-Albanian origin. According to the MIGHEAL report, this group includes women from various non-Western countries, hence we cannot make safe assumptions about the particular mechanisms driving this inequality. However, we can suggest that women within less prominent immigrant

groups in the Greek society bear a greater health disadvantage than other women of migrant and non-migrant origin. This implies that the relationship between gender and occurrence of NCDs is subject to both migration status and ethnic origin and highlights that immigrants represent a group that is diverse across multiple social categories. (4)

From a structural viewpoint, our findings suggest that gender and migration status do not represent fixed attributes with specific health impact. Rather, they are informed by the social context and by each other associating with differential amounts of privilege and disadvantage (Nash, 2008; Collins, 2000). As we saw masculinity does not imply the same privilege and health effect for Albanian immigrants. Moreover, our results highlight the importance of institutional factors particularly in the labour market and the way they interact with individual social positions. We saw that occupational factors foster gender inequalities in reporting non-communicable diseases.

These conclusions call for future research in social inequalities in NCDs that adopts an intersectional and institutional perspective, (4) focuses on specific immigrant groups and takes into consideration this interplay between multiple dimensions of individual positions (e.g. ethnicity, gender, migration experience) and institutional factors like labor market regulations and employment initiatives.

Our findings should be interpreted in light of some limitations. First, while we do find some important differences in the health gender gap between Greek-borns and immigrant groups, our findings do require some caution. In particular, the limited number of cases for each of the NCDs is an issue. Even though the grouping of reporting NCDs was based on a maximum-likelihood factor analysis, we did not apply a standardized categorization and we could possibly find different results if we looked at the NCDs separately. This however would require ethnic (background) groups of a larger size. Furthermore, the cross-sectional nature of our data does not allow us to make any causal claims. Finally, the observed NCDs are based on self-reports.

**Conclusion**

Our results have highlighted that women living in Greece are more vulnerable to NCDs and that gender inequalities in NCDs are subject to migration status and ethnic origin. This suggests that gender has an influence on the health of both men and women but to a different extent across immigrant and non immigrant groups. This reinforces the idea that an intersectional approach in health inequalities gives a more accurate picture of complex health conditions and relationships of health inequality. Policies targeted at reducing the risk of NCDs need to consider how gender, migration status, ethnic origin and their intersections render certain social groups more vulnerable than others, in our case immigrant women of non-Albanian origin. Further, we found that occupational factors foster rather than explain these gender inequalities in the Greek context and this calls researchers as well as policy makers to pay specific attention to the underlying structural

factors associated such as working conditions, labour market regulations and employment initiatives. Although gender inequalities in NCDs are prevalent, they are not inevitable as there is variation across countries and groups but also across different type of NCDs. Further work is needed to explore how institutional factors contribute to the creation and maintenance of gender inequalities in NCDs, and on how contextual factors may mitigate the effects of gender inequality on NCDs.

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Table A1: Prevalence of NCD's – for males and females according to their nationality

| | | heart or circulation problems | high blood pressure | breathing problems | allergies | back or neck pain | muscular or joint pain in the hand or arm | muscular or joint pain in the foot or leg | stomach or digestion related problems | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Greek** | men N=353 | 7.93 | 18.98 | 3.40 | 7.37 | 11.90 | 7.65 | 12.75 | 4.25 | |
| | women N=444 | 9.01 | 19.37 | 6.53 | 8.56 | 23.20 | 18.92 | 25.45 | 7.66 | |
| **Albanian** | men N=182 | 1.65 | 3.85 | 1.65 | 4.40 | 4.40 | 2.75 | 2.20 | 4.40 | |
| | women N=138 | 1.45 | 2.90 | 1.45 | 7.25 | 12.32 | 10.14 | 10.14 | 4.35 | |
| **Other** | men N=120 | 4.17 | 5.83 | 5.00 | 4.17 | 10.00 | 3.33 | 5.00 | 5.83 | |
| | women N=92 | 7.61 | 7.61 | 4.35 | 17.39 | 18.48 | 15.22 | 19.57 | 4.35 | |

*Notes:* Percent per nationality group presented for men and women.

Table A2: Results factor analysis (NCDs)

| variable | cardiovascular and respiratory disorders | musculoskeletal disorders | digestion and headaches | allergies and skin conditions | Uniqueness |
|---|---|---|---|---|---|
| heart or circulation problems | 0.85 | | | | 0.23 |
| high blood pressure | 0.75 | | | | 0.21 |
| breathing problems | 0.73 | | | | 0.30 |
| allergies | | | | 0.74 | 0.34 |
| back or neck pain | | 0.67 | | | 0.32 |
| muscular or joint pain in the hand or arm | | 0.86 | | | 0.21 |
| muscular or joint pain in the foot or leg | | 0.82 | | | 0.20 |
| stomach or digestion related problems | | | 0.90 | | 0.24 |
| skin condition related problems | | | | 0.88 | 0.23 |
| severe headaches | | | 0.71 | | 0.39 |
| diabetes | 0.51 | | | | 0.45 |

Note: Maximum-likelihood factor analysis based on a tetrachoric correlation matrix; only factor loadings >0.3 presented.

Table A3: Variable operationalization

| Variable | MIGHEAL measures | Categories/scores |
|---|---|---|
| Behavioural factors | | |
| BMI | Self reported weight /self-reported height | Underweight/ normal < 24.9 |
| | | Overweight/obese/very obese > 24.9 |
| Smoking | Description of smoking behaviour | Non-smoker = 'never smoked' 'smoked few times |
| | | Ex-smoker = 'used to smoke' |
| | | Smoker= 'smoke daily' 'smoke but not every day' |
| Alcohol consumption | Quantity of alcohol consumption on the last occasion | Recommended maximum amount 2 units |
| | Frequency of alcohol consumption | Infrequent = 'Never' 'Less than once a month' ' Once a month |
| | | Frequent = ' 2-3 time a month' 'Once a week' 'Several times a week' 'Every day' |
| Occupational factors | | |
| Material hazards | Ever exposed to a list of material hazard | No exposure |
| | | Exposure to one material hazard |
| | | Exposure to two or more material hazard |
| Ergonomic hazards | Ever exposed to a list of ergonomic hazard | No exposure |
| | | Exposure to one ergonomic hazard |
| | | Exposure to two or more ergonomic hazard |
| Occupational status | Current economic activity | Economically active |
| | | Economically inactive |

Living conditions

| | | |
|---|---|---|
| Financial difficulties growing up | Frequency of financial difficulties while growing up | Infrequent = 'Never' 'Hardly ever' |
| | | Frequently = 'Sometime' 'Often' 'Always' |
| Financial strain | Feeling about the household income | No financial strain= 'Living comfortably' ' Copping' |
| | | Financial strain= 'Difficult on present income' ' Very difficult' |
| Social contacts with friends and relatives | Frequency of social meetings | Frequent meetings ≥ once a week Infrequent meetings < once a week |
| Close confidants | Number of confidants | > 3 confidants ≤ 3 confidants |
| Social activity | Frequency of taking part in social activities | Frequently taking part ≥ once a week Infrequently taking part < once a week |

|  |  | Baseline model | Behavioral factors | Occupational factors | Living conditions | Social factors |
|---|---|---|---|---|---|---|
| **Greece** | ARR | 1.1909 (1.0654, 1.3312) | 1.2106 (1.0734, 1.3653) | 1.3013 (1.1478, 1.4754) | 1.1854 (1.0614, 1.3239) | 1.1899 (1.0580, 1.3382) |
|  | ARD | 0.0889 (0.0333, 0.1445) | 0.0970 (0.0375, 0.1565) | 0.1376 (0.0735, 0.2017) | 0.0861 (0.0314, 0.1409) | 0.0881 (0.0297, 0.1465) |
|  | p-value | 0.0021 | 0.0018 | 0.0000 | 0.0021 |  |
| **Albania** | ARR | 1.3501 (1.1179, 1.6306) | 1.3956 (1.1372, 1.7127) | 1.5603 (1.2632, 1.9274) | 1.3485 (1.1139, 1.6325) | 1.3416 (1.1025, 1.6327) |
|  | ARD | 0.0748 (0.0270, 0.1225) | 0.0835 (0.0313, 0.1358) | 0.1199 (0.0620, 0.1778) | 0.0730 (0.0257, 0.1203) | 0.0757 (0.0247, 0.1267) |
|  | p-value | 0.0021 | 0.0017 | 0.0000 | 0.0025 | 0.0036 |
| **Other** | ARR | 1.2507 (1.0853, 1.4414) | 1.2744 (1.0956, 1.4823) | 1.4026 (1.1909, 1.6518) | 1.2489 (1.0828, 1.4404) | 1.2643 (1.0804, 1.4797) |
|  | ARD | 0.0968 (0.0364, 0.1573) | 0.1072 (0.0422, 0.1722) | 0.1495 (0.0797, 0.2193) | 0.0960 (0.0351, 0.1570) | 0.0938 (0.0315, 0.1562) |
|  | p-value | 0.0017 | 0.0017 | 0.0000 | 0.0020 | 0.0032 |

Table A4: Results from Figure 1 including confidence intervals

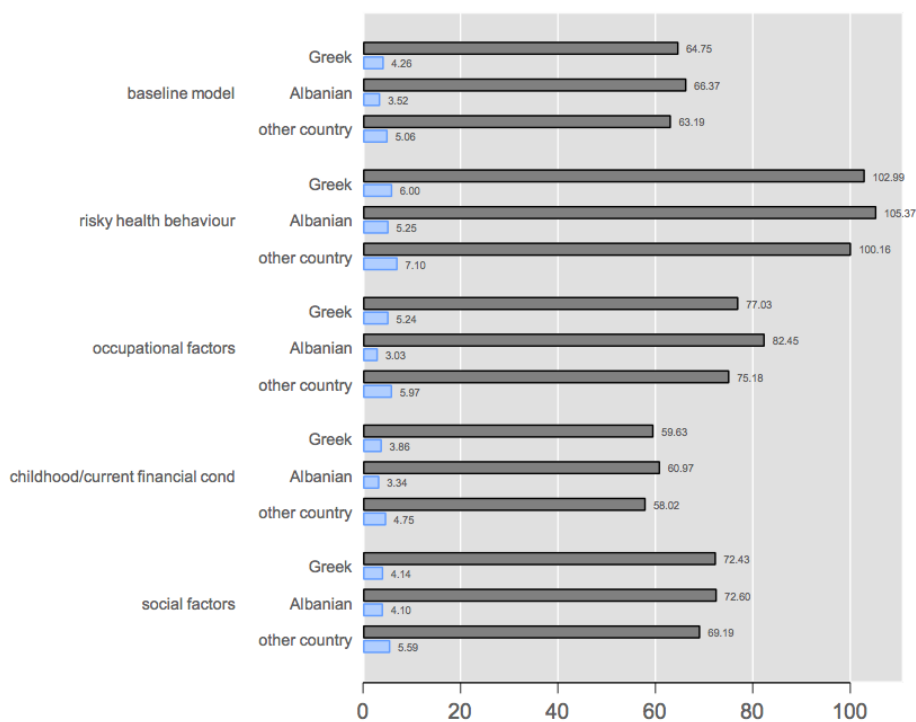Figure A1: Musculoskeletal disorders
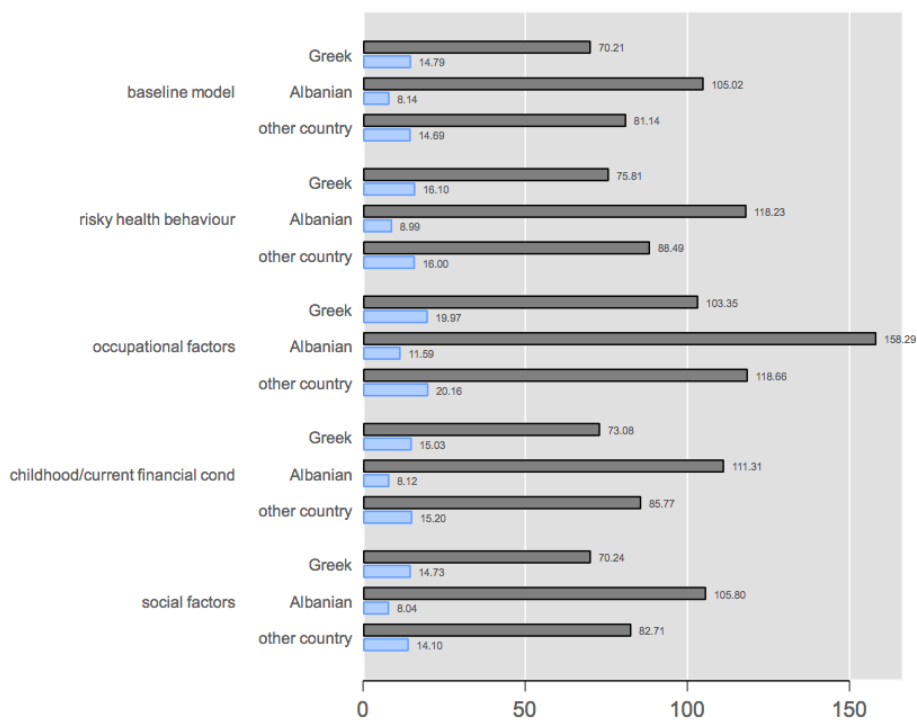


Notes: The dark grey bars represent the average risk ratio (ARR) and the light blue bars the adjusted risk difference (ARD).

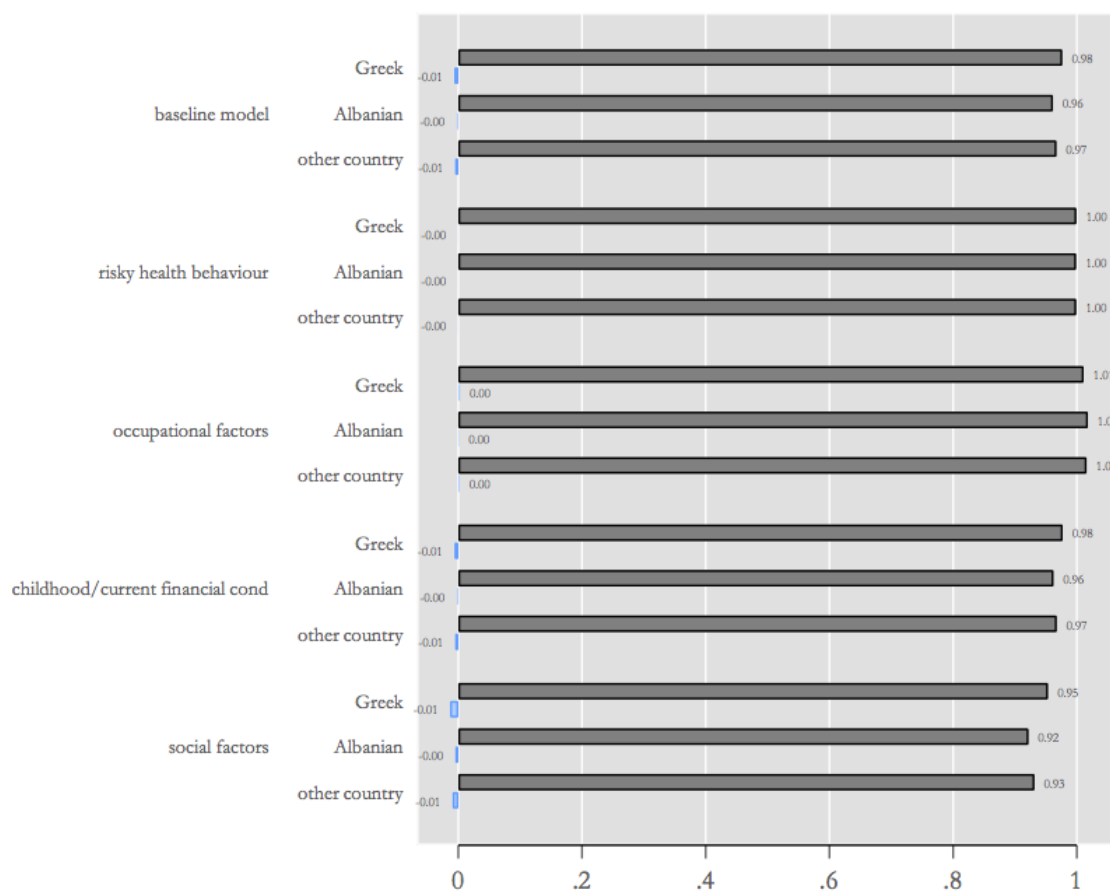Figure A2: Digestion and Headaches
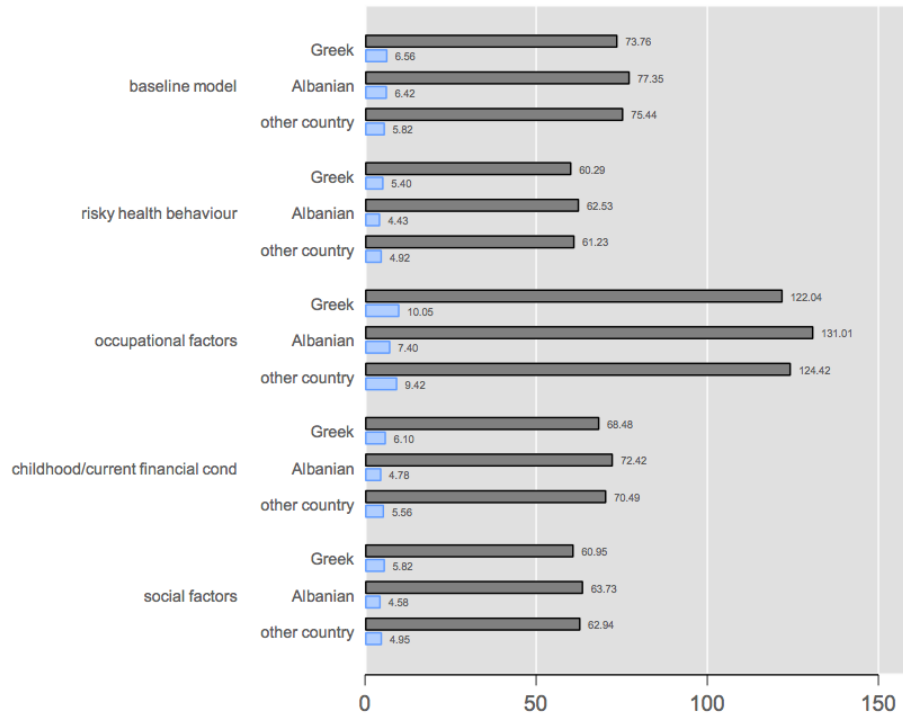


Notes: The dark grey bars represent the average risk ratio (ARR) and the light blue bars the adjusted risk difference (ARD).

Figure A3: Allergies and skin conditions



Notes: The dark grey bars represent the average risk ratio (ARR) and the light blue bars the adjusted risk difference (ARD).

Figure A4: Cardiovascular and respiratory disorders



Notes: The dark grey bars represent the average risk ratio (ARR) and the light blue bars the adjusted risk difference (ARD).