



Editorial

The impact of migration on cardiovascular diseases[☆]Anna Odone^a, Charlotte McKee^b, Martin McKee^{c,*}^a Department of Medicine and Surgery, University of Parma, Parma, Italy^b Department of War Studies, Kings College London, United Kingdom^c Department of Health Services Research and Policy, London School of Hygiene & Tropical Medicine, 15-17 Tavistock Place, London WC1H 9SH, United Kingdom

ARTICLE INFO

Article history:

Received 18 November 2017

Accepted 22 November 2017

1. Introduction

Cardiovascular disease (CVD) is now the leading contributor to disability-adjusted life years lost worldwide [1]. Within CVD, ischaemic heart disease and stroke rank first and second [1], with hypertensive heart disease and heart failure, rheumatic heart disease (RHD), cardiomyopathy and atrial fibrillation also contributing substantially [2]. There is clear international commitment to address this issue. The WHO 25 × 25 Global Action Plan [3], and the Sustainable Development Goals [4] set ambitious targets to reduce premature mortality from CVD. Yet while there has been considerable progress in many countries, this has not been matched in others, especially low and middle-income ones, with death rates in, for example, South Asia, now over three times as high as in high income countries [2,5].

These differences in levels and trends in CVD matter in a world experiencing high levels of migration. Those migrating, within or across national boundaries, may have patterns of disease that differ from the existing population, due to features of both where they have come from and where they have arrived. Of course, while there have been many mass migrations in the past, such as the expansion of European populations into the Americas and Australasia, who to varying degrees displaced existing populations [6], or the movement of entire nationalities in the aftermath of the Second World War [7], the scale of migration to Europe in particular since the beginning of the 21st century, has been on a scale not seen for many decades, much of it a consequence of conflict and environmental factors.

Knowledge of how these developments are influencing the pattern of disease in populations is essential for those involved in planning services in areas experiencing high levels of migration so as to enable them to plan and implement appropriate health services and targeted prevention interventions [8]. Here it is important to note that the

pattern of settlement is extremely uneven. Thus, even within Europe, some countries have experienced relatively little recent migration, such as the United Kingdom, reflecting its government's policy of creating a "hostile environment" [9], a situation that also applies in many countries of central Europe, while others have been much more welcoming, exemplified by the German term *Willkommenskultur*, or "welcoming culture", that has seen the absorption of over one million migrants in 2015. Moreover, within those countries that have received large numbers of migrants, the new arrivals are often concentrated predominantly in urban environments.

The information needed may not, however, be easy to obtain. Much of our knowledge of the causes of CVD comes from research on existing populations in high-income countries [3,8,10–13], defined by their residence of a country or community [11] or their occupation or employer [14]. The evidence they have provided shows how the causes of CVD operate at many levels [2,15], from proximal risk factors, both modifiable, both behavioural (diet, smoking, alcohol, physical activity) and metabolic (blood pressure, cholesterol, diabetes), and non-modifiable, such as age and gender. Other studies have assessed the impact of upstream and community determinants of CVD related to the physical and social environments, including what are termed the social determinants of health [16], including poverty, inequality, and the political and economic factors that create them, [8] as well as the roles of health systems, urbanization and pollution [2,17]. There is much less research on those populations from which people are now migrating, including both exposures and outcomes [18].

In this paper we review some of the key issues relating to the impact of international migration flows on cardiovascular disease dynamics, proposing a conceptual framework for assessing the health effects of different steps in the migration process, which we then use to explore some of the ways in which these steps can influence CVD risk. Recognizing the constraints of space, we do not look in detail at the associated challenge of internal displacement, although this also raises important issues for health policy makers. We also recognize that the available literature is dominated by studies of migrants moving to high-income countries, even though most international migrants are in other low and middle-income countries. We then make suggestions for how the burden of CVD might be addressed in migrant populations.

We argue that there are three key factors influencing CVD burden in migrant populations: i) conditions in the country of origin, including ethnicity, access to life sustaining treatment, and the reasons why people migrate; ii) the migration process itself, and iii) legal status in the host country. Although previous research has to a very large extent focused

[☆] The authors report no relationships that could be construed as a conflict of interest.

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on each separately, [19] we view them as part of a dynamic, complex continuum.

Given the complexity of migration, of necessity this review must be limited. Thus, it focuses primarily on ischaemic heart disease, its risk factors, and consequences. We note, but do not address further, the high burden of rheumatic heart disease in many parts of the world [20] and Chagas Disease among migrants from South America [21]. It also excludes issues related to the large numbers of migrants moving between rich countries, such as Northern Europeans retiring to the Mediterranean [22], although they too pose challenges for those providing health services.

2. CVD in migrant populations: a conceptual framework

Research on the health of migrants typically combines successive phases of the migratory process with a life-course perspective [23,24]. Zimmerman et al. [23] identified five phases of the migration process: i) pre-departure, ii) travel, iii) destination, iv) interception, and v) return. In this review, we apply this framework to CVD. The framework is depicted graphically in Fig. 1, distinguishing the role of CVD risk factors in host countries, the migration selection process, and the risks facing migrants in host countries. The dominant risks to migrants vary along this journey. Thus, risks of injury and violence (including drowning), psychological distress, mental health disorders and lack of access to care and, especially, life-sustaining medicines, dominate during *travel*, when migrants are moving from their place of origin to the host country and *interception*, which refers to forced migrants' temporary detention or interim residence. In contrast, the risk factors for CVD are more important during the *pre-migration* phase, before individuals leave from their place of origin, and the *post-migration* phase, covering the period that individuals spend in host countries. We include in our conceptual framework the *reason to migrate*, which influences which people migrate and, thus, their socio-demographic and clinical characteristics that impact on patterns of CVD risk factors.

Pre-migration risk factors relevant to CVD include genetic and environmental factors acting in migrants' countries of origin, among which are: individual behavioural risk factors, access to care, and upstream community determinants of CVD. These vary, with different countries at different stages of the epidemiologic transition [25], the impact of factors associated with ethnicity, such as genetic predisposition in some populations [2,26], and selective survival where premature mortality is high because of limited access to life sustaining treatment. *Post-migration* risk factors for CVD include the conditions in which migrants live in host countries, including poverty and marginalization, barriers to accessing care, and problems adapting to the prevailing culture,

especially if this creates barriers to health-seeking behaviour (although cultural factors may offer some protection, for example by reducing susceptibility to marketing by the tobacco and alcohol industries). These, in turn, are influenced by characteristics of the particular migrant population, such as whether established communities already exist in the host nation, the scale and nature of cultural differences (such as availability of food compliant with religious restrictions). However, in practice, it is often difficult to differentiate the contribution of *pre-migration* and *post-migration* determinants of CVD, with evidence that, at least for some migrants, they arrive in host western countries with a higher risk of CVD that subsequently increases further [27].

Classic migrant studies have compared those staying and those migrating. For example, the Ni-Hon-San study [28] reported increasing serum cholesterol level and body mass index as Japanese men moved, progressively, from Japan to Hawaii and then California, reflected in increasing coronary heart disease rates. This was interpreted as evidence of the adverse impact of transition to a Western life-style. However, until recently, such studies were limited to those moving between high-income countries, although this is now changing [29].

Our conceptual model also considers *reason to migrate*, recognizing that there may be differences between, for example, those who are forcibly displaced, labour migrants, and those moving for family reunification migrants. The precise circumstances prevailing at the time when the decision is made to move will influence who moves, and, in particular, the probability that those with pre-existing CVD with both move and survive the journey. Given its importance in the overall process, this issue will be examined first.

3. Reasons to migrate, and what it means for patterns of CVD?

When seeking to understand the complex pattern of CVD in migrant populations it is important to reflect upon “who migrates”. The scope of migration is broad and includes different forms of human mobility: temporary or more permanent, over long or shorter distances, [23] forced or voluntary [19]. There are various taxonomies of migration status, depending on the question being asked. Some are based on legal factors, such as residence status (citizen, permanent/temporary resident, undocumented migrant) while others consider the reason for moving (refugees, family reunification, student visa, skilled workers) [19,23]. Different reasons for migrating and migrant status may select people with different sociodemographic and clinical characteristics and, ultimately, different CVD risk factors patterns.

Historically, many people have migrated, nationally or internationally, to work; the “Healthy Migrant effect” refers to the selective migration of young healthy migrants or individuals with healthy lifestyles and

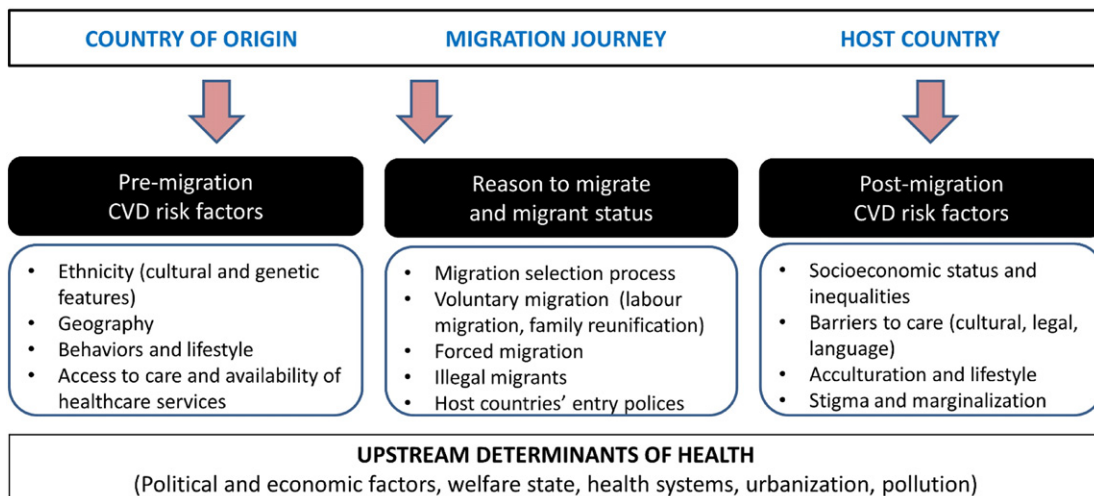


Fig. 1. A conceptual framework for understanding CVD in migrant populations.

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