

# BMJ Open Understanding of and perceptions towards cardiovascular diseases and their risk factors: a qualitative study among residents of urban informal settings in Nairobi

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## ABSTRACT

**Objectives** The study explored the understanding of and perception towards cardiovascular disease (CVD) and risk factors, and how they influence prevention and development of the conditions, care-seeking and adhering to treatment.

**Setting** Informal settlements of Nairobi.

**Participants** Nine focus group discussions consisting of between six and eight purposively sampled participants were conducted among healthy individuals aged 20 years or older. A total of 65 participants (41 female) were involved.

**Results** Poverty, ignorance and illiteracy promoted behaviours like smoking, (harmful) alcohol consumption, physical inactivity and unhealthy diet, implicated in the development of obesity, diabetes and hypertension. Some respondents could not see the link between behavioural risk factors with diabetes, hypertension and stroke and heart attacks. Contaminated food items consumed by the residents and familial inheritance were factors that caused CVD, whereas emotional stress from constant worry was linked to hypertension, stroke and heart attacks. Few and inadequately equipped public health facilities were hindrances to treatment seeking and adherence to treatment for CVD conditions. Lack of medication in public health facilities was considered to be the single most important barrier to adherence to treatment next to lack of family support among older patients.

**Conclusion** Interventions to prevent and manage CVD in low-resource and urban poor settings should consider perceptions and understanding of risk factors for CVD, and the interrelationships among them while accounting for cultural and contextual issues for example, stigma and disregard for conventional medicine. Programmes should be informed by locally generated evidence on awareness and opportunities for CVD care, coupled with effective risk communication through healthcare providers. Screening for and treatment of CVD must address perceptions such as prohibitive cost of healthcare. Finally, social determinants of disease and health, mainly poverty and illiteracy, which are implicated in addressing CVD in low-resource settings, should be addressed.

## Strengths and limitations of this study

- The study employed focus group discussions to explore general community-level knowledge and understanding of and perceptions towards cardiovascular diseases (CVDs) and risk factors.
- Quality of data and focus of the research was ensured by the discussions being moderated by researchers trained in qualitative research.
- Explanations, clarifications and examples were offered to study participants to enhance their understanding of the CVDs in question (stroke and heart attack) and the risk factors being explored (obesity, diabetes, hypertension, smoking and excessive alcohol consumption).
- Despite our best effort to explain and clarify to the study respondents' CVD conditions and risk factors being investigated, their understanding seems to have been unclear in some instances.
- Although the study was carried out among the slum residents of Nairobi, we expect the findings to apply to the general population in Kenya and to be used to inform programming for CVD prevention in the country.

## BACKGROUND

Cardiovascular diseases (CVD) which include stroke and ischaemic heart diseases caused 31.7% of all deaths globally in 2016, accounting for 50% of deaths from non-communicable diseases.<sup>1-3</sup> Low-income and middle-income countries (LMICs) account for more than 80% of CVD deaths.<sup>3</sup> In 2013, sub-Saharan Africa (SSA) reported nearly one million deaths, translating to 5.5% of global CVD deaths,<sup>4</sup> and the number is expected to increase due to population growth, ageing and epidemiological changes being experienced in the region.<sup>4,5</sup>

Poor understanding and knowledge of the potential risks for developing CVD exists in

SSA.<sup>6</sup> In addition, many individuals in the region lack knowledge regarding risk factors for CVD.<sup>7,8</sup> Beyond the widely known behavioural/modifiable and physiological risk factors for CVD, psychosocial stressors that cause anger, anxiety and depression, especially among the materially deprived populations in SSA have been proposed as an emerging and important risk factor for CVD.<sup>6,9,10</sup>

The poor sections of the populations living in rampant poverty in SSA are also faced with high illiteracy levels. Growing and unplanned urbanisation in SSA has resulted in poor quality of urban housing, sanitation issues and limited access to efficient healthcare systems. These key issues have been identified as psychosocial stressors that can trigger the deterioration of health and well-being of people and have been linked to the development of CVD.<sup>11,12</sup> Existing evidence also shows that in LMICs, urban populations are disproportionately affected by the CVD burden compared with the rural populations.<sup>13,14</sup>

An individual's perception towards CVD risk is key in influencing action towards prevention of and adherence to treatment.<sup>15</sup> Existing models of health behaviour propose that individuals who perceive themselves to be at a higher risk of developing a disease may take action and institute risk mitigation and consequently lower their chances of developing the disease when perceived severity, susceptibility and benefits for taking such steps are high.<sup>15-18</sup>

In this study conducted among the residents of Nairobi slums, where more than half of the urban dwellers of the city live, we investigated the understanding of and perceptions towards CVD and their risk factors and how the understanding and perception affected actions taken by individuals to prevent CVD and in seeking care and adhering to treatment. These findings offer insights into existing perceptions regarding CVD and their risk factors as well as what influences these perceptions. Evidence could inform strategies for and enhance the effectiveness of CVD prevention and treatment programmes.

## METHODS

### Study site and sampling

The qualitative study was conducted in Korogocho and Viwandani, two urban slums in Nairobi Kenya. The sites are characterised by rampant poverty, congestion, poor housing, lack of basic social and health infrastructure and services, poor water and sanitation amenities, widespread insecurity and violence and high unemployment rates.<sup>19</sup> Participants for the focus group discussions (FGDs) were purposively sampled from the general 'healthy' population, among individuals aged 20 years and older and living in the study community. Research assistants approached individuals in their households and invited them to participate in the study. FGDs were composed of between six and eight participants who were neither diagnosed with or on treatment for diabetes, high blood cholesterol and hypertension nor had suffered stroke, heart attack or heart disease and heart failure in the past. A total of 65 participants (41 female) were involved in the study.

### Study design

This phenomenological qualitative study aimed to explore the knowledge and understanding, as well as the experiences of the urban slum community with CVD conditions, their risk factors and how this knowledge and understanding influenced their care-seeking and treatment behaviours.

### Data collection, management and analysis

Data were collected in April 2017. Trained research assistants identified eligible participants and invited them to participate in the study. The FGDs were moderated by the lead researcher who is experienced in qualitative research methodology. During the interviews, the researcher explained to the participants the CVD conditions and the risk factors being discussed. CVDs were defined as disorders of the heart and blood vessels that included heart disease (angina), heart attack and heart failure and stroke. Risk factors were listed as hypertension and raised blood pressure, diabetes and raised blood sugar, overweight and obesity, physical inactivity, smoking and harmful/excessive alcohol consumption. Perceptions comprised opinions on CVD and the risk factors as well as what influenced these opinions, and the understanding and interpretation of individuals considered to be at risk.

Interviews were conducted in Kiswahili, a language widely spoken and understood by the study population. A semistructured guide (online supplementary appendix 1) was used, interviews were tape-recorded and transcribed verbatim and translated into English by two professional transcribers familiar with the objectives of the study.

Coding was done using NVivo 10 (QSR International). The coding scheme was developed from the interview guides and from a first reading of the transcripts. Thematic analysis was carried out while paying attention to emerging themes and to contradictions and diversity of views. Triangulation used field and debrief notes taken during the conduct of the interviews.

### Ethical considerations

Interviews were conducted in a private and convenient location in the community. Participants were informed of potential benefits and risks of their involvement in the study in a language that they understood. Research assistants were trained on the objectives of the study and the emphasis on protecting research participants during and after the study. Prior to inclusion in the study, written consent was obtained from each of the study participants.

### Patient and public involvement

The objectives and the design of the study were informed by previous findings from research in the community that showed that despite there being opportunities for free and subsidised treatment for CVD and their risk factors, the response of the public was poor to the extent that those who signed up in the programme dropped off soon after.

### Findings

The demographic characteristics of the study respondents are shown in [table 1](#). Nine FGDs involved 65 participants,

**Table 1** Characteristics of focus group discussions study participants (n=65)

Participant characteristics	Korogocho (n=30)	Viwandani (n=35)
FGDs	4	5
Age (SD)	42.4 (9.46)	46.6 (8.86)
Sex		
Female	23	18
Male	7	17
Education		
No schooling/below primary school education	12	1
Primary	10	16
Secondary	8	16
Post-secondary/Tertiary	0	2
Marital status		
Single/not married	2	5
Married	24	26
Divorced/separated	4	4
Employment/occupation		
Unemployed	12	13
Casual worker	7	3
Formally employed	1	3
Self-employed	10	16
Religion		
Christian	26	30
Muslim	4	5

FGDs, Focus group discussions.

aged between 20 and 65 years, mean age 45 years and 63% female. The main themes emerging from the FGDs were related to (i) knowledge, understanding and awareness regarding CVD and CVD risk factors; (ii) understanding of and perception towards risk factors for CVD and (iii) barriers to screening, care-seeking and adherence to treatment for CVD.

During the interviews, the researcher explained to the participants the conditions being discussed. CVDs were defined as disorders of the heart and blood vessels, namely heart disease (angina), heart attack and heart failure and stroke. Risk factors were listed as hypertension and raised blood pressure, diabetes and raised blood sugar, overweight and obesity, physical inactivity, smoking and harmful alcohol consumption. Perceptions comprised opinions on CVD and the risk factors and what influenced these opinions, and understanding and interpretation of individuals at risk.

#### Knowledge, understanding and awareness regarding CVD and the risk factors

Generally, among the residents of Nairobi slums, there was poor knowledge of CVD conditions and understanding

of the risk factors involved. A small number of respondents reported that some of their family members discovered 'only by chance' that they suffered from conditions such as diabetes and hypertension, which would mostly happen when they experienced stroke and heart attacks and were hospitalised. In most instances, it was too late to treat the conditions.

R: Not many people are aware of these diseases ... not many people know about the diseases .....and you know they normally find out when they are sick, maybe when they have a cold and they go to the hospital. When they undergo the tests the doctor may ask them whether they suffer from [blood] pressure and they may say no. Some of them don't even know about the symptoms. So there are very few people who know about these diseases. Participant, FGD #02, Site\_1.

The magnitude of the CVD burden in the community was not obvious among many of the study respondents, because in their own opinion, 'these conditions were discrete and considered private'. Many respondents, however, were of the opinion that hypertension, a known risk factor for CVD, when compared with, say diabetes, was more common in the community, especially among women.

R4: Like blood pressure is very much widespread. There is a period when we were being screened for it, most women who went for that screening were found to be having high blood pressure. Participant, FGD #05, Site\_1.

There was some knowledge among the respondents regarding the relationship and cooccurrence of CVD risk factors in individuals, as well as the relationships between risk factors and CVD outcomes. For instance, obesity was commonly linked with diabetes and hypertension, conditions which were said to consequently lead to heart attacks as shown in the quotes below.

R5: I think...that (over)weight, isn't it just fat? Now the fats get into the veins, and bring about the risk of blood not flowing through the body and that causes hypertension. Participant, FGD #01, Site\_2.

R: You can see that person who has obesity ... he can easily develop (high blood) pressure, he can easily develop diabetes ... he can easily develop heart attack because it is like they follow each other, they move together. Participant, FGD #04 Site\_2.

Risk for CVD was an abstract concept to a majority of the respondents involved in our study. Most respondents could not readily identify individuals who were likely to suffer from CVD or relate common risk factors like smoking and excessive alcohol consumption with increased risk of developing a heart attack and/or stroke. However, 'anyone-all members of the community' were considered at risk of developing CVD. This opinion was based on 'observed trends' in the community where 'even

younger people as well as children' were diagnosed with diabetes and hypertension.

According to a few of the study respondents, independent of their age, individuals who harboured worry and suffered stress were more likely to develop CVD. Women were especially singled out as those likely to develop CVD resulting from stress and worry.

R4: Because if you look at the causes of this disease, and more so stress, ... to a woman, when a child is sent away from school for lack of school fees, that will be a challenge to her. When we [her family] miss supper, it is just a challenge to the woman. The man will not see that as a problem, and even when this man comes back home drunk, still it will be a problem to her. That is why the women have higher risks of developing the sickness (high blood pressure) than men. Participant, FGD #01, Site\_1.

CVD conditions could also be inherited or passed down generations, and according to one respondent, in certain cases were considered a 'curse'.

R2: For a disease like diabetes ... I don't think one can avoid it because [some of these diseases are] inherited from the parents. It is in the family. It is like a chain in the family. Some of these [diseases] you cannot avoid. So for me I think it is only God who can help someone [suffering these diseases]. Participant, FGD #03, Site\_2.

R: So you just wonder, if the children are getting these diseases then this must be as a result of a curse ... because if even a child in class eight can be diabetic ... so some believe that the Lord is just angry with us. Participant, FGD #04, Site\_1.

A female respondent thought that hormonal contraceptives may cause women to gain weight, become obese and consequently develop high blood pressure.

R6: Family planning [contraceptives] bring these problems because when you go there [to a health facility], the first thing they have to check is your weight and [blood] pressure. I wonder if they do that to check if they [contraceptives] have given you pressure or what. Let's just say they may cause these diseases. Participant, FGD #01, Site\_1.

### Understanding of and perception towards risk factors for CVD

#### Poverty and stress as underlying risk factors for CVD

The study respondents almost unanimously agreed that widespread poverty in their community was the major reason they had health challenges and that poverty was an impediment to them seeking prevention and treatment services for CVD. The thinking here was that poverty bred stress as a result of everyday worry, insecurities and lack of livelihood opportunities to address family and personal needs. Family conflicts were also more likely to arise, more often, in poor households. Stressed individuals

were likely to suffer from diabetes, a condition that was said to also cause stroke and heart attacks.

R6: For me what I know is that when you have stress... it is like when you think too much then the sugar levels also rise in your body. And they continue rising ... so stress in my opinion also contributes to these diseases. Participant, FGD #04, Site\_1.

Study participants held the opinion that urban slum dwellers were predisposed to indoor and outdoor environmental pollution through their use of low-quality fuels like kerosene and wood charcoal for cooking, as well as from gaseous emissions and effluents from industries surrounding their homes. An opinion that was supported by majority of the participants was that the food items and commodities consumed in their community contained harmful toxins and chemicals that could cause CVD because they were grown along polluted river banks. The 'bad food' was blamed for the rise in the burden of CVD, especially among the younger population which was not known to suffer CVD in the years gone by.

#### Factors that cause cardiovascular diseases

One theme that we explored in this study was the link between the conventional risk factors for CVD: behavioural risk factors like smoking, [harmful] alcohol consumption, physical inactivity and unhealthy diet, with physiological risk factors that include obesity, hypertension and diabetes and with the CVD outcomes stroke and heart attacks.

#### Unhealthy diet, salt and sugar

Foods rich in fat were said to lead to 'blockage of blood vessels', consequently leading to stroke and heart attacks. Despite this understanding, participants argued that avoiding fat when cooking was a difficult proposition, because women whose role was to prepare food for the family were under pressure to satisfy the tastes of their family members, especially that of their husbands. Using 'enough cooking fat' was one such negative practice that was difficult to stop. Two female respondents noted:

'You know if you do not use oil on [cooking] vegetables, it (food) will just taste like it has been boiled; but if you use a lot of oil, it will taste like you have fried it' and 'some (family members) will ask you, 'is this house a hospital where we eat food that is not fried?' Participants #02 & #05, FGD #01, Site\_1.

Although sugary drinks were mentioned as a cause for CVD, according to respondents that were involved in heavy lifting and energy-sapping manual work it was still okay to consume a lot of sugar (sometimes up to five teaspoons in a cup of tea) because of their high energy requirements, and because they would 'sweat a lot' and thus would get rid of the excess sugar in the process. The understanding and the requirement to consume healthy diets in order to prevent against CVD was met with a big challenge to the community. Majority of the respondents noted that their access to

healthy food was constrained by the inability of the community members to afford them.

R2: When I talk of types [of food], I mean that human body needs a lot of elements even from the fruits, and so we don't eat different healthy foods not because we like it that way but (because) it is due to financial constraints. Sometimes you may want to eat the right food but because you cannot afford it, you will have to take what your money can buy. FGD #03 Site\_2.

On the flipside however, respondents pointed out families that were considered 'well off' and had the opportunity to eat 'good food' for example, meat, but were generally physical inactive. Members of such families were perceived to be more likely to be obese, with an enhanced chance of developing hypertension and suffering heart attacks.

### Smoking and harmful consumption of alcohol

Very few respondents possessed the awareness or understanding on how harmful and/or excessive alcohol consumption and tobacco smoking could lead to CVD.

R2: On that point [on how excessive alcohol can cause CVD] I am not very sure but I normally hear that when you have high blood pressure you should not use alcohol at all because even the alcohol makes the blood pressure to rise very fast and very high. Participant, FGD#04, Site\_2.

Tobacco smoking and alcohol consumption were said to be closely associated, with individuals that consumed alcohol being more likely to smoke. The urban slum environment was awash with illicit brews that contained harmful chemicals that could cause CVD, and in many cases, also lead to death. Alcohol consumption was also linked to stress, an issue that we earlier alluded to as a cause for CVD. There was a perception among the study participants that among the married, female partners were stressed by conflicts brought about by their alcoholic/drunken partners, and from the fear that their partners would engage in reckless sexual behaviours when drunk, which may lead them to contracting infections and transmitting to them.

### Physical inactivity

An opinion held by most of participants was that the residents of urban slums had increasingly become less and less physically active. The new and cheap forms of transportation, including the commonly used *boda boda* (motorcycle taxi), mean that people ride even for distances they would have walked. Another issue linked to community members practicing insufficient physical activity was the widespread crime and insecurity which has made safe spaces for children and adults to play to shrink. Insecurity was also blamed for decreased episodes of walking and engagement in other forms of physical activity. As seen below:

'...previously, there was a field, we used to play [there at the Chief's camp]. But these days, it (the field) is no longer there'. Participant, FGD #01, Site\_1.

### Overweight and obesity

In this community, being overweight or 'fat' was an indication that an individual was living a 'good and stress-free life'. Some respondents also mentioned that there were individuals who were born with a 'fat gene' and would therefore get fat whether or not they ate fatty or unhealthy food. Respondents linked overweight and obesity to high blood pressure, and subsequently to stroke and heart attacks, with some holding the perception that obesity affected women more than men in the community. A female respondent noted that obesity came about because women who use a lot of fat for cooking also ate oily and unhealthy food more than men.

R: When it comes to eating chips (fried potatoes), it is the women who mostly eat the chips. If you ask a man the last time he took chips.... he may tell you about a long time ago. But when you find these things that are normally deep fried using these fats ... it is us women that normally feed on these things ... so you find that these are the things [fatty food causing obesity] that are causing (blood) pressure. Participant, FGD #04, Site\_1.

### Barriers to screening, care-seeking and adherence to treatment for cardiovascular diseases

#### Individual and community level barriers

There was a widely held opinion that the cost of treatment for any illness, let alone for CVD was prohibitive and therefore members of the community could not afford. Cost of healthcare was singled out as one of the greatest barrier to care-seeking and adherence to treatment for CVD and specifically for diabetes and hypertension. Consultation fees charged at private health facilities were considered 'hefty', and the cost of purchasing medication from private pharmacies due to their unavailability at the public health facilities was also high. For patients with diabetes, the cost of 'healthy and special' foods required for them to manage their condition, as well as insulin was unaffordable.

R4: Because they [patients] are buying medicine [insulin] and also buying [healthy] food because they have to really be careful with their diets.

R5: When you meet them and begin telling them they should eat this and that [healthy food], they [respond] that for them to do that they have to plan their pockets well. FGD #01, Site\_1.

A small number of respondents felt that most urban slum residents did not even seek care in the first place because they despaired just from the thought of discovering that they suffered CVD, yet they felt poor, helpless and in a position to do nothing to manage their condition. Participants talked of conditions such as diabetes and hypertension, as well as stroke and heart attacks being untreatable by conventional medicine, and did not therefore see the need to seek treatment in health facilities. Such a misconception, especially with respect to treatment of hypertension and diabetes, made some members

of the community to hesitate to seek treatment for their conditions from health facilities and instead chose to seek care from traditional healers and herbalists.

Respondents also recognised lack of knowledge about CVD and the attendant risk factors, together with misinformation on what causes these conditions and how they can be mitigated as additional barrier to care-seeking. In one instance and a clear case of misconception, a respondent suggested that stroke could result from a mental disorder.

'In my own opinion of which I am not sure if I am right or not....I think stroke comes in when you are affected mentally. Like when you encounter many difficult problems, like the death of a child then this begins to disturb you [mentally] and you end up with stroke'. Participant FGD #01, Site\_1.

It was not clear to some respondents how behaviours like excessive/harmful alcohol consumption and smoking were related to CVD. One can speculate that this would be the reason why, as reported by the respondents, many community members failed to take action to prevent themselves from CVD, by getting screening and treatment for conditions they could have. Participants suggested that there was an urgent need to sensitise the urban poor on the mechanisms through which behavioural (and other) risk factors may lead to CVD, while suggesting pragmatic and inexpensive strategies for the community to prevent and protect themselves from developing CVD. One such suggestion proposed that sensitisation on the dangers of the use of unhealthy fat in cooking target entire family members, including the men.

R5: You know we are women. If our husbands are not also sensitized and made aware of the risks associated with it [unhealthy fat in cooking], he will think I am cooking just the way I want, and he will not know the dangers which come with the fats. He will say that is something I learnt on my own and he will insist that I just cook the way it should be done [with fats] in the house. Participant, FGD #01 Site\_1.

Relatively younger people were said to be dismissive of any suggestions that they could suffer from CVD, despite earlier statements indicating the understanding that anyone, regardless of their age or sex, could suffer from CVD. A respondent mentioned that the youth felt that the information to screen for CVD was better targeted to the older members of the society.

R3: People (in the community) have not really understood what these diseases are all about ... you just normally hear ... someone had a heart attack and he died ... he just woke up feeling very well but he just collapsed and died. So people have not understood it ... how it affects a person ... they only know when the person dies. Participant FGD #04 Site\_1.

One issue that was said to be was a major barrier to care-seeking and management of CVD and specific to the elderly was the lack of family support. This situation

mostly affected elderly individuals living on their own or away from their families, who struggled with activities such as visiting health facilities for treatment and lacked effective guidance on and when taking medication.

R2: There are many challenges you may go to the hospital and sometimes it's a grandmother or grandfather, they will not know how to take drugs, how many to take in the evening, at noon or in the morning. So they have to have someone to help them. Participant FGD #02, Site\_2.

Non-dominant themes that emerged from this research included the mention of perceived stigma towards conditions such as stroke, as they were believed to a result of curses or evil. For instance, some respondents talked of individuals suffering stroke in their community being discouraged from discussing their conditions in public, and in some cases patients being locked away from the public's sight by their caregivers to avoid bringing an embarrassment to their families. The result therefore was that patients were afraid to reveal their conditions to family and friends.

Excessive alcohol consumption and substance use was linked to contribute to low levels of screening for CVD risk factors among a section of the community, especially among men. Excessive alcohol consumers and illicit drug users were less likely to get screened or tested for CVD, a situation that meant very few of them were aware of the conditions.

R6: Again alcohol is not very good, because you say that you are not sick but when you go to take alcohol and you have not been tested, it will affect your health because maybe you have the disease but you have not been tested. Participant FGD #05, Site\_1.

### Healthcare system barriers

Respondents identified healthcare system barriers that affected their access to screening, care-seeking and treatment for CVD. These barriers included the lack of enough healthcare facilities in and around the community where residents could seek care and information regarding CVD. Although few health facilities were present, they were privately run, and there was a perception by the community that they were costly and unaffordable. The issue of unaffordable and costly healthcare can be linked to poverty which was tagged as the biggest driver of and cause for the risk factors.

The community lacks access to specialist clinics for CVD. In addition, there is overcrowding at the few public health facilities, a situation that adds to the inaccessibility to services, especially for patients with hypertension and diabetes. The unavailability of drugs following diagnosis also means that patients are required to purchase drugs at private pharmacies at high prices.

Few respondents alluded to the poor attitude of healthcare providers and lack of empathy patients whenever patients visited their facilities as a barrier to care-seeking.

## Addressing barriers to screening, care seeking and treatment for cardiovascular diseases

We explored suggestions on how CVD could be prevented and strategies that can enhance care-seeking and access to and effectiveness of care for CVD in the community. Many respondents agreed that addressing poverty, ignorance and high levels of illiteracy in the community was key and the first place to begin. These three issues were considered the main drivers of stress and worry and were linked to the factors that caused CVD in the community.

Individuals would minimise stress, by avoiding thinking too much or worrying themselves too much, and if they also limited their exposure to pollution, chemicals and toxins air by living in clean houses, using clean toilets and avoiding bad food sold in the community. Physical activity was recognised a strategy to prevent CVD and was especially an advice directed at individuals considered obese or 'too fat' (from living comfortable lives). The main benefit ascribed to engaging in physical activity was the reduction in the amount of fat in blood, leading to unclogging of blood vessels and reduction in the risk of developing high blood pressure. Physical activity was also said to help in easing the mind and to reduce stress, while respondents who engaged in vigorous activities said the resulting sweating helped 'remove' harmful toxins ingested through poor quality food from the body.

R2: Instead of just sitting in the house and getting stressed up, one should get out and look for something to do. Through this one is kept busy outdoors, and so they don't get stressed up. Participant, FGD #03, Site\_2.

One key suggestion by a section of the respondents regarding an effective programme to enhance prevention of CVD was with respect to raising awareness in the community on the main CVD conditions, the common risk factors and how individuals could avoid/prevent them. For efficiency and a wide reach, health promotion campaigns should be led by healthcare workers 'in their element, and dressed up in white coats' and employ public events and forums where majority of the community members were likely to be found. Yet other respondents favoured door-to-door screening, suggesting that this method 'preserved the dignity of the would-be patients' as opposed to when screening was done in public or at the health facilities. Door-to-door screening has the benefit of reducing the propagation of stigma tied to conditions such as stroke in this community as we saw earlier, and which was identified as a barrier to care-seeking among patients.

R2: The question is if they can go door to door because it's only his family members who know he has this disease so if they go door to door they can know the problem that these people are facing. Participant, FGD #02, Site\_2.

Another favoured strategy by a section of the participants was the short messaging service and the use of social media platforms to disseminate messages on the risk for

CVD, to inform on available opportunities to screen and advice on where care and treatment could be sought. Respondents highlighted how the use of community health volunteers (CHVs) has worked well for them in other programmes to pass information and in providing services. The participants suggested CHVs can also be used to conduct screening for CVD in the community. Screening for CVD can happen in the households, and by so doing, would ensure the identities and dignity of the individuals diagnosed with CVD are protected. The other advantage of using CHVs was that they live in the community, are accepted by the locals, and can communicate in a language the community members understand. Living in the community also made it easier for the CHVs to carry out follow-up with treatment defaulters.

R6: CHVs ... those people ... they should be educated and then be sent into the Villages to educate the people. Participant, FGD #02, Site\_1.

## DISCUSSION

This study conducted among healthy adult members of an urban slum community in Nairobi sought to explore their understanding of and perceptions towards CVD and CVD risk factors, care-seeking and adhering to treatment. Study participants were on average 45 years, a period in life when exposure to CVD risk factors is high and the risk for developing CVD is real.

A key finding of this work was the identification of widespread poverty, illiteracy and ignorance in the urban community as major contributors to the perceived low levels of understanding and awareness of the risk factors for CVD conditions such as diabetes, hypertension, stroke and heart attack. For instance, majority of the respondents did not see the association between smoking and excessive/harmful alcohol consumption with CVD. We also observed that a good number of the respondents were unaware of the link between stroke and heart attacks with smoking, excessive alcohol consumption and insufficient physical activity as well as with obesity, diabetes and hypertension. It was also apparent that most of our study respondents could neither see how the co-occurrence and interrelationships among the said risk factors could lead to CVD outcomes, nor the pathways and mechanisms involved. Respondents believed that with respect to the environment in which they lived, toxins from contaminated foodstuff and from illicit alcohol, and the effect of indoor and outdoor pollutants contributed to the risk for hypertension, diabetes, stroke and heart attacks and consequently to death.

Individuals in this community were on many occasions diagnosed with diabetes and hypertension at a late stage, a situation that impacted negatively on available treatment options. Some individuals diagnosed with stroke in this community chose to suffer in silence due to the perceived stigma directed at these conditions because of their association with curses and evil deeds, and abstained

from speaking about their conditions in public, which would embarrass their families.

Respondents also referred to the widespread insecurity and crime posing a detrimental effect on recreational physical activities, as public spaces were considered to be unsafe for walking and playing.

Poor diet was caused by lack of access to healthy foods, which compromised the nutrition and health of the people. Urban populations are known to experience marked changes in dietary patterns following the adoption of unhealthy diets common in their environments,<sup>20</sup> practice little physical activity, and display increased smoking and harmful alcohol consumption rates, all of which are key risk factors for CVD.<sup>20–22</sup> The respondents also mentioned that in their community emotional stress was a cause for CVD conditions, mostly hypertension and heart attacks. There exists a perception that the slum environment in which they live predisposed them to psychosocial stressors and constant worry that enhanced their risk of developing strokes and heart attacks. Elsewhere, chronic stress resulting from everyday challenges from family and work has been shown to contribute to worsening health behaviours, and in promoting behavioural risk factors for CVD like smoking and physical inactivity.<sup>23</sup> The INTERHEART study conducted in LMICs reports that ‘permanent stress’ at work or at home doubled the risk of an individual developing a myocardial infarction.<sup>24</sup>

The perception by the urban slum residents that CVD conditions were inherited and that there was very little one could do to prevent these may hinder the adoption and maintenance of preventive behaviours against disease, as has been reported previously.<sup>15</sup> A notable barrier to treatment and care seeking for CVD in this community was reported to be the lack of knowledge on where to find appropriate healthcare as well as frustrations arising from previous experiences by the members of the community with poor quality of services received at public health facilities, lack of clinicians and unavailability of drugs following screening and overcrowding of patients in the few public facilities available in the community. Similar findings have been documented elsewhere in the region.<sup>25</sup> Lack of awareness by the public of CVD risk factors has been shown to be associated with lack of national programming for non-communicable diseases (NCDs) elsewhere.<sup>26</sup> Generally in SSA, structural and health system level barriers such as lack of sufficient health facilities, widespread poverty and the inability to raise money to afford treatment, are the main reasons for lack of prevention, surveillance and treatment efforts for conditions such as CVD.<sup>27</sup>

The practice of lifestyle and behaviour modification to prevent CVD, like the adoption of a healthy diet, was affected by the cost of so-called ‘healthy foods’ in the urban slum settings described to be higher compared with cheaply and readily available less healthy options.

There was a perception that some CVD risk factors were gendered. Some respondents insisted that obesity affected more women than men in their community because

the latter practiced less physically activity that included sports, walking and manual labour. Smoking and (excessive) alcohol consumption was however ascribed to men. These perceptions point to the need for the redesign of health promotion and awareness campaigns by taking into consideration locally held perceptions. There is also a need to address the misconceptions by the different sections of the community on who they consider most-at-risk of CVD in order to influence the actions taken to prevent and enhance care-seeking and adherence to treatment for CVD. Similar findings were reported in a recent systematic review,<sup>27</sup> and from other studies conducted in the same population.<sup>14 28</sup> A study reported that many communities in SSA perceive a larger body size as ‘a sign of affluence and good living’, highly desirable and respectful.<sup>29</sup> For instance, obese men in Cameroon were considered to live a ‘good life’.<sup>30</sup> We found similar results in this study, where positive terms like ‘*mdosi*’, loosely translated as ‘big man’, indicating well-to-do, were used to refer to men with bigger bodies. Previous evidence also suggests that individuals from low socioeconomic groups were more likely to engage in harmful alcohol consumption and tobacco use and to consume less fruit and vegetables.<sup>31 32</sup> In SSA, socioeconomic stressors, including poverty and urbanisation, have been linked to the rise of mortality and morbidity from CVD.<sup>7 8 33 34</sup>

We acknowledge that the understanding of some study respondents regarding the CVD conditions being investigated, including stroke and heart attack may have been unclear in some instances in our study, despite our best effort to clarify and explain. Despite this limitation, we believe that the study provides important insights into how CVD risk and risk factors are understood in a low-resource urban setting, and how the understanding and perception affects treatment-seeking and management for CVD in the community.

Urban lifestyles that include sedentary behaviour, practice of insufficient physical activity, together with the consumption of energy-dense, salty and sugary foods and drinks are increasingly diffusing to and being adopted by the rural populations in Kenya. These findings offer useful information to policy makers and programme implementers in their design of programmes to enhance awareness on CVD risk and risk factors and insights into how to deliver effective CVD prevention and care in low-resourced communities, for both urban and rural populations. Specifically, the findings bring to the fore the need to take into account perceptions on and understanding of risk factors for CVD within the cultural context issues for example, how stigma for stroke is a barrier to care seeking and how a perception that conventional medicine is unable to treat certain CVD conditions make individuals seek help from traditional healers and herbalists. It therefore follows that effective health promotion should tap into locally generated knowledge and perspectives derived from those directly affected by these conditions. Programmes for CVD prevention and treatment for low-resourced settings should aim to address the social

determinants of health and disease in the form of poverty, illiteracy and ignorance. This can be done by creating awareness on CVD and its risk factors and risk communication by healthcare providers, alongside deliberate efforts to improve the performance and effectiveness of existing healthcare systems.

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