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1

General introduction

GENERAL INTRODUCTION

Cardiometabolic disease is one of the leading causes of death in high-income countries (1). Cardiometabolic disease comprises cardiovascular disease, diabetes, and chronic kidney damage. These conditions often coexist, and the prevalence of one condition increases the risk of the other conditions. One of the strategies to tackle cardiometabolic disease is early detection by means of screening. Unfortunately, not all groups in a society participate equally well in screening initiatives, widening already existing health inequalities. These populations are, therefore, referred to as ‘underserved’. What do we know about these underserved groups; what are their reasons for not participating in cardiometabolic screening?

BACKGROUND: CARDIOMETABOLIC SCREENING

Prevalence of cardiometabolic diseases: cardiovascular disease, diabetes, and chronic kidney damage

In the Netherlands, over 1 million individuals have cardiovascular disease, representing almost 6% of the population (2). Another million persons have diabetes, and approximately 1.7 million individuals have chronic kidney damage, representing 10% of the population (3, 4). Of the individuals with diabetes, approximately 1 out of 5 is not aware of this (3); of the individuals with chronic kidney damage, this number is 2 out of 5 (4). Worldwide, cardiometabolic diseases yearly cause approximately 17.5 million deaths due to cardiovascular disease and 1.5 million deaths due to diabetes (5). Chronic kidney damage acts mostly as a risk factor for cardiovascular disease and diabetes, and is less often the actual direct cause of death. Approximately three quarters of these diseases can be prevented by tackling major overarching risk factors such as smoking, poor diet, and inadequate physical activity (6). For this, an early identification of individuals who will benefit most from preventive interventions is essential. One way of doing this is by means of cardiometabolic screening.

History of cardiometabolic screening in the Netherlands

Early detection of individuals at risk enables prevention of these chronic conditions, for example by stimulating individuals to take actions regarding their lifestyle. This will lead to health gains, but also to social gains due to reductions in sick leave and prolonged social participation (7). In the early 2000's, a fast rise occurred in initiatives in the Netherlands concerning early detection of cardiometabolic disease and other lifestyle-related diseases. An explorative investigation in 2007 of cardiovascular health checks in primary care revealed 15 promising initiatives (7). The number of initiatives was even larger when taking the full range of cardiometabolic disease and healthcare settings into account. The primary care initiatives varied in their recruitment method, follow-up, and setting, but all seemed promising in systematically identifying individuals at high risk of cardiovascular disease. Despite this variation, and the dominant curative orientation of the healthcare system at the time, various important stakeholders in the field (such as municipal health services, health funds, and primary care professionals) were willing to create public support and to influence the political agenda regarding this preventive activity. The time was right to strive for a national structure for early detection, with a crucial role for the connection between preventive and curative healthcare. This was also stressed by the Ministry of Health, Wellbeing, and Sports in 2007, giving priority to preventing and postponing disease by lifestyle measures and paying attention to early detection of high-risk groups (8). The increasing interest from the various stakeholders resulted in a gradual paradigm shift in healthcare from purely curative and demand-driven care, towards care including various types of prevention (9). The development and refinement of risk prediction models, such as the SCORE and FINDRISK, contributed positively to these changes (10, 11).

This paradigm shift resulted in various initiatives from the Dutch government, non-profit organizations, and commercial companies to raise awareness among the public of the importance of assessing risk profiles and to encourage individuals at risk to take action to prevent these diseases (12). However, several threats regarding the proliferation of these initiatives were identified. First, the diversity in health checks and screening tools was confusing to the general public as well as healthcare providers. Secondly, the quality of some health checks was questionable, and for lay persons it was expected to be difficult to distinguish the higher from the lower quality checks. Thirdly, health professionals lacked sufficient skills and knowledge for coaching high-risk individuals, resulting in individuals at high-risk who did not know what to do to reduce their risk or where to go for follow-up, as this was not arranged in regular health care (12).

One of the health professionals who was perceived to have a central role in the identification of cardiometabolic disease was the general practitioner (GP) (9). GPs play a central and coordinating role in the Dutch healthcare system, and every individual is registered at a GP's office. The threshold to visit the GP is very low, with 75% of individuals visiting their GP annually and basic healthcare insurance covering the costs of the consultations. The relationship of trust between GP and patient made the GP practice the most appropriate setting for programmatic approaches to prevention (with the annual flu vaccination program and screening for cervical cancer as successful examples). In addition, it was known that a large proportion of the Dutch GPs had a positive attitude towards primary prevention of cardiometabolic disease (13).

These advantages of the primary care system, as well as the threats regarding the various health check initiatives, fuelled the need for an evidence-based integrated approach to prevention, well embedded in regular primary health care (12). In 2011, the Dutch college of General Practitioners (NHG), the Dutch National Association of General Practitioners (LHV), and the Netherlands Society of Occupational Medicine (NVAB) worked together with three health foundations (the Netherlands Heart Foundation, the Dutch Diabetes Research Foundation, and the Dutch Kidney Foundation) to develop an evidence-based guideline to improve the early detection and follow-up of individuals at increased risk of cardiometabolic disease. This guideline was called “Preventieconsult, module Cardiometabool risico” (Prevention consultation, module cardiometabolic risk).

Prevention consultation, module Cardiometabolic risk

Individuals aged 45 to 70 years, without known cardiometabolic disease and not using anti-hypertensive or lipid lowering drugs, were the target group for the Prevention consultation. For Hindustani Surinamese individuals the lower age limit was set at 35 years because of their genetically increased risk of diabetes, as will be explained below. The Prevention consultation followed a two-stage approach, see figure 1.

The Prevention consultation was embedded in primary care, although GPs did not receive additional reimbursement for actively approaching their patients, as this was considered selective prevention. In the Netherlands, selective prevention is not covered by the health care insurance companies. Health insurance companies only reimbursed so-called indicated prevention, targeted at persons with an already known increased risk. Thus, when a patient had a risk score above the threshold, follow-up actions were considered indicated prevention and could be reimbursed by the usual tariffs for a consultation.

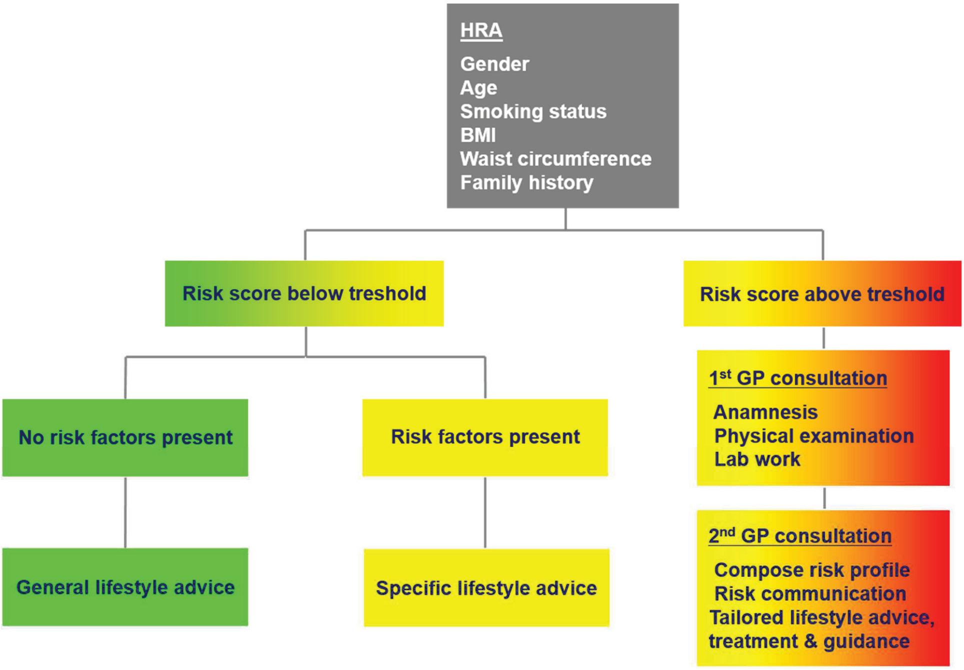

Figure 1. Two-stage approach Prevention consultation

Before the guideline was published in its definite form in 2011, three pilots had been conducted to test the feasibility in a general practice setting (9, 12, 14, 15). The researchers concluded that it was indeed feasible to implement the guideline in general practice. However, based on these experiences some adjustments were made:

- An active invitation by means of a personal letter was chosen, because it was much more effective than simply putting up a poster and having leaflets available at the practice.
- Because age turned out to be a major determinant of risk, all men over the age of 60 years and women over the age of 65 years automatically received a high-risk score. It was deemed justifiable for those groups to be invited to consult the GP immediately.
- A written HRA (in addition to the online version) was also made available, to increase response.

In the Prevention consultation the screening process is divided into two distinct stages. The first stage is an (online) Health Risk Assessment (HRA): by means of a quick and low-threshold questionnaire the entire eligible population is narrowed down to a population estimated to be at high-risk of cardiometabolic disease. Only this high-risk population is then invited for the second stage, comprising two practice consultation at the GP's office to further establish an individual's 10-year risk of cardiometabolic disease and discuss options. Below, we describe the two stages in more detail.

Stage one: Online Health Risk Assessment

The Health Risk Assessment (HRA) is an integrated risk estimation for the three above mentioned cardiometabolic diseases and the outcome is a prediction of the incidence of any of these three diseases (12). The HRA was specifically developed for individuals without already diagnosed cardiometabolic disease, hypertension, or hypercholesterolemia, and is, therefore, suitable for the general public or high-risk groups. The HRA incorporates components from the SCORE risk function and the FINDRISK questionnaire (10, 11). Scores for each item are gender-specific and the sum score indicates the total risk estimation. For the questions and scores for each item see figure 2. The HRA is available online at www.testuwrisico.nl [www.testyourrisk.nl].

As can be seen in figure 1, HRA completers can be categorized in having a risk below or above the threshold. Individuals with a risk below threshold can be further classified in having risk factors or not. Individuals without risk factors only receive general lifestyle advice, to stimulate them to remain in the 'green' domain. Those with one or more cardiometabolic risk factors receive lifestyle advice tailored to the individual's risk profile. Individuals with a risk score above threshold are advised to visit their GP for the second stage of the Prevention consultation.

HRA risk score calculation for men			**HRA risk score calculation for women**		
What is your age? I am:	30 – 44 years	0 p	What is your age? I am:	30 – 44 years	0 p
	45 – 49 years	13 p		45 – 49 years	10 p
	50 – 54 years	17 p		50 – 54 years	16 p
	55 – 59 years	22 p		55 – 59 years	23 p
	60 – 64 years	33 p		60 – 64 years	29 p
	65 years or older	37 p		65 years or older	37 p
Do you smoke?	No	0 p	Do you smoke?	No	0 p
	Yes	9 p		Yes	9 p
What is your BMI?	Underweight	0 p	What is your BMI?	Underweight	0 p
	Healthy weight	0 p		Healthy weight	0 p
	Overweight	4 p		Overweight	4 p
	Obesity	12 p		Obesity	7 p
What is your waist circumference?	Less than 94 cm	0 p	What is your waist circumference?	Less than 80 cm	0 p
	94 cm or more	3 p		80 – 87 cm	2 p
				88 cm or more	6 p
Has your father, mother, brother, or sister had a cardiovascular disease before the age of 65?	No	0 p	Has your father, mother, brother, or sister had a cardiovascular disease before the age of 65?	No	0 p
	Yes	1 p		Yes	4 p
Does your father, mother, brother, or sister have diabetes type 2?	No	0 p	Does your father, mother, brother, or sister have diabetes type 2?	No	0 p
	Yes	4 p		Yes	3 p
	HRA total score =	… p		**HRA total score =**	… p
Score less than 30 and all answers **black**: no increased risk Score less than 30 and one or more answers red: slightly increased risk Score of 30 or more: increased risk			Score less than 35 and all answers **black**: no increased risk Score less than 35 and one or more answers red: slightly increased risk Score of 35 or more: increased risk		

Figure 2. HRA questions and scores for each item

Stage two: Practice Consultations

High-risk individuals according to the HRA are advised to visit the GP (or practice nurse) for two so-called Practice Consultations (PC), see again figure 1. During the first consultation the anamnesis of the 10-year risk of cardiovascular mortality and/or a diagnosis of diabetes is assessed. This risk profile includes lab work (serum cholesterol ratio and glucose level), blood pressure measurements, and a verification of the HRA items (figure 2). The second consultation consists of composing and communicating the risk profile, providing tailored lifestyle advice, and/or starting with (preventive) drug treatment (e.g. lipid lowering drugs). The tailored lifestyle advice can consist of an evidence-based lifestyle program in the local community, or a referral to a dietician for dietary advice or a physiotherapist for exercise programs.

Studies indicate that two-stage screening could be a cost-effective strategy (16, 17). The cost-effectiveness of the Prevention consultation specifically is currently investigated (18). A pre-requisite for cost-effectiveness is reaching those who benefit most, in other words: those who are at highest risk. Unfortunately, individuals participating in health checks are more often the health-conscious, higher-educated, affluent people (9, 19). Participation is lower among people with an increased risk, generally individuals of non-Western descent or with a lower SES (20).

CARDIOMETABOLIC SCREENING AMONG UNDERSERVED GROUPS

Underserved groups

Some groups in a society are underserved regarding health profits to be gained from cardiometabolic screening.

In the Netherlands, these groups are those of native Dutch origin with a low SES and certain non-Western immigrant groups. On the one hand this is due to an increased susceptibility to cardiometabolic disease, generally because of an unfavourable genetic makeup and/or unhealthier lifestyle habits (21, 22). On the other hand these groups are more vulnerable to be (unintentionally) excluded from screening initiatives because the one-size-fits-all approach does not reach them or does not appeal to them (20). This increased susceptibility and vulnerability are described in the next paragraphs.

Susceptibility to cardiometabolic disease

Mortality from cardiovascular disease is higher among those with a low socioeconomic status (23). Additionally, individuals with a low SES have an increased risk of type 2 diabetes, particularly in high-income countries like the Netherlands (24). A low SES is also associated with measures of chronic kidney damage: lower estimated glomerular filtration rate (eGFR), higher albuminuria, and unfavourable eGFR/ albuminuria ratios, and with renal failure (25). The prevalence of cardiovascular disease is more than two times higher (10.6%) among Turkish than among native Dutch (5.0%), even when adjusting for lifestyle factors, educational level, and other health-related factors (figure 3) (26). The prevalence of diabetes is almost two times higher (5.6%) among Turkish than among native Dutch (3.1%) (27). Additionally, the age of onset is typically a decade lower for Turkish than for native Dutch. The age-standardized prevalence of chronic kidney disease is more than two and a half times higher (8.0%) among Turkish than among native Dutch (3.0%) (28).

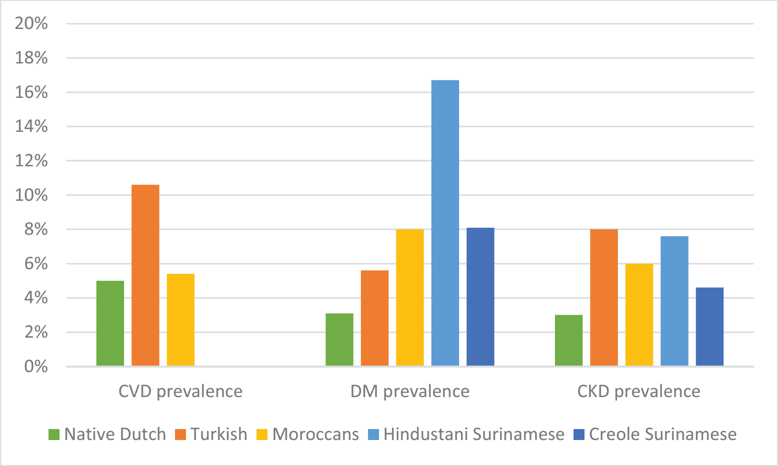

Figure 3. Prevalence of cardiometabolic disease among non-Western groups when compared to native Dutch (26-29)

As can be seen in figure 3 the prevalence of cardiovascular disease does not differ substantially between Moroccans (5.4%) and native Dutch (5.0%) (26). The mortality due to cardiovascular disease is even lower among Moroccan males than among native Dutch males, with a relative risk of 0.51 (21). However, the prevalence of diabetes is more than two and a half times higher (8.0%) among Moroccans than among native Dutch (3.1%) (27). When adjusting for sociodemographic factors and physical activity, the prevalence of diabetes is even three and a half times higher among Moroccans than among native Dutch (27). Additionally, the age of onset is typically two decades younger for Moroccans than for native Dutch. The age-standardized prevalence of chronic kidney disease is more than two times higher (6.0%) among Moroccans than among native Dutch (3.0%) (28).

Mortality due to cardiovascular disease is higher among Surinamese than among native Dutch, both for males and females (21). Surinamese individuals have a higher risk of diabetes, and at a younger age. This is especially so for the Hindustani Surinamese. The prevalence of diabetes is four times higher among Hindustani Surinamese than among native Dutch, and two times higher among Creole Surinamese than among native Dutch (figure 3) (29). For the age group of 35-44 years, this comes down to 16.7% of Hindustani Surinamese having diabetes, 8.1% of Creole Surinamese, and 4.2% of native Dutch. For the age group of 45-60 years, prevalences are 35.0%, 19.0%, and 8.2%, respectively. Hindustani Surinamese have a two and a half time higher (7.6%) prevalence of chronic kidney disease than native Dutch, and Creole Surinamese a one and half time higher prevalence (4.6%) (28).

Vulnerability due to limited access to screening

In recent years, in the Netherlands as well as in other European countries, (quality-adjusted) life expectancy has increased. However, this increase has not been equal for all groups within society. The largest increases have been seen among the highest educated, resulting in a health gap (30). This gap has been widening in the period from 2001 to 2011: inequalities in mortality as well as in health-related quality of life increased between the highest and lowest educated. In 2001, the difference in quality-adjusted life expectancy between the low and the highly educated was 7.4 healthy years for men and 6.3 for women. By 2011 this difference had increased to 8.1 health years for men and to 7.1 healthy years for women (30).

Next to the fact that those with a low socio-economic status and certain non-Western immigrant groups have an increased risk of cardiometabolic disease, it has been shown that these groups are more vulnerable to be (unintendedly) excluded from health checks (20). Those with greater clinical need or risk factors, thus, take up health checks unequally. This differential uptake may lead to suboptimal health gains from cardiometabolic screening and, thus, contributes to the widening of health inequalities in society. This may be even more so for a cardiometabolic health check with a two-stage screening approach, as individuals may drop out on two separate occasions. Therefore, it is important to investigate why underserved groups do or do not participate in two-stage cardiometabolic screening.

Determinants of participation

Most of the literature regarding determinants of cardiometabolic screening concerns (non-)attendance among the general population. From this literature we can conclude that health-conscious patients more frequently follow up an invitation for a health check as they see the importance and advantages of doing so. Individuals without health problems have a more negative attitude and do not recognize the necessity of screening because they consider themselves to be in good health (20, 31, 32). Contrastingly, it has also been found that individuals with already existing health problems less often attend health checks. Perhaps these individuals lack personal relevance as they already have regular contact with primary care for their health complaints (32). Next, not wanting to know one's risk and fear (for the outcome and the consequences of that outcome) seem to play a distinct role in non-attendance among the general population (20, 31, 33, 34). Finally, individuals with unhealthy lifestyle habits (such as smoking) seem to be more reluctant to visit a GP for lifestyle advice wanting to avoid comments on their unhealthy behaviour (35).

Few studies specifically investigated (non-)participation in cardiometabolic screening among non-Western immigrants or individuals with a lower SES. Moreover, those studies that do report determinants among underserved populations exclusively focus on physical assessments at a doctor's office (one-stage screening), not two-stage screening with risk stratification as a first step. Some of the determinants that we find in the literature regarding one-stage cardiometabolic screening have to do with the invitation method. A multi-strategy approach combining mailed letters, telephone calls, and/or especially face-to-face strategies seems useful for increasing uptake in underserved groups (36). Determinants from these studies may also provide insight into determinants of participation in two-stage screening, although decision making can be expected to differ when potential participants have to weigh pros and cons twice.

Underserved groups have been studied in the context of participation in another form of screening, namely cancer screening. Results from these studies theoretically also provide insight into reasons for (non-)participation in cardiometabolic screening. However, the risk perceptions and beliefs regarding cancer differ substantially from those regarding cardiometabolic diseases: perceived risk and worries are much higher for cancer than for CMD (37).

Clearly, the reasons of members of underserved groups to participate in two-stage cardiometabolic screening or not need to be investigated further.

AIM OF THIS THESIS

With the high burden of cardiometabolic disease among non-Western immigrants in the Netherlands and native Dutch with a low SES, their participation in preventive screening is eminent. It is, therefore, worrisome that these groups are particularly underrepresented in screening initiatives, as this may widen health inequalities in a society. To increase participation of these underserved groups in two-stage cardiometabolic screening, insight into the motivation and determinants of participation of these groups is essential. This dissertation describes the **CHECK'D** (**C**ardiometabolic **H**ealth check **E**valuating **C**ardiometabolic and **K**idney **D**isease) study. The aim of the CHECK'D study was to get insight into the (psychosocial) determinants of participation of underserved groups in both stages of the Dutch cardiometabolic health check (Prevention consultation, module cardiometabolic risk) as well as the actual response and participation rates in the two stages.

We pursued a systematic inventory of these determinants of participation and used a comprehensive theoretical framework for this purpose: the I-change model (figure 4). The I-change model explains health behaviours and has been applied in studies among native and immigrant populations (38-41). Health check attendance can be seen as a health behaviour and in that sense can be studied using this model. Another reason that we selected this model is that it provides the opportunity to get a comprehensive insight into the factors influencing participation as it integrates ideas from several theories: the transtheoretical model (motivational stages of change), theory of planned behaviour, social cognitive theory, the health belief model, and goal setting theories. The model states that behaviours are determined by a person's motivation or intention, as well as his or her abilities to carry out the behaviour. Attitudes, social influences, and self-efficacy expectations influence a person's motivation and are determined by predisposing (e.g. current lifestyle), information (e.g. source of delivery), and awareness (e.g. knowledge and risk perception) factors.

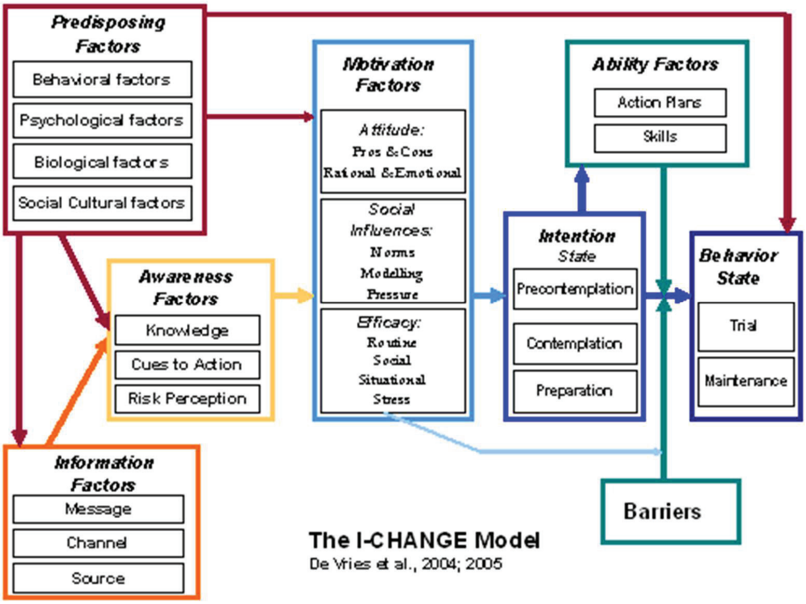

Figure 4. The I-change model, from http://www.maastricht-university.eu/hein.devries/interests/change

OUTLINE OF THIS THESIS

Chapter 2 describes a qualitative study among underserved groups on their determinants of (hypothetical) participation in the first stage (the HRA) and in the second stage (the PC). In Chapter 3, the response and participation rates of underserved groups in both the HRA and the PC are described. Chapter 4 and 5 cover the determinants among underserved groups of (actual) participation in the HRA and the PC, respectively. Chapter 6 describes the yield of the PC among underserved groups. The thesis ends with a summary and discussion.

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2

‘Check it out!’ Decision-making of vulnerable groups about participation in a two-stage cardiometabolic health check: A qualitative study

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ABSTRACT

Objective

Exploring determinants influencing vulnerable groups regarding (non-)participation in the Dutch two-stage cardiometabolic health check, comprising a health risk assessment (HRA) and prevention consultations (PCs) for high-risk individuals.

Methods

Qualitative study comprising 21 focus groups with non-Western (Surinamese, Turkish, Moroccan) immigrants aged 45–70, adult children from one of these descents, native Dutch with a lower socioeconomic status, and healthcare professionals working with these groups.

Results

Reasons for not completing the HRA included (flawed) risk perceptions, health negligence, (health) illiteracy, and language barriers. A face-to-face invitation from a reliable source and community outreach to raise awareness were perceived as facilitating participation. Reasons for not attending the PCs overlapped with completing the HRA but additionally included risk denial, fear about the outcome, its potential consequences (lifestyle changes and medication prescription), and disease-related stigma.

Conclusion

Reasons for not completing the HRA were mainly cognitive, whereas reasons for not attending the PCs were also affective. Practice implications: when designing a two-stage health check, choice of invitation method seems important, as does training healthcare professionals in techniques to effectively handle patients’ (flawed) risk perceptions and attitudinal ambivalence. Focus should be on promoting informed choices by providing accurate information.

INTRODUCTION

In most Western countries (including The Netherlands) mortality and morbidity of cardiovascular disease, diabetes, and kidney failure are higher for people with a lower socioeconomic status (SES) and for non-Western immigrants (1, 2). Moroccan, Turkish, and especially Hindustani Surinamese immigrants are at higher risk of developing diabetes (3). Prevalence of cardiovascular disease is particularly high in the latter two groups (4–6). Health checks are currently implemented to identify those at increased risk of cardiometabolic disease (CMD) (7–9). However, individuals participating in health checks are more often health-conscious, higher-educated, affluent people (10, 11). Participation is lower among people with a heightened risk, e.g. individuals of non-Western descent or with a lower SES (12). Few studies specifically investigated (non-)participation in cardiometabolic health checks of non-Western immigrants or lower SES groups. The literature mostly concerns (non-)attendance in cancer screening or cardiometabolic screening in the general population (13–16). Results from studies on cancer screening might provide reasons for (non-)participation generalizable to cardiometabolic screening. However, risk perceptions and beliefs regarding cancer differ from those regarding CMD: perceived risk and worries are higher for cancer than for CMD (17). Thus, more insight into determinants of (non-)participation in a cardiometabolic health check is needed, specifically among vulnerable groups to enable them to make an informed decision about participation. Several studies concluded that a two-stage approach could be a cost-effective screening strategy for cardiometabolic risk (18, 19). The Dutch cardiometabolic health check follows a two-stage approach and comprises a short risk stratification tool (health risk assessment: HRA) for people aged 45–70 years, and two prevention consultations (PCs) including a blood test with the GP for those at increased risk according to the HRA. During the PCs patients receive information about their risk profile, followed by lifestyle advice and, if necessary, medication prescription. However, this approach implies that patients can refrain from participation on two separate occasions, which may represent an even greater problem among difficult-to-reach groups. Indeed, pilot studies showed substantial dropout rates in both stages (20). In-depth research focusing on determinants related to (not) completing a HRA and (non-)participation in subsequent PCs separately is scarce. Moreover, vulnerable groups require special attention. Therefore, this study investigates which informational, practical, and psychosocial determinants influence the decision of different vulnerable groups to (not) participate in the HRA and the PCs.

METHODS

Sample and recruitment

This study was approved by the Medical Ethical Committee of the Leiden University Medical Center (CME-09-126). Participants' verbal informed consent was audio-taped. Purposive sampling by key persons was used to conduct focus groups with non-Western immigrants (45–70 years, except Surinamese: 35–70 years because of their higher diabetes risk); adult children of non-Western immigrants (18–45 years); lower SES native Dutch (45–70 years); and health professionals working with the target population. Key persons (educational coordinators and managers or employees of community/cultural organizations or local community health services) were well-known persons within a community who used their status and contacts to recruit people willing to participate. Potential participants were approached by e-mail, telephone, or face-to-face, and we also made use of flyers and posters, distributed mainly in colleges and secondary vocational education institutes. The rationale for also conducting focus groups with health professionals was their ample experience with the target population in relation to health (screening) initiatives and their ability to reflect on what would (not) work, and why. Health professionals were recruited through our network for primary care research in which 90 regional general practices work together in scientific research. Focus groups were held separately for each ethnic group. For immigrants, focus groups were purposively held separately for males and females. The rationale for also conducting focus groups among adult children of immigrants was that they usually have a better command of the Dutch language and frequently act as brokers for their parents in the Dutch healthcare system. Two focus groups were held in each subgroup. Due to the large number of subgroups, it was not possible to use data saturation as a criterion for individual subgroups. However, by combining results from the adult children, immigrants, native Dutch, and health professionals, we reached saturation on group level. Focus group characteristics are presented in Table 1.

Table 1. Characteristics of the focus groups

Group	No. of focus groups	No. of participants	Location/recruitment
Immigrants			
Turkish	1♂ ; 1♀	5 ; 10	Turkish associations
Moroccan	1♂ ; 1♀	10 ; 8	Community organisation
Hindustani	1♂ ; 1♀	7 ; 8	Community organisation
Creole	1♂ ; 1♀	5 ; 7	Community organisation
Adult children			
Turkish	1♂ ; 2♀	7 ; 7 ; 8	Senior secondary vocational education and Turkish activity centre
Moroccan	2♀	2 ; 8	Senior secondary vocational education and higher professional education
Hindustani	1♂♀	4	Higher professional education
Creole	1♂♀	2	Higher professional education
Mix[a]	1♂♀	4	Senior secondary vocational education
Dutch lower socio-economic status	1♂ ; 1♀ ; 1♀♂	4 ; 5 ; 8	Community health service and general practice
Health professionals	2♂♀	3 ; 3	General practices

♂ Focus group held with males. ♀ Focus group held with females. ♂♀ Focus group held with both males and females.
[a] Hindustani and Creole.

Data collection

Focus groups were held between February and July 2010 at locations familiar to participants, where they felt safe and at-ease. All focus groups with immigrants and one with adult children were performed at their own community/cultural organizations, during the evening. The other focus groups with adult children were held at their educational institution during free hours between classes. One focus group with native Dutch was held at a community health service where the participants regularly attended recreational activities or health classes, the other was held at the participants' own general practice, both around lunch time. The focus groups with health professionals were held at the research center. One female researcher (IG) was trained to be facilitator and another female researcher (MC) was observer/notetaker. During focus groups at community/cultural organizations a female staff member of the same ethnic background was observer/notetaker. Focus groups were held primarily in Dutch, were audio-taped, and lasted 1–2 h. The observer/notetaker translated when participants did not speak Dutch or preferred to speak in their native language. The interview protocol was pilot tested with members of our target population and consisted of two parts (see Appendix for an example protocol). First, HRA invitation strategies and determinants influencing HRA participation were discussed. Second, risk communication and determinants influencing PCs participation were discussed. The interview protocol was based on the constructs from the Integrated change model (I-change model) (Fig. 1), which has been applied in studies on screening attendance and smoking behaviour in native and immigrant populations (21–24). The I-change model aims to explain health behaviours and incorporates elements from health behaviour theories such as the Health Belief Model (25), Protection Motivation Theory (26), Theory of Planned Behaviour (27), and Precaution Adoption Process Theory (28). The model states that behaviours are determined by a person's motivation or intention to carry out a behaviour and is the result of a person's intentions, abilities, and barriers. Attitudes, social influences, and self-efficacy expectations influence a person's motivation and are determined by various distal factors, such as predisposing (e.g. current lifestyle), information (e.g. source of delivery), and awareness (e.g. knowledge) factors. The rationale for choosing this model was that health check attendance could be seen as a health behaviour and in that sense be studied with this comprehensive model.

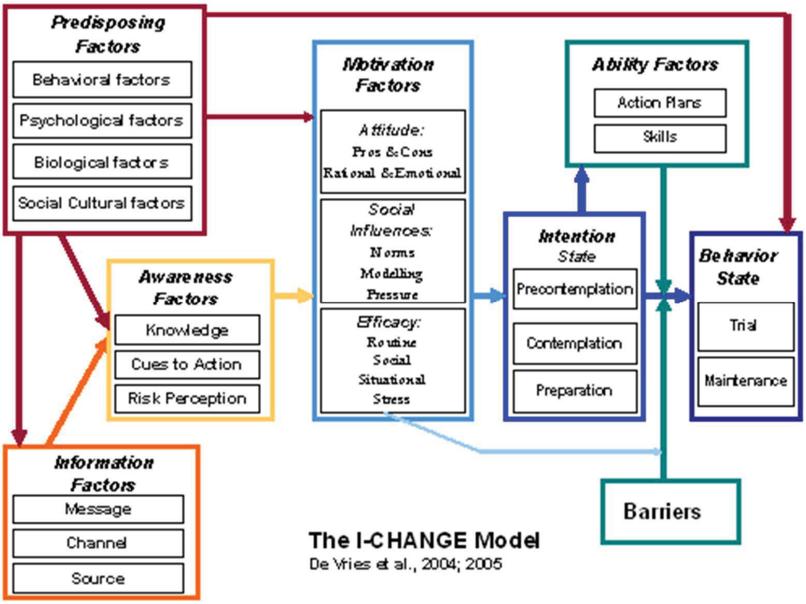

Figure 1. The I-change model, from http://www.maastricht-university.eu/hein.devries/interests/change

Data analysis

Audio-tapes were transcribed verbatim. The remarks of the participants without command of the Dutch language were transcribed and translated by the ethnicity-matched observer. Data analysis was done on all focus group transcripts combined and facilitated by Atlas.ti 6.2 software. Most coding was performed deductively with codes based on the determinants of the I-change model, and partly inductively when a new code emerged. To increase reliability, coding was independently performed by two researchers (IG and MC) until consensus was reached, which was after five interviews (29, 30). After this, the other transcripts were coded by IG and only discussed with MC in case of doubt about the appropriate code. Alike the codes, themes were partly identified in advance and partly derived from the data. Thematic content analysis (including merging or subdividing codes and allocating to themes) was performed by IG and MC and validated among members of the research team (WA, AS, SvD, and WG) until consensus was reached.

RESULTS

Demographics

In total, 125 participants took part in the focus groups, of whom 119 filled out the background information questionnaire. Table 2 presents these participants characteristics. Many Surinamese participants were retired and participants in the other groups were often unemployed or disabled. Female participants mainly reported housekeeping as their occupation in daily life. The majority of the adult children (mainly female) combined their education or job with housekeeping.

Table 2. Characteristics of the participants in the focus groups (n=119)

Group	Mean age, in years (±SD)	Married, n (%)	Religious, n (%)	Occupation in daily life[b], n (%)			
				Education	Job	Retired	Household
Immigrants							
Turkish (n=15)	52 (± 8.5)	13 (87%)	15 (100%)	NA	1 (7%)	1 (7%)	6 (40%)
Moroccan (n=18)	54 (± 6.8)	18 (100%)	18 (100%)	NA	1 (6%)	1 (6%)	8 (44%)
Hindustani (n=15)	62 (± 12.4)	9 (60%)	13 (87%)	NA	0 (0%)	7 (47%)	6 (40%)
Creole (n=12)	64 (± 7.6)	3 (25%)	12 (100%)	NA	2 (17%)	9 (75%)	1 (8%)
Adult children							
Turkish (n=22)	34 (± 13.4)	13 (59%)	17 (77%)	9 (41%)	12 (55%)	NA	5 (23%)
Moroccan (n=10)	19 (± 3.6)	1 (10%)	9 (90%)	10 (100%)	4 (40%)	NA	3 (30%)
Hindustani (n=4)	21 (± 1.4)	0 (0%)	2 (50%)	4 (100%)	2 (50%)	NA	2 (50%)
Creole (n=2)	25 (± 5.0)	0 (0%)	1 (50%)	2 (100%)	0 (0%)	NA	0 (0%)
Mix[a] (n=4)	19 (± 1.5)	0 (0%)	4 (100%)	4 (100%)	1 (25%)	NA	1 (25%)
Dutch low SES (n=17)	61 (± 11.4)	13 (77%)	10 (59%)	NA	2 (12%)	4 (24%)	4 (24%)

NA: Not applicable. [a] Hindustani and Creole. [b] Multiple answers possible

Methods of invitation

Information factors

A personal invitation for participation in the HRA during a GP or home visit was preferred to an invitation by letter, telephone, or online. Face-to-face contact was believed to result in more reliable results because people would receive practical help and be more honest. Additionally, it was thought to be a useful way of spending time in the waiting room. The GP was seen as a reliable source. Nevertheless, a good relationship and trust were considered essential for participation. Participants emphasized the importance of regional/national publicity and repetition regarding the availability of the HRA to get acquainted with it and for branding to occur. It was proposed to notify people in advance that they would soon receive an invitation, to provide reminders, and to make use of social networks for word-of-mouth publicity.

Determinants regarding participation in the HRA

Tables 3 and 4 present an overview of reasons respectively decreasing and increasing the likelihood of participation in the HRA. Reasons are categorized under I-change constructs and more specific determinants. Ethnic group(s) for whom the reason was most prominent is mentioned, as well as a detailed description of the reason, with an illustrative quote for a selection of reasons.

Predisposing factors

Participants believed that women would be more likely to participate than men. A lack of physical symptoms would be a reason for some to participate (Quote 1.2, Table 4), whereas for others it would not. Already having a disease made participants more prone to participate, as would a family history of CMD. An exception were the Hindustani participants (a group genetically predisposed to CMD), who expressed the view of Hindustanis being more passive in general (Quote 1.3, Table 3). Passiveness was not expressed as a typical group trait among other ethnicities, but was recognized as an individual trait affecting participation (i.e. being lazy/lax). Dissatisfaction with the Dutch healthcare system was a reason for many Turkish and Moroccan participants to prefer a health check in their home country.

Table 3. Summary of determinants decreasing the likelihood of participation in the HRA

Construct	Determinant	Ethnicity[a]	Description		Quote
1.Predisposing factors	1.Gender; male	A	More stubborn, selfish, and careless about their health	➔	Quote 1.3 on family history (Surinamese adult child): *“Usually they often say: ‘it runs in our family so I’ll get it all too. Whether I’ll fill it out or not, I’ll get it anyway’. Because on my dad’s family’s side somebody has diabetes and on my mom’s side…so they would think: ‘I’ll get it, whether I’ll fill it out or participate or not, I’ll get it anyway’.”*
	2.Symptoms; not present	A	Feeling healthy, thus not seeing the need to screen for cardiometabolic disease		
	3.Genetics; family history	S	High awareness of family history of cardiometabolic disease among Hindustani, yet burying their heads in the sand		
	4.Passiveness/laziness	A/S	Not showing up, not being interested, not participating, especially among Hindustani		
	5.Comparison health care home country	T/M	Perceived less expensive and better care, more in-depth testing, and faster results in home country		
2.Awareness factors	1.Health illiteracy	A	People with little or no education are more ignorant concerning health and disease	➔	Q 2.2 on unrealistic risk estimation (Dutch lower SES): *“Because unconsciously you think: ‘I live healthy right? I don’t smoke, I exercise’, while you’re eating a nice and fat meal you think: ‘damn, I live healthy right? I eat well’.”*
	2.Risk estimation; unrealistic	A	Unrealistically optimistic evaluation of lifestyle, incorporating facts and emotions, or a perceived lower risk than that of others		
3.Motivation factors	1.Attitude; negative	D A	Aggressiveness, ‘none-of-your-business-attitude’ Disadvantages of participation: poor outcome and confrontation	➔	Q 3.3 on fear (Health professional): *“I’m afraid that if you motivate people based on their fear, at a certain point in time this fear will subside and they’ll think: ‘whatever, never mind’. I don’t believe in this. Concerning health, especially prevention, it’s best to be positive. A negative approach…no I don’t think that will be the way to hold on to people.”*
	2.Attitude;indifference	A	Nonchalance, not feeling like it		
	3.Fear	A	Anticipated fear of a poor outcome, disease, death, doctors, medication, and lifestyle changes		
	4.Social influences	A	The unimportance of participation as norm within the community, the (expected) unimportance that significant others would place on one’s participation (subjective norm), the (expected) non-participating behavior of significant others (descriptive norm or modeling), negative conversations, and pressure. Important others were mainly children, other family members, a confidant such as the GP or a key person within the community, friends, or neighbors		
	5.External locus of control	D/S T/M	External causes of disease, or destiny A God causing disease		
4.Barriers and ability factors	1.Illiteracy	A	Too extensive and too complicated making participation difficult, especially for illiterate people, or people who have had little or no education	➔	Q 4.2 on language barriers (Turkish immigrant): *“Look: I’m Turkish and I’ve got the Dutch and Turkish nationality. I can read a bit of Dutch and speak normally. But if I see a form, I don’t understand half of it, to fill it out precisely and accurately. My kids speak better Dutch than Turkish. If I ask them to fill out a form in Turkish, they can’t do it because they are not good in Turkish.”*
	2.Language barrier	T/M	Little or no command of Dutch language		
	3.No action linkage children	D/S	Rather toss HRA aside than ask for help		
	4.Costs	D	Possible costs of cardiometabolic screening		

[a] Column represents the ethnic group(s) in which determinant was most prominent: A=all groups, T=Turkish, M=Moroccan, S=Surinamese, D=Dutch

Awareness factors

Completing the HRA would be too difficult for some due to health illiteracy, i.e. they would be less able to understand the HRA and its accompanying information on CMD. Many participants were aware of health checks being offered for a variety of health conditions by various sources. Previous experience with a health check would not make participants more reluctant to participate, provided that it concerned a different health condition (Q 2.1, Table 4). It was believed that many people would not participate while feeling less at risk than others. They would compare their own perceived healthy lifestyle with that of others and, possibly unrealistically, would conclude that participation would not be useful for them (Q 2.2, Table 3). Simultaneously, it was presumed that many participants desired a sense of certainty about their risk status, even when they believed that they had a low risk.

Motivation factors

Most participants had a positive attitude and elaborated on the advantages of participating. Nevertheless, participants knew many people who would have a negative or indifferent attitude. Although fear of being ill was deemed important, participants (especially the healthcare professionals) considered it wrong to deliberately use fear as a motivational strategy (Q 3.3, Table 3). This could make people more afraid of the outcome and the possible consequences of a high-risk status (i.e. having to make lifestyle changes). Although participants tended to be reluctant admitting this, social influences seemed to play a major role in the decision-making, both emotionally and practically. For example, some participants were afraid that the test results would be known by others besides the GP who would then know that they were ill and, consequently, would judge or mistreat. Encouraging would be having family members or important others advising them to participate or participating themselves (Q 4.2, Table 4). Sometimes, participation seemed unnecessary for patients who believed in a God or other external influences causing disease (i.e. external locus of control).

Table 4. Summary of determinants increasing the likelihood of participation in the HRA

Construct	Determinant	Ethnicity[a]	Description		Quote
1.Predisposing factors	1.Gender; female	A	More health conscious, aware, and actively engaged in their health		
	2.Symptoms; not present	A	Realization one might still have an increased risk of cardiometabolic disease or be ill already	→	Q 1.2 on symptoms not present (Surinamese immigrant): *"Yes, that's what I always say: you're walking ill. You live but you're ill from the inside. Till it erupts you don't know that you're ill, but it has already started, maybe from a young age. But because you didn't know or you didn't go to the GP, you let it be. People should be convinced: 'Even though I feel like a bear who can conquer the world, something might potentially be present, so let's do that check'."*
	3.Symptoms; present	A	More health conscious, more serious		
	4.Genetics; family history	A	Family history of cardiometabolic disease makes people more aware and more likely to participate		
	5.Comparison health care home country	S	Wish for health care system in Surinam to be more like the prevention focused system in the Netherlands		
2.Awareness factors	1.Prior experience	A	Prior experience with a health check does not make participants more reluctant to participate provided that it concerns a different disease	→	Q 2.1 on prior experience (Surinamese adult child): *"He does check-ups now regularly too, so I don't know if this is really something different, but if it is something different he would do it for sure."*
	2.Risk estimation; sense of certainty	A	Reason to screen is more certainty about risk status: knowing whether you are at high risk or not		
3.Motivation factors	1.Attitude; positive	A	Advantages of participation: health benefits, future, sense of certainty, importance, interesting, no harm could result		
	2.Social influences	A	The importance of participation as norm within the community, the (expected) importance that significant others would place on one's participation (subjective norm), the expected participating behavior of significant others (descriptive norm or modeling), positive conversations, pressure, and support. Important others were mainly children, other family members, a confidant such as the GP or a key person within the community, friends, or neighbors	→	Q 3.2 on social influences (Moroccan adult child): *"That you let an Imam or so say: 'Oh guys, think about that test. Don't forget to fill it out!'."*
4.Barriers and ability factors	1.Textual adjustments	A	Formulate as concisely and simply as possible, limit number of questions, keep overall level of difficulty to a minimum		
	2.Action linkage children	T/M	Children as translators	→	Q 4.2 on children as action linkage (Moroccan adult child): *"And truthfully, for my mom it depends on whether we have time for it because she doesn't speak Dutch, so she's always dependent on us. First, they'll call for me, probably I'm in the middle of doing something fun in my room. 'THERE'S A LETTER!', well then I'll read it. They'll make sure it gets filled out by one of the children."*
	3.Compensation in costs	A	Participation for free, providing a self-addressed envelope or stamp, and possibly a small present		

[a] Column represents the ethnic group(s) in which determinant was most prominent: A=all groups, T=Turkish, M=Moroccan, S=Surinamese, D=Dutch

Barriers and ability factors

Participants usually found questionnaires and invitation letters too extensive and complicated. It was strongly advised to formulate these texts as concisely and simply as possible. Because Turkish and Moroccan participants also faced a language barrier (Q 4.2, Table 3), in many families the children would translate (Q 4.2, Table 4). Among Surinamese and Dutch participants it was not common to ask the children for help. Finally, especially among the Dutch groups, it was emphasized that participation would be free. Summarizing, reasons for not completing the HRA were mainly cognitive and included rational cost–benefit considerations incorporating (flawed) risk perceptions, health negligence, (health) illiteracy, and language barriers.

Risk communication

Information factors

The message of a high-risk HRA result should be formulated simply and briefly, but not too directly and information about its consequences should be provided. Surinamese and Dutch participants felt strongly about the voluntary nature of PCs participation. Consequently, providing a prescheduled date for the appointments would have adverse effects. The ensuing face-to-face contact and physical examinations during the PCs made the relationship between the participants and their GP even more important. They felt that the GP should be reassuring and make an effort to come to them, i.e. into the community.

Determinants regarding participation in PCs

Tables 5 and 6 present an overview of (additional) determinants respectively decreasing and increasing the likelihood of participation in the PCs.

Predisposing factors

Similar predisposing factors mentioned for HRA (non-)participation were raised again when discussing the PCs. An additional factor mentioned was that the older generation would be more likely to visit their GP than the younger generation (Q 1.1, Table 6). However, at a certain age (i.e. around 70 years) people would not see the point of prevention anymore (Q 1.1, Table 5).

Table 5. Summary of (additional) determinants decreasing the likelihood of participation in the PCs

Construct	Determinant	Ethnicity[a]	Description		Quote
1.Predisposing factors	1.Generation differences; oldest generation	A	Not seeing the use of going to a doctor for prevention anymore	➔	Q 1.1 on generation differences (Dutch lower SES): "*But at a certain point in time, he was 78 years old, my father in law said: 'I'm not interested anymore, never mind'.*"
2.Awareness factors	1.High risk test result	A	'License to misbehave'	➔	Q 2.1 on high risk test result (Surinamese immigrant): *"I think there are people who think: 'oh, an increased risk, okay, I won't go to the GP, I'm okay with it, I'm not going to follow a diet, I'm going to live and I'll see how it goes.' I think, they see it to some extent as: now is the chance to live my life to the fullest."*
3.Motivation factors	1.Fear	A	Fear: caused by the risk communication, of confirmation of risk status or diagnosis of disease during PCs, of the GP or doctors in general, of treatment and/or medication, of lifestyle changes		
	2.Fatalism	A	Feeling of helplessness, feeling that one will get the disease and die anyway, that time has inevitably come	➔	Q 3.2 on fatalism (Turkish immigrant): *"After 50, Turkish females don't function anymore, somehow they don't want to anymore. They do want to live but they say: 'Our kids are grown up, we're old, yes it's time for us, we retreat. It's time for us to go to the other side'."*
	3.External locus of control	A	External causes, faith, or a God causing disease, making participation pointless		
	4.Convictions; 'guinea pig'	T	Feeling of being treated like a guinea pig, leading to denial and distrust in research and the Dutch health care system		
	5.Gossip	T/M	About high-risk test result, but more so what would be discussed during PCs and possible diagnosed disease. An ethnicity-matched translator would encounter suspicion out of fear that (s)he would not keep things from the community		
4.Barriers and ability factors	1.Health illiteracy and language barrier	A T/M	Difficulty of information provided and translation barriers, leading to mistakes and misunderstandings		
	2.Money concerns	A	Concerns whether PCs, including lab work, would be covered by insurance. Costly consequences of PCs: medication or other treatment, and lifestyle changes		
	3.Time concerns	D T/M	Getting free from work (office hours GP). Prolonged absence during holidays + Ramadan, leading to reluctance or prohibition to participate, the latter mainly because of the physical tests	➔	Q 4.3 on time concerns (Health professional): *"The boss won't allow it, for men that's a common problem. Being ill is for your spare time. Then they won't participate, well maybe your mere loyal soul but the vast majority will fall out obviously. And don't organize it during the wrong period of time: never during summer holidays and never during Ramadan. Right before or right after Ramadan isn't a good idea either. Actually, you've got pretty little time left."*

[a] Column represents the ethnic group(s) in which determinant was most prominent: A=all groups, T=Turkish, M=Moroccan, S=Surinamese, D=Dutch

Awareness factors

An important cue to action would be the confrontation with an unfavourable test result (Q 2.1, Table 6), after which many would go to the PCs to gain more certainty about their risk and disease status. However, some would not go and might use a high-risk status as a ‘license to misbehave’ (Q2.1, Table 5). According to the participants, these people might think that it would no longer be necessary to put much effort into behaving healthily as they already have a high risk.

Motivation factors

Participants believed that many would be convinced of the necessity of screening after receiving a high-risk HRA result (Q 3.1, Table 6). However, they also believed that for some an increased risk would come as such a shock that they would not believe it. Participants thought that fear would be so strong that it would translate into helplessness or fatalism (Q 3.2, Table 5). Also, an external locus of control played a role in the perceived pointless-ness of participation. Among the Turkish groups, a feeling of being treated like a ‘guinea pig’ was common. Notable was the more prominent role of gossip, especially among the Turkish and Moroccan groups. They were afraid that a bad test result would be passed on, for example, by ethnicity-matched translators, while (severe) illness was perceived as something private and often seen as a taboo.

Table 6. Summary of (additional) determinants increasing the likelihood of participation in the PCs

Construct	Determinant	Ethnicity[a]	Description		Quote
1.Predisposing factors	1.Generation differences; older generation	A	Experiencing more complaints, more aware of health	➔	Q 1.1 on generation differences (Dutch lower SES): *"I think that the older you are, the sooner you would go because something is wrong, you have complaints. Look: if you're younger, you think: 'I'm healthy, I'm in the prime of my life', you don't care."*
2.Awareness factors	1.High-risk test result	A	Participating in the HRA increased awareness, the high risk test result combined with a wish for certainty would be a cue to action to go to doctor because the sooner to undertake action the better	➔	Q 2.1 on high-risk test result (Moroccan adult child): *"If I would get this and they would say: 'you have an increased risk', than I would immediately contact my GP."*
3.Motivation factors	1.Convictions; 'must'	A	There would simply be no other sensible choice than participating after receiving a high risk test result	➔	Q 3.1 on conviction of 'must' (Turkish immigrant): *"Yeah sorry, but if you don't go to the GP in that case, I think that's pretty stupid, you just have to go. Yeah sorry, but that's just how it is!"*
4.Barriers and ability factors	1.Action linkage children	T/M	Accompany their parents, translate, provide mental support or a ride		Q 4.3 on overcoming time barriers (Moroccan immigrant): *"For example, when you're in Morocco and the letter arrives, because most of the elderly spend a lot of time in Morocco, I feel that it should be possible to rearrange the appointment. I feel that this should be taken into account."*
	2.Compensation	A	Insurance coverage of PCs, medication or other wtreatment, and lifestyle changes		
	3.Overcoming time barriers	A	Person's own skills to 'make time', taking as little time as possible for PCs, and being flexible	➔	

[a] Column represents the ethnic group(s) in which determinant was most prominent: A=all groups, T=Turkish, M=Moroccan, S=Surinamese, D=Dutch

Barriers and ability factors

Turkish and Moroccan participants would again face a language barrier and ask their children for translation. The difficulty of the verbal information (i.e. health illiteracy) provided during the PCs was recognized as a problem for all groups. For the HRA, costs were mainly an issue among the Dutch groups, while this aspect was expressed among all groups when discussing PCs participation. Compensation for possible costs would be an important facilitating factor. Time concerns were also expressed (Q 4.3, Table 5), although participants felt that people should make time for PCs (Q 4.3, Table 6). For the Dutch groups this involved arranging time off from work, and for the Turkish and Moroccan groups this involved the prolonged stay in their home country during the summer vacation. In addition, during the period of Ramadan many would be reluctant, or even prohibited, to attend the PCs. Summarizing, reasons for not attending the PCs overlapped with reasons for not completing the HRA but additional reasons were notably more affective and included negative emotional responses and related coping strategies incorporating risk denial, fear about the outcome, its potential consequences (lifestyle changes and medication prescription), and disease-related stigma.

DISCUSSION AND CONCLUSION

Discussion

In this study we have identified factors influencing (non-)participation in a two-stage cardiometabolic health check among difficult-to-reach, vulnerable populations. The kind of invitation and the source was thought to influence the decision-making process, as recognized by studies in the general population (31– 33). A multi-strategy approach combining mailed letters, telephone calls, and/or especially face-to-face strategies seems useful for increasing uptake in vulnerable groups (34). Combined with an awareness campaign and/or a more community-involved GP, uptake may be further increased. Nonetheless, a good relationship with their GP and sufficient trust in the Dutch healthcare system would benefit this invitation (32, 33). In line with the literature among the general population, our vulnerable participants expected health-conscious patients to more frequently follow-up an invitation for the HRA as they would see the importance and advantages of doing so (12, 15). This contrasting a more negligent group, comprising men and individuals without health problems who would have a more negative attitude and not recognize the necessity of screening. Feeling healthy was also seen as hampering the acceptance of a high-risk HRA outcome as it would not fit the patient's illness perceptions (35). Participants also expected these negligent patients to regularly engage in denial strategies to cope with an increased risk, for example, by minimizing their personal vulnerability by comparing their own behaviour with that of others behaving in even less healthy ways (i.e. downward social comparisons), or the stereotype person at risk (36). Consequently, they would not see the purpose of further testing at the GP, which may be labelled as a 'defensive bias' (37). Negative emotional reactions were mentioned as a response to a high-risk HRA result and most prominently as a reason for nonparticipation in the PCs. Fear was also the most distinct emotional reaction and reason for non-attendance among the general population (12, 15). Others concluded that avoiding further testing is a way of managing fears caused by an increased risk and explained it as a strategy for individuals to ease the stigma and guilt associated with the perceived personal responsibility for their risk status: they wanted to postpone screening until they had made progress through lifestyle changes (38). The current study adds that refraining from further testing may follow from the wish not to be treated differently, fuelling the fear of gossip, especially among Turkish and Moroccan patients. For Turkish and Moroccan patients, the poorer command of the Dutch language would be a problem when completing the HRA, it could hinder a trusting relationship with their GP and, consequently, their PCs' attendance. The deployment of ethnicity-matched translators seems a logical solution, but may pose a problem considering the fear of gossip (passing on negative screening outcomes to others).

Strengths and limitations

Carrying out focus groups with adult children of immigrants is an innovative approach and worked best among the Turkish and Moroccan children: we obtained more extensive information because they were generally more outspoken and assertive. Focus groups with adult children of immigrant groups seem especially useful when these children are accustomed to being involved in their parents' decision-making. The results from focus groups with these adult children were verified among the immigrant groups and combined with data from the healthcare professionals. By this way of triangulation, we looked at the data from multiple angles composing a complete as possible picture. To further increase the internal validity, the design and analysis of this study were embedded in an encompassing theoretical framework, allowing room for inductively derived determinants. The I-change model seems important in explaining the decision of (non-)participation in a health check, particularly the HRA. Regarding the decision of attending the PCs, the model could be improved by adding coping determinants for dealing with an increased risk. Finally, to ensure reliability we have structurally organized the data, including audio-taping of interviews, using an analysis software program and a coding tree, keeping a log, and double-coding. Some limitations to the study should be discussed. First, we had to pre-set the number of focus groups, which led to small and diverse groups of participants. Some focus groups did not consist of the intended minimum of six participants, which could have led to less interaction between participants. These aspects may have diminished generalizability of findings. Previous studies, however, found comparable results suggesting a certain level of generalizability to other types of screening and populations. Second, although we presented inferences for one or more of the separate ethnic groups only if strongly present, they have to be interpreted with caution. Third, in the few cases the observer/notetaker had to translate misunderstandings and loss of profundity may have occurred. Fourth, participants did not have the opportunity to comment or correct the transcripts, possibly impeding internal validity of the study. Finally, participants were highly motivated to participate in the study, therefore, a selection bias might have occurred. Nevertheless, all participants verbalized potential doubts of others less willing to participate, which may have been a subtle way of ventilating their own doubts.

Conclusions

The purpose of this study was to provide an overview of informational, practical, and psychosocial factors influencing the (non-)participation in a two-stage cardiometabolic health check among difficult-to-reach, vulnerable populations. Even though similarities between determinants influencing (non-)participation in the HRA and the PCs were manifold, important differences were also noted. When considering filling out the HRA, more cognitive aspects, including rational cost–benefit considerations, were prominent. After a high-risk HRA result and the subsequent decision to (not) participate in the PCs, cognitive aspects would still play a role but more importantly would trigger negative affective responses and related coping aspects to deal with these emotions. We had expected to find distinct determinants for (non-)participation in cardiometabolic screening among non-Western immigrants and lower SES native Dutch. However, the majority of observed determinants seemed similar to determinants found in previous studies among the general population or studies focusing on cancer screening. This suggests that though perceived risk of and worries about cancer are higher than about CMD, determinants influencing the decision to participate in screening may not differ much. These determinants may not vary substantially between ethnicities except for language barriers and possibly the larger impact of gossip and taboos among Turkish and Moroccan immigrants.

Clinical implications

Findings from this study can be used to design new or adapt existing two-stage cardiometabolic health checks for vulnerable groups. Regarding the first stage, i.e. inviting people to complete a short non-invasive HRA, choice of invitation strategy seems crucial. A multi-strategy approach, including a face-to-face strategy, may be important in increasing uptake, especially when combined with an awareness campaign and/or a more community-involved GP. Written or verbal translations must be provided for non-native participants. Finally, as flawed risk perceptions and attitudes regarding screening are common, individuals should be presented with accurate information on risks and (dis)advantages of screening to support them in making informed choices about participation (32). Regarding the second stage, i.e. inviting people to attend PCs for further testing, negative emotional responses and defensive coping strategies have to be taken into account. Minimizing one’s risk and feelings of personal vulnerability does not necessarily mean that high-risk individuals are not receptive to information (36). GPs or other healthcare professionals should explore these emotions and fears regarding further testing, in order to, again, support informed choices. Additionally, there is a need to take social context into account, especially since many non-Western cultures can be characterized as group cultures (36). To increase acceptance of ‘being different’ due to having a high-risk or CMD, it is suggested to involve family and friends in the patient’s lifestyle advice and/or treatment. Additionally, the topic of cardiometabolic risk should be brought to the attention of key figures within the community, who can help eliminate some of the associated stigma and taboo (39, 40).

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Contributors

MC, SD, WG, and AS filed the proposal for this study. The design, execution, and analysis were mainly done by IG and MC, in close collaboration with the research team. The paper was written by IG and critically revised by all authors. All authors had full access to all of the data in the study and can take responsibility for the integrity of the data and the accuracy of the data analysis. IG is guarantor.

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Competing interests

None of the authors have other financial relationships with organizations that might have an interest in the submitted work.

Ethical approval

This study was approved by the Medical Ethical Committee of Leiden University Medical Center (CME-09-126).

Data sharing

Anonymized transcripts and coding tree are available from the corresponding author.

Transparency

The lead author (IG) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned have been explained.

APPENDIX A

Example interview protocol for native Dutch with lower socioeconomic status (SES)

Focus groups; interview protocol native Dutch lower SES

Checklist

- Name tags and markers.
- Recording equipment.
- Informed consent forms.
- Flip-over.
- Coffee, tea, and snacks.
- Gift certificates.
- Example invitations (for participation in HRA and PC).
- Yellow, pink, green, and blue post-its and pens.
- Educational materials on cardiometabolic diseases.

Opening
Facilitator and observer/notetaker introduce themselves.
Explanation about the study and reason for the choice of participants.
What is expected of the participants. It concerns opinions and experiences of the participants. Answers given are never wrong. Everyone is expected to join the discussion.
Data will be treated anonymously and confidentially, which also means: everything discussed by the group will stay within the group.
The discussion will be audio taped, transcribed, and then erased (Informed consent).
Interested in report of findings?
Duration: approximately 2 h. In between: short break with coffee/tea and snacks.
Afterwards: gift certificate (and depending on time of day: meal).
Questions?

Introduction round
Name (or pseudonym), age, family status, reason for participation.

Opening question
(1) Has anybody ever heard of a health check?
If yes: could you explain what it is?
(A) Have you ever participated in such a check?
(B) Do you know people who have participated in such a check?
(C) What was your/their experience with it?
If no: what do you think of when you hear this term?
Explanation about the Health Check, the HRA specifically.

Questions about the HRA
(2) Imagine that the GP sends an invitation to participate in a health check, how would your family react?
(A) Who opens the mail?
(B) Who would know about the invitation?
(C) Who decides what would be done with the invitation?

(3) Here I have got two example invitations for such a health check, attentively read both of them. What is your first impression?
(A) What should be included in the invitation by all means, and what should not?
(B) Did you notice anything about the formulation of the message? If necessary ‘help out’: one of them is gain framed, while the other is loss framed. What would work better?

(C) What would be the most effective way of inviting (written/ by telephone/face-to-face/other)?
(D) Additions. . .
(E) Anecdote!

(4) What would be reasons for you (or your neighbour/brother or sister/best friend) not to participate in the HRA?
(A) Any biological (physical) reasons? Would women or men be more inclined to fill out the test?
(B) Any psychological reasons, for example character traits?
(C) Would young or older people be more inclined to fill out the test?
(D) How would important others react? Would others find it important to fill out the test? Would others fill out the test?
(E) Trust in health care system/doctors/researchers?
(F) (Religious) locus of control? Do you have control over your health? Are external causes the reason for getting ill?
(G) Knowledge and awareness (‘health literacy’)? Publicity? Relationship with GP
(H) Communication/interaction?
(I) Emotional?
(J) Name 3 advantages.
(K) Name 3 disadvantages.
(L) Name 3 barriers which would prevent you from filling out the test.
(M) Name 3 things which would make it easier for you to fill out the test.

(5) What would be reasons for you (or your neighbour/brother or sister/best friend) to participate in the HRA?
(A) till (M) as above.
What would be solutions for the problems mentioned earlier?

Break

Questions about the PCs
Explanation about the Health Check, the PCs specifically.
(6) Again we have made two example invitations, attentively read both of them. What is your first impression?
(A) What should be included in the invitation by all means, and what should not?
(B) Did you notice anything about the formulation of the message? If necessary ‘help out’: one of them is gain framed, while the other is loss framed. What would work better?
(C) Would a prescheduled date and time work?
(D) Would you prefer to be approached differently for this than what we discussed about the HRA?
(E) Additions . . .

(7) What would be reasons for you (or your neighbour/brother or sister/best friend) not to participate in the PCs?
(A) Any biological (physical) reasons? Would women or men be more inclined to go to the PCs?
(B) Any psychological reasons, for example character traits?
(C) Would young or older people be more inclined to go to the PCs?
(D) How would important others react? Would others find it important to go to the PCs? Would others go to the PCs?
(E) Trust in health care system/doctors/researchers?
(F) (Religious) locus of control? Do you have control over your health? Are external causes the reason for getting ill?
(G) Knowledge and awareness (‘health literacy’)? Publicity? Relationship with GP?
(H) Communication/interaction?
(I) Emotional?
(J) Name 3 advantages.
(K) Name 3 disadvantages.
(L) Name 3 barriers which would prevent you from attending the PCs.
(M) Name 3 things which would make it easier for you to attend the PCs.

(8) What would be reasons for you (or your neighbour/brother or sister/best friend) to participate in the PCs?
(A) till (M) as above.
What would be solutions for the problems mentioned earlier?

(9) Would anybody like to share anything about what we discussed today, it may concern anything?

Closing

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3

Response and participation of underserved populations after a three-step invitation strategy for a cardiometabolic health check

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ABSTRACT

Background

Ethnic minority and native Dutch groups with a low socioeconomic status (SES) are underrepresented in cardiometabolic health checks, despite being at higher risk. We investigated response and participation rates using three consecutive inexpensive-to-costly culturally adapted invitation steps for a health risk assessment (HRA) and further testing of high-risk individuals during prevention consultations (PC).

Methods

A total of 1690 non-Western immigrants and native Dutch with a low SES (35–70 years) from six GP practices were eligible for participation. We used a ‘funnelled’ invitation design comprising three increasingly cost-intensive steps: (1) all patients received a postal invitation; (2) postal non-responders were approached by telephone; (3) final non-responders were approached face-to-face by their GP. The effect of ethnicity, ethnic mix of GP practice, and patient characteristics (gender, age, SES) on response and participation were assessed by means of logistic regression analyses.

Results

Overall response was 70% (n=1152), of whom 62% (n=712) participated in the HRA. This was primarily accomplished through the postal and telephone invitations. Participants from GP practices in the most deprived neighbourhoods had the lowest response and HRA participation rates. Of the HRA participants, 29% (n=207) were considered high-risk, of whom 59% (n=123) participated in the PC. PC participation was lowest among native Dutch with a low SES.

Conclusions

Underserved populations can be reached by a low-cost culturally adapted postal approach with a reminder and follow-up telephone calls. The added value of the more expensive face-to-face invitation was negligible. PC participation rates were acceptable. Efforts should be particularly targeted at practices in the most deprived areas.

BACKGROUND

Cardiometabolic disease (CMD), namely cardiovascular disease (CVD), diabetes mellitus (DM), and kidney failure, is a leading cause of death in high-income countries (1). CMD risk is related to low socioeconomic status (SES) and a non-Western origin (2, 3). In The Netherlands, CVD prevalence and mortality are particularly high among Surinamese and Turkish people (4, 5). Turkish, Moroccans, and especially Hindustani Surinamese have a higher DM risk (6). As CMD is largely preventable, focus has shifted towards primary prevention among high-risk individuals and, as a result, health checks have been implemented in various countries (7–9). A non-Western origin and a low SES are associated with lower health check attendance (10). This selective non-attendance contributes to inequalities in health gains from screening. Efforts to increase participation of these underserved (difficult-to-reach, high-risk) populations are therefore relevant, and a prerequisite for cost-effectiveness (11, 12).

Attempts to increase participation in health checks in the general population usually compared postal, telephone, and face-to-face strategies in parallel (13–17). In general, a postal invitation combined with telephone reminders was most effective in cancer screening attendance (14). However, studies taking ethnicity or SES into account tend to find the more labour-intensive, expensive face-to-face strategies or combinations of strategies, to be most effective (13, 15–17). In The Netherlands, only this ‘case-finding’ approach is currently reimbursed by basic health insurance (18). Nevertheless, a strategy with a sequential inexpensive-to-costly ‘funnel’ invitation procedure might be more cost-effective. We investigated response and participation in a health check by using such a funnel design that encompassed three consecutive culturally targeted and personalised invitation steps: first, a postal invitation to eligible individuals, second, a telephone invitation for postal non-responders, third, a face-to-face invitation for telephone non-responders. We assessed both response and participation, with response referring to the patient’s awareness of the screening and providing a response as to whether or not (s)he intended to participate, and participation to actual participation in the health check.

Another way of increasing cost-effectiveness entails using a two-stage health check approach, which usually refers to employing a non-invasive and low-cost risk stratification tool for all individuals, followed by more expensive biometric and blood testing for high-risk individuals (12, 19). The Dutch cardiometabolic health check follows such a two-stage approach. Stage one comprises a short health risk assessment (HRA) consisting of six risk factor questions (20, 21) for people aged 45–70 years. Patients have to calculate their own HRA risk score. In case of an increased risk according to the HRA, patients are advised to attend a prevention consultation (PC) at the GP (stage two). However, in the general population it has been shown that patients then refrain from participation on two separate occasions (HRA and PC), possibly leading to even higher non-participation rates among underserved populations (22). Therefore, we examined HRA participation and subsequent PC participation after receiving an increased HRA risk score, as well as the effect of ethnicity, ethnic mix of GP practice, and patient characteristics (gender, age, SES) on participation.

Summarizing, our research questions were:

1. What are response and participation rates among different underserved populations after a postal invitation to complete the HRA?
2. To what extent can response and HRA participation among postal non-responders from the different groups be increased by telephone and by a subsequent face-to-face invitation by the GP among remaining non-responders?
3. What proportion of high-risk HRA participants attends the PC, and does this vary between different underserved populations and invitation steps?

METHODS

Study population and setting

Between May 2012 and December 2013, patients from six general practices in deprived neighbourhoods in the Netherlands were invited for the cardiometabolic health check. Patients had to be Turkish, Moroccan, or Surinamese, or native Dutch with a low SES. As ethnicity is not registered by the GP, ethnic origin was deduced from family name, after which the classification was checked by the GP. He/she also selected the native Dutch patients with a low SES. The SES status was then corroborated by a neighbourhood SES score. A low SES score represents a low neighbourhood social status and consists of the average income and the proportion of low-income, low-educated, and unemployed individuals (23). Patients had to be 45–70 years old. The lower age limit for the Hindustani Surinamese was 35 years because of their genetically increased risk of DM. Exclusion criteria were having (had) CMD, use of antihypertensive/lipid-lowering drugs, or having a complete cardiometabolic risk profile within the previous year (see Additional file 1).

Ethical approval was obtained from the Medical Ethics Committee of the Leiden University Medical Centre. Participation in the study followed an 'opt-out procedure': patients could sign a reply card declining participation.

Three-step invitation strategy for stage one: HRA participation

The HRA consisted of six short questions on age, smoking status, BMI, waist circumference, and family history of CVD or DM. Three culturally targeted and personalised invitation steps for the HRA were tested following a funnel design.

Step one

Eligible patients were invited by a personalised, GP-signed letter. Enclosed were the HRA and an information brochure (both with ethnic specific pictures), a tape measure for measuring waist circumference, a reply card declining participation, and a stamped return envelope addressed to the GP. The formulation was simplified to fit the generally lower health literacy levels of our target population. Turkish and Moroccan patients received Turkish or Arabic versions, respectively, in addition to the Dutch materials. After two weeks of non-response, patients received a reminder package. A detailed description of the (cultural) adaptations made in the invitation, HRA, and information brochure can be found in Additional file 2.

Step two

After another two weeks of non-response, patients were called by a trained research assistant on behalf of the GP. Turkish and Moroccan patients were called by Turkish, Arabic, and Berber (which is an oral only language) speaking research assistants. The conversation was structured by a script supporting patients in making an informed decision about (non-)participation. When a participant decided to participate, the HRA was immediately completed by telephone and the HRA risk score was calculated by the research assistant. The national telephone directory was consulted when telephone numbers were missing, unlisted, or inoperative. Patients were approached with a maximum of four call attempts.

Step three

After four failed call attempts, patients were invited face-to-face when visiting their GP for an unrelated consultation. GPs received a pop-up in the electronic patient file of a non-responding patient. The GPs followed a short version of the telephone script to help patients make an informed decision about (non-)participation. When a participant decided to participate, the HRA was immediately completed at the GP practice and the HRA risk score was calculated by the practice nurse. The face-to-face invitation period lasted six months, which was deemed long enough since ethnic minorities and native Dutch patients with a low SES are known to consult the GP up to once or twice a month (24, 25). If patients had not visited the practice within this period, they were classified as final non-responders.

Stage two: PC participation among high-risk individuals

Participants had to calculate their own HRA risk score. Participants with a low risk score were referred to the Dutch health check website where advice for maintaining or improving their lifestyle was provided. Participants with a high-risk score were advised to attend the PC. This advice was provided either written, by phone, or face-to-face, depending on the relevant invitation step. Patients themselves were responsible for making an appointment with the GP. During the first PC, the biometric HRA measures were checked (weight, height, and blood pressure) and lab work on fasting glucose and cholesterol levels was completed. During the second PC, the results were discussed, the cardiometabolic risk profile was drawn, lifestyle advice was provided, and medication was prescribed if necessary (26). Because we only looked at participation in the first consultation, we refer to both consultations as one (‘PC participation’).

Measures

The main outcome measures were response, HRA participation, and PC participation. The secondary outcome measure was HRA risk score.

Response was defined as ‘yes’ if an individual provided a reaction as to whether he/she wanted to participate in the HRA or not and ‘no’ if an individual did not respond at all. It was calculated as a percentage of all patients. Telephone response was calculated as the proportion of postal non-responders, who picked up the phone and indicated an intention to participate or not. Finally, face- to-face response was calculated as the proportion of telephone non-responders, who were approached face-to-face by their GP and indicated an intention to

participate or not. Additionally, to take into account the fact that not all patients visited their GP for an unrelated consultation in the research period, face-to-face response was also calculated as a percentage of those telephone non-responders who actually visited their GP.
HRA participation was defined as 'yes' if the HRA was completed and 'no' if the HRA was not completed. It was calculated as the proportion of responders of each specific invitation step.
HRA risk score was defined as low or high risk and was calculated as the proportion of HRA participants.
PC participation was defined as 'yes' if the PC was attended when having a high-risk HRA score and 'no' if the PC was not attended. It was calculated as the proportion of individuals with a high-risk HRA score.

Covariates

Patient characteristics were: ethnicity (native Dutch/Turkish/Moroccan/Surinamese), gender (male/female), age (30-45/45-50/50-55/55-60/60-65/65+ years), and neighbourhood SES score (>0/0 till −2/-2 till −4/<−4). A low SES score equals a low SES. The average SES score in the Netherlands in 2010 was 0.17 (−7.25 till 3.19), whereas in our study it was −2.14 (−6.23 till 2.88) [23]. The ethnic mix of GP practice variable was divided in three groups: predominantly non-Western patient population, approximately equal combination, and predominantly native Dutch with a low SES patient population. Invitation steps were: mail, phone, and face-to-face.

Data analysis

Descriptive analyses were applied to describe the patient population. Differences in patient characteristics between the ethnic groups were assessed by means of ANOVA. Univariate logistic regression was used to assess whether patient characteristics were or ethnic mix of GP practice was related to response and participation rates. Odds ratios (ORs) regarding the influence of ethnicity on outcome measures were corrected for relevant covariates (p-value <0.05) by means of multivariate logistic regression. As the populations who responded to the various invitation steps logically differed, results were stratified by invitation step.

RESULTS

Demographics

Of the 1690 individuals eligible for invitation, 43 had an unknown or wrongly classified ethnicity, two had started antihypertensives right before start of the study, and one had missing contact details. Exclusion from analyses resulted in 1644 eligible individuals. Slightly more males (54%) than females (46%) were invited (Table 1). The Moroccan group consisted of more males than the native Dutch and Surinamese groups. Participants were on average 50 years old. The native Dutch were older and the Surinamese were younger than the other ethnic groups. The native Dutch and the Turkish had a higher and a lower SES score than the other ethnic groups, respectively.

Response

Total response (those who indicated an intention to participate or not) was 70% (n=1152) of our underserved populations (Fig. 1). Of all individuals invited, 41% (n=681) responded to the postal invitation (Table 2). Of the postal non-responders, 46% (n=443) responded by telephone. Finally, of all telephone non-responders, 5% (n=28) responded face-to-face. When we only considered those non-responders who attended their GP for an unrelated consultation during the research period of 6 months (n=225), response was 12%. Face-to-face results are not presented in the tables as numbers were too small. A comparison between (postal or telephone) responders (n=1125) and non-responders (n=520) revealed that those left over for face-to-face recruitment were more often men ($p \leq 0.001$) and individuals with a low SES score ($p \leq 0.001$).

The higher odds of response among native Dutch groups disappeared when adjusting for relevant covariates. This was mainly explained by differences regarding ethnic mix of GP practice (Table 3). The native Dutch in predominantly non-Western practices did not respond more often than the other ethnic groups, and even significantly less than the Turkish (OR 0.52, 95% CI 0.31-0.88, p=0.014). Additionally, response was higher for all ethnic groups in the mixed and predominantly native Dutch practices when compared to the predominantly non-Western practices (Table 2).

Table 1. Sociodemographic characteristics of all patients eligible for the cardiometabolic health check

	Total (n=1644)			Dutch with low SES (n=437)			Turkish (n=353)			Moroccan (n=344)			Surinamese (n=510)			
	n	**%**	**mean (SD)**	**n**	**%**	**mean (SD)**	**n**	**%**	**mean (SD)**	**n**	**%**	**mean (SD)**	**n**	**%**	**mean (SD)**	***p* value**
Gender																
Male	882	54		220	50		192	54		210	61[a]		260	51		.011
Female	762	46		217	50		161	46		134	39		250	49		
Age (years)	1644	100	50 (7.00)	437	100	52 (6.27)[b]	353	100	51 (5.55)	344	100	51 (6.32)	510	100	47 (7.57)[c]	<.001
Age (cat.)																
35-45	259	16		14	3		8	2		15	4		222	44		
45-50	595	36		160	37		164	46		147	43		124	24		
50-55	392	24		118	27		97	27		93	27		84	16		
55-60	213	13		75	17		48	14		44	13		46	9		
60-65	120	7		45	10		26	7		27	8		22	4		
65+	65	4		25	6		10	3		18	5		12	2		
SES score (score)	1644	100	-2.14 (2.46)	437	100	-0.39 (1.55)	353	100	-3.32 (2.28)	344	100	-2.30 (2.43)	510	100	-2.73 (2.43)	<.001[d]
SES score (cat.)																
> 0	470	29		231	53		48	14		82	24		109	21		
0 till -2	386	24		151	35		57	16		91	26		87	17		
-2 till -4	267	16		34	8		66	19		52	15		115	23		
< -4	521	32		21	5		182	52		119	35		199	39		

[a] Significantly more males than females when compared to the Dutch and Surinamese. [b] Significantly older than the other ethnic groups. [c] Significantly younger than the other ethnic groups. [d] All ethnic groups differed significantly from each other

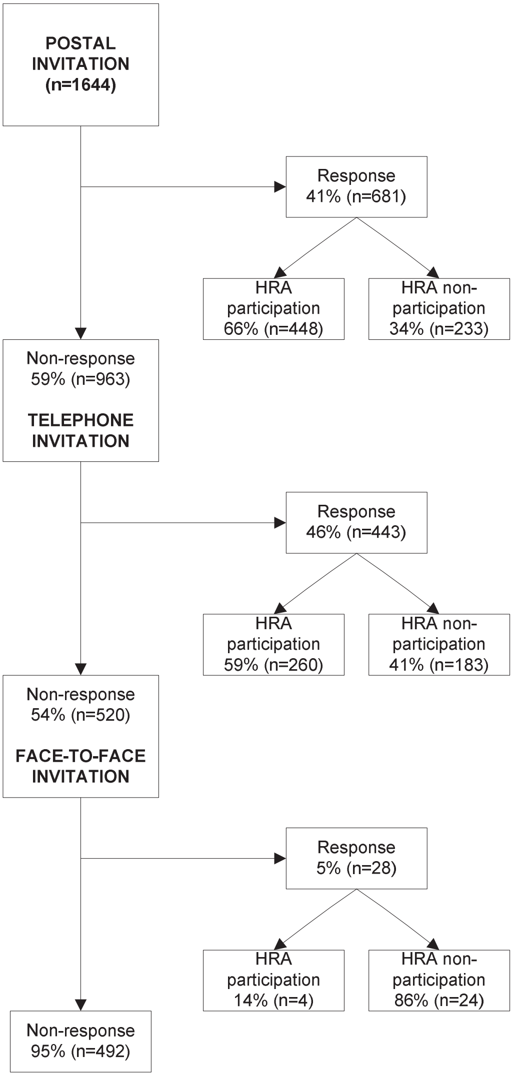

Figure 1. Flowchart response and participation by postal, telephone, and face-to-face invitation step, with response referring to the patient's awareness of the screening and providing a response as to whether or not (s)he intended to participate, and participation to actual participation in the health check

Table 2. Response in postal and telephone steps

		Postal		**Telephone**[a]	
		Response	**Odds ratio (95% CI)**	**Response**	**Odds ratio (95% CI)**
Total group (n=1644)		41% (n=681)		46% (n=443)	
Univariate analyses					
Ethnicity	Dutch[c] (n=437)	49% (n=214)	1.00	57% (n=126)	1.00
	Turkish (n=353)	45% (n=158)	0.84 (0.64-1.12)	47% (n=91)	0.67 (0.46-0.99)[*]
	Moroccan (n=344)	39% (n=134)	0.67 (0.50-0.89)[*]	40% (n=84)	0.51 (0.35-0.75)[**]
	Surinamese (n=510)	34% (n=175)	0.54 (0.42-0.71)[**]	42% (n=142)	0.57 (0.40-0.80)[**]
Gender	Male[c] (n=882)	39% (n=343)	1.00	42% (n=225)	1.00
	Female (n=762)	44% (n=338)	1.25 (1.03-1.53)[*]	51% (n=218)	1.48 (1.14-1.91)[*]
Age	35-45 (n=259)	27% (n=70)	0.51 (0.37-0.70)[**]	46% (n=87)	0.90 (0.63-1.28)
	45-50[c] (n=595)	42% (n=250)	1.00	49% (n=168)	1.00
	50-55 (n=392)	45% (n=176)	1.12 (0.87-1.45)	49% (n=106)	1.02 (0.72-1.43)
	55-60 (n=213)	46% (n=98)	1.18 (0.86-1.61)	44% (n=51)	0.84 (0.55-1.28)
	60-65 (n=120)	48% (n=58)	1.29 (0.87-1.91)	36% (n=22)	0.58 (0.33-1.02)
	65+ (n=65)	45% (n=29)	1.11 (0.66-1.85)	25% (n=9)	0.35 (0.16-0.77)[*]
GP practice[b]	Dutch[c] (n=361)	50% (n=179)	1.00	61% (n=111)	1.00
	Mix (n=193)	54% (n=105)	1.21 (0.86-1.72)	56% (n=49)	0.80 (0.48-1.35)
	Non-Western (n=1090)	36% (n=397)	0.58 (0.46-0.74)[**]	41% (n=283)	0.44 (0.32-0.62)[**]
SES score	> 0[c] (n=470)	46% (n=217)	1.00	54% (n=137)	1.00
	0 till -2 (n=386)	41% (n=160)	0.83 (0.63-1.08)	47% (n=106)	0.75 (0.52-1.07)
	2 till -4 (n=267)	39% (n=104)	0.74 (0.55-1.01)	35% (n=57)	0.46 (0.30-0.68)[**]
	< -4 (n=521)	38% (n=200)	0.73 (0.56-0.94)[*]	45% (n=143)	0.68 (0.49-0.95)[*]
Multivariate analyses					
Ethnicity	Dutch[d] (n=437)	49% (n=214)	1.00	57% (n=126)	1.00
	Turkish (n=353)	45% (n=158)	1.43 (0.98-2.08)	47% (n=91)	1.11 (0.68-1.82)
	Moroccan (n=344)	39% (n=134)	0.88 (0.64-1.22)	40% (n=84)	0.66 (0.43-1.01)
	Surinamese (n=510)	34% (n=175)	1.23 (0.83-1.81)	42% (n=142)	0.93 (0.57-1.89)

[a] As percentage of postal non-responders. [b] Predominant composition of patient population. [c] Reference category univariate analyses. [d] Reference category multivariate analyses, corrected for relevant variables (gender, age, ethnic mix of GP practice, and/or SES score). [*] p≤0.05. [**] p≤0.001.

Table 3. Response and HRA participation, stratified by GP practice and ethnicity

GP practice	**Ethnicity**	**% (n)**	**Response, %[a] (n)**	**HRA participation, %[b] (n)**
Dutch low SES (n=362)	Dutch	74% (n=270)	82% (n=221)	70% (n=154)
	Turkish	3% (n=10)	80% (n=8)	63% (n=5)
	Moroccan	21% (n=75)	80% (n=60)	60% (n=36)
	Surinamese	2% (n=7)	86% (n=6)	50% (n=3)
	Total	*100% (n=362)*	*81% (n=295)*	*67% (n=198)*
Mix (n=194)	Dutch	49% (n=95)	88% (n=84)	64% (n=54)
	Turkish	9% (n=18)	83% (n=15)	53% (n=8)
	Moroccan	39% (n=76)	74% (n=56)	66% (n=37)
	Surinamese	3% (n=5)	80% (n=4)	100% (n=4)
	Total	*100% (n=194)*	*82% (n=159)*	*65% (n=103)*
Non-Western (n=1091)	Dutch	6% (n=73)	58% (n=42)	57% (n=24)
	Turkish	30% (n=325)	72% (n=235)	58% (n=137)
	Moroccan	18% (n=194)	55% (n=106)	56% (n=59)
	Surinamese	46% (n=499)	63% (n=315)	61% (n=193)
	Total	*100% (n=1091)*	*64% (n=698)*	*59% (n=413)*

[a] As percentage of the entire ethnic group. [b] As percentage of responders.

Stage one: HRA participation

Of the 1152 responders, 62% (n=712) participated in the HRA (Table 4). Participation rates among postal responders (n=448, 66%) were comparable to those among telephone responders (n=260, 59%). The participation rate of face-to-face responders was only 14% (n=4). Just as with response, the ethnic differences in HRA participation disappeared when adjusting for relevant covariates, in particular ethnic mix of GP practice. In the predominantly native Dutch practices, the native Dutch patients participated more often in the HRA than the non-Western patients (Table 3). However, in the predominantly non-Western and mixed practices, the native Dutch had comparable or lower HRA participation rates than the other ethnic groups (not significant).

Stage two: HRA risk result and PC participation

Of the HRA participants, 29% (n=207) had a high-risk result (Table 5). When correcting for relevant covariates, the significantly lower risk score of Surinamese participants disappeared. This was mainly explained by age differences between groups. For Hindustani Surinamese, the age threshold to be invited for the HRA was lower due to their genetic higher risk of DM. The risk formula, however, was not adjusted for this heightened risk. Of the high-risk individuals, 59% (n=123) participated in the PC. All non-Western groups had higher odds of PC participation when compared to the native Dutch. We found no differences in risk score and in PC participation between the postal versus the telephone step.

Table 4. Participation rates of responders to postal and telephone steps

		Postal (response n=681)		Telephone (response n=443)	
		Participation	**Odds ratio (95% CI)**	**Participation**	**Odds ratio (95% CI)**
Total group (n=1152)		66% (n=448)		59% (n=260)	
Univariate analyses					
Ethnicity	Dutch[a] (n=347)	76% (n=163)	1.00	55% (n=69)	1.00
	Turkish (n=258)	58% (n=91)	0.43 (0.27-0.66)**	65% (n=59)	1.52 (0.87-2.65)
	Moroccan (n=222)	60% (n=81)	0.48 (0.30-0.76)*	56% (n=47)	1.05 (0.60-1.83)
	Surinamese (n=325)	65% (n=113)	0.57 (0.37-0.89)*	60% (n=85)	1.23 (0.76-2.00)
Gender	Male[a] (n=576)	64% (n=218)	1.00	55% (n=123)	1.00
	Female (n=576)	68% (n=230)	1.22 (0.89-1.68)	63% (n=137)	1.40 (0.96-2.05)
Age	35-45 (n=161)	63% (n=44)	0.86 (0.49-1.49)	57% (n=50)	0.75 (0.44-1.28)
	45-50[a] (n=427)	66% (n=166)	1.00	64% (n=108)	1.00
	50-55 (n=287)	66% (n=117)	1.00 (0.67-1.51)	54% (n=57)	0.65 (0.39-1.06)
	55-60 (n=156)	67% (n=66)	1.04 (0.64-1.72)	51% (n=26)	0.58 (0.31-1.09)
	60-65 (n=83)	59% (n=34)	0.72 (0.40-1.29)	55% (n=12)	0.67 (0.27-1.63)
	65+ (n=38)	72% (n=21)	1.33 (0.57-3.13)	78% (n=7)	1.94 (0.39-9.66)
GP practice	Dutch[a] (n=295)	79% (n=141)	1.00	51% (n=57)	1.00
	Mix (n=159)	72% (n=76)	0.71 (0.40-1.23)	55% (n=27)	1.16 (0.59-2.28)
	Non-Western (n=698)	58% (n=231)	0.38 (0.25-0.57)**	62% (n=176)	1.56 (1.00-2.43)*
SES score	> 0[a] (n=364)	70% (n=152)	1.00	54% (n=74)	1.00
	0 till -2 (n=268)	71% (n=113)	1.03 (0.66-1.61)	56% (n=59)	1.07 (0.64-1.78)
	-2 till -4 (n=169)	71% (n=74)	1.06 (0.63-1.76)	63% (n=36)	1.46 (0.77-2.75)
	< -4 (n=351)	55% (n=109)	0.51 (0.34-0.77)**	64% (n=91)	1.49 (0.92-2.40)
Multivariate analyses					
Ethnicity	Dutch[b] (n=347)	76% (n=163)	1.00	55% (n=69)	1.00
	Turkish (n=258)	58% (n=91)	0.94 (0.50-1.76)	65% (n=59)	1.09 (0.53-2.22)
	Moroccan (n=222)	60% (n=81)	0.71 (0.41-1.23)	56% (n=47)	0.93 (0.52-1.66)
	Surinamese (n=325)	65% (n=113)	1.31 (0.69-2.49)	60% (n=85)	0.88 (0.45-1.71)

[a] Reference category univariate analyses. [b] Reference category multivariate analyses, corrected for relevant variables (ethnic mix of GP practice and/or SES score). * $p \leq 0.05$. ** $p \leq 0.001$.

Table 5. HRA risk score and participation in PC

		HRA risk score		**Participation in PC[a]**	
		High	**Odds ratio (95% CI)**	**Yes**	**Odds ratio (95% CI)**
Total group (n=714)		29% (n=207)		59% (n=123)	
Univariate analyses					
Ethnicity	Dutch[c] (n=232)	35% (n=82)	1.00	46% (n=38)	1.00
	Turkish (n=150)	37% (n=56)	1.09 (0.71-1.67)	68% (n=38)	2.44 (1.20-4.97)*
	Moroccan (n=132)	30% (n=40)	0.80 (0.50-1.26)	68% (n=27)	2.41 (1.09-5.31)*
	Surinamese (n=200)	15% (n=29)	0.31 (0.19-0.50)**	69% (n=20)	2.57 (1.05-6.32)*
Gender	Male[c] (n=344)	38% (n=130)	1.00	63% (n=82)	1.00
	Female (n=370)	21% (n=77)	0.43 (0.31-0.60)**	53% (n=41)	0.67 (0.38-1.18)
Age	35-45 (n=95)	2% (n=2)	0.14 (0.03-0.61)*	0% (n=0)	-
	45-50[c] (n=277)	13% (n=36)	1.00	67% (n=24)	1.00
	50-55 (n=174)	28% (n=48)	2.55 (1.57-4.13)**	69% (n=33)	0.91 (0.36-2.29)
	55-60 (n=93)	55% (n=51)	8.13 (4.75-13.92)**	53% (n=27)	0.51 (0.23-1.16)
	60-65 (n=47)	91% (n=43)	71.97 (24.37-212.50)**	58% (n=25)	0.63 (0.27-1.49)
	65+ (n=28)	96% (n=27)	180.75 (23.82-1371.33)**	52% (n=14)	0.49 (0.19-1.29)
GP practice[b]	Dutch[c] (n=198)	31% (n=62)	1.00	53% (n=33)	1.00
	Mix (n=103)	37% (n=38)	1.28 (0.78-2.12)	50% (n=19)	0.88 (0.39-1.97)
	Non-Western (n=413)	26% (n=107)	0.77 (0.53-1.11)	66% (n=71)	1.73 (0.91-3.29)
SES score	> 0[c] (n=227)	29% (n=65)	1.00	55% (n=36)	1.00
	0 till -2 (n=173)	32% (n=56)	1.19 (0.78-1.83)	55% (n=31)	1.00 (0.49-2.05)
	2 till -4 (n=112)	31% (n=35)	1.13 (0.69-1.85)	60% (n=21)	1.21 (0.52-2.78)
	< -4 (n=202)	25% (n=51)	0.84 (0.55-1.29)	69% (n=35)	1.76 (0.82-3.80)
Multivariate analyses					
Ethnicity	Dutch[d] (n=232)	35% (n=82)	1.00	NA	NA
	Turkish (n=150)	37% (n=56)	1.59 (0.93-2.70)	NA	NA
	Moroccan (n=132)	30% (n=40)	0.92 (0.52-1.63)	NA	NA
	Surinamese (n=200)	15% (n=29)	0.54 (0.28-1.01)	NA	NA

NA: Not applicable. [a] As percentage of individuals with a high HRA risk score. [b] Predominant composition of patient population. [c] Reference category univariate analyses. [d] Reference category multivariate analyses, corrected for relevant variables (gender, age). * p≤0.05. ** p≤0.001

DISCUSSION

Strengths and weaknesses

We developed materials matching the (cultural) preferences of underserved populations facilitating response and HRA participation possibilities. These adjustments were based on information derived from the literature and the results of focus groups (27). This approach, combined with the funnelled invitation design, gave as many individuals as possible the opportunity to make an informed decision about participation, acknowledged previously to be important but difficult to measure (28, 29). With the fast rise of individuals having access to internet we considered using the current online HRA, but after careful deliberation with the populations under study decided it would be fruitless (30). The pragmatic stepwise invitation approach is most feasible to implement in practice and has the greatest potential of being cost-effective. However, we cannot conclude which invitation step is most effective and, therefore, results are difficult to compare with others usually comparing strategies in parallel. Second, we did not receive a response of 30% of the patients. In the scope of reducing health inequalities, it is important to reach precisely those individuals about whom we have no health risk information at all, to find out whether our responders are the groups at highest risk. Third, the HRA was completed by participants themselves, possibly leading to reporting errors and mistakes in calculating one's risk score. Fourth, the telephone calls were performed by research assistants, not the GP practice nurse. The average duration of these calls was nine minutes, however, this included the time necessary to ask some additional questions needed for the study. Approximately six minutes were used to invite a person to participate in the HRA and to complete the HRA. The feasibility of this invitation step in the GP practice needs to be studied further. Finally, the number of GP practices was small because we aimed to recruit practices consisting mainly of specific underserved populations. Therefore, it was impossible to perform multi-level analyses. Theoretically, many practice-level characteristics could influence response and participation, therefore, our conclusions on the effect of practice on outcome measures should be regarded as a first indication and need to be studied further.

Comparison with other studies

Our postal HRA participation rate was lower compared to the general population (31–33). This may, in part, be due to the low percentage of underserved populations in other studies and their use of an additional online HRA. Moreover, in these studies HRA results could not be calculated by patients themselves, returning the HRA might have worked as an incentive. In contrast, a pilot study of the Dutch cardiometabolic health check provided the risk score immediately and found similar participation rates as we did (34).

The telephone invitation increased the number of people making a decision about participation. This is in line with a study among non-participants in cardiovascular screening in which 40% changed their initial decision after receiving additional information about risks and screening (35).

The literature suggests that, if used as a separate strategy, face-to-face strategies are more effective in reaching underserved populations. We found that if used as an additional step in a multi-step strategy, the added value of the face-to-face invitation was negligible. We also saw that the individuals left over for face-to-face recruitment were more often the 'harder-to-reach' men and individuals with a low SES. Additionally, face-to-face strategies are labour-intensive and expensive. Given their lack of feasibility in practice and the high response obtained using a postal and telephone invitation, this latter multi-step approach seems advisable (16, 17).

Ethnic differences in response and HRA participation were no longer significant when adjusting for ethnic mix of GP practice, possibly because of differences in practice size or sociocultural aspects (e.g., stronger assimilation and social cohesion in some neighbourhoods). The predominantly non-Western practices had the lowest response and participation rates. These practices were larger and located in more deprived neighbourhoods where social cohesion is usually lower and both native Dutch and non-Western patients may be more illiterate (36). Unfortunately, we did not have individual SES scores. We did, however, have individual education information for a sample of participants. Using this data did not change our conclusions, justifying the use of a neighbourhood SES score.

The PC participation rate among our high-risk patients was larger than in the pilot study among the general population, but smaller than in two other studies of the Dutch cardiometabolic health check (31, 32, 34). In the latter studies, high-risk participants were invited for the PC, whereas in both the pilot and our study, high-risk participants were personally responsible for scheduling an appointment. In follow-up interviews, high-risk participants who had not attended the PC frequently indicated that they had not been aware or had not understood they had to schedule their own appointment. Thus, it would be advisable for these groups to shift the responsibility of making an appointment to the GP.

Our PC participation rate was larger than in the British NHS health check (7, 11). However, their patients were risk-stratified in advance, and only high-risk individuals were invited. We risk-stratified by means of the HRA. High-risk HRA participants were more likely to also participate in the PC.

The lower age threshold for being invited explained the lower HRA risk score among Surinamese. This emphasizes that a lower threshold is only useful when an ethnicity-based risk score is used (37).

The native Dutch with a low SES refrained most often from PC participation. These groups have been shown to rely less on the GP for lifestyle advice (38).

CONCLUSIONS

Principal findings

Total response was as high as 70% among our underserved populations using a funnelled invitation design. Of the responders, 62% participated in the HRA. Postal response was 41%, of whom 66% participated. Telephone response was 46% among postal non-responders, of whom 59% participated in the HRA. A face-to-face invitation barely increased response and HRA participation rates. Of the high-risk individuals, 59% participated in the PC, irrespective of invitation step.

Implications and future research

Underserved populations can be reached by a low-cost culturally adapted postal approach with a reminder and follow-up telephone calls. The actual cost-effectiveness of this approach needs to be studied. Efforts should be particularly targeted at GP practices in the most deprived areas, focusing on why response and participation fall behind less deprived but still low socioeconomic areas. Future qualitative (ethnographic) studies could be useful. Though a face-to-face approach barely increased response and participation, in the Netherlands, only this ‘case-finding’ approach is currently reimbursed by basic health insurance (18). Considering the socioeconomic inequalities in health, the feasibility of implementing a culturally adapted two-step invitation strategy to increase participation in the HRA should be discussed and studied. Moreover, to increase the likelihood of cost-effectiveness of two-stage screening, as many high-risk individuals as possible need to comply with attending their GP for further testing. If feasible, the responsibility for scheduling an appointment should be shifted toward the GP practice or other healthcare organisations.

ACKNOWLEDGEMENTS

Competing interests

The authors declare that they have no competing interests.

Authors' contributions

MC, SD, WG, and AS filed the proposal for this study. The design, execution, and analysis were mainly done by IG and MC, in close collaboration with the research team. All authors had full access to all of the data in the study and can take responsibility for the integrity of the data and the accuracy of the data analysis. IG is guarantor. All authors read and approved the final manuscript.

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Ethical approval

This study was approved by the Medical Ethical Committee of Leiden University Medical Center (P11.151).

Transparency

The lead author (IG) affirms that the manuscript is an honest, accurate, and transparent account of the study being reported; that no important aspects of the study have been omitted; and that any discrepancies from the study as planned have been explained.

ADDITIONAL FILE 1

Exclusion criteria

- Already having one or more of the following diseases (in ICPC codes):
  - K74 ANGINA PECTORIS
  - K75 ACUTE MYOCARDIAL INFARCTION
  - K76 OTHER CHRONIC ISCHEMIC HEART DISEASES
  - K77 CONGESTIVE HEART FAILURE
  - K78 ATRIAL FIBRILLATION / -FLUTTER
  - K79 PAROXYSMAL TACHYCARDIA
  - K82 COR PULMONARY
  - K83 VALVE DISEASE NOT RHEUMATIC/NOS
  - K84 OTHER HEART DISEASES
  - K86 HYPERTENSION WITHOUT ORGAN DAMAGE.
  - K87 HYPERTENSION WITH ORGAN DAMAGE.
  - K89 TRANSIENT CEREBRAL ISCHEMIA/TIA
  - K90 CEREBROVASCULAR ACCIDENT (CVA) [EX.TIA]
  - K91 ATHEROSCLEROSIS [EX.CORON.,CEREBR.]
  - K92 OTHER DISEASES PERIFERAL ARTERIES
  - T90 DIABETES
  - T93 LIPID DISORDER
  - U88 GLOMERULONEPHRITIS/NEFROSIS
  - U99 OTHER DISEASES URINARY TRACT

- Use of one of the following drugs (in ATC-classifications):
  - A10 ANTIDIABETICS
  - B01/C01/C02/C03/C07/C08/C09 ANTIHYPERTENSIVES
  - C10 ANTILIPAEMICS

- Complete risk profile with a maximum of one year old with a known measurement for all of the following factors:
  - Smoking status
  - Comments on characteristics of diet
  - Physical activity
  - Alcohol use
  - BMI
  - Waist circumference
  - Systolic blood pressure
  - Fasting glucose
  - LDL

ADDITIONAL FILE 2

(Cultural) Adaptations to invitation, HRA, and information brochure

Personalization

In the invitation letter, we used the patient’s demographics, such as gender, last name, and GP name. Examples:
“Dear Mr. Gül” / “Dear Ms. Gül”.
“Kind regards, your GP, H.J. van Duijn, M.D.”

Formulation

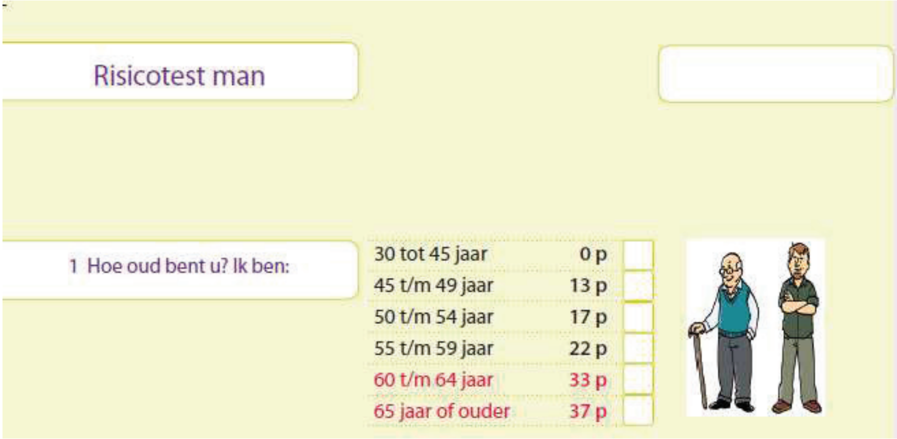
Taking into account the lower (health) literacy levels and language barriers of our population, we used short sentences and started every sentence on a new line. Example:
“Maybe you have doubts about testing your health.
Then please read the brochure.”

Gender and ethnicity targeting

Targeting refers to designing messages for a subgroup of a population taking into account characteristics shared by the subgroup’s members, which we applied to gender and ethnicity.

- Gender- and ethnic-specific pictures (see example HRAs and brochures).
- Reference in text to specific ethnic descent. Example:
  “What factors increase your risk of cardiovascular disease, diabetes, and kidney failure?
  → Surinamese origin.
  You have an increased risk of diabetes.”
- Additional Turkish and Arabic language for Turkish and Moroccan patients (see example HRAs and brochures).
- An anecdote/story of a person with the same gender and ethnic background describing their decision-making process and what participation had brought them. A common, ethnic-specific last name was chosen for this person.
- Common barriers for these groups to screening attendance and information provision on these topics: fear for the test result; no perceived control over one’s health; no perceived effect of the test results; for Dutch and Surinamese patients experiencing no health complaints; and for Turkish and Moroccan patients already attending screening in home country.
- A sentence on the person’s right to do this check, as was found to be of importance for these groups.

Example native Dutch male HRA in Dutch



Risicotest man

1 Hoe oud bent u? Ik ben:

30 tot 45 jaar	0 p	☐
45 t/m 49 jaar	13 p	☐
50 t/m 54 jaar	17 p	☐
55 t/m 59 jaar	22 p	☐
60 t/m 64 jaar	33 p	☐
65 jaar of ouder	37 p	☐

Example Turkish female HRA in Turkish

Risk testi bayanlar

1 Kaç yaşındasınız?

30 - 45 yaş	0 p	☐
45 - 49 yaş	10 p	☐
50 -54 yaş	16 p	☐
55 - 59 yaş	23 p	☐
60 - 64 yaş	29 p	☐
65 yaş ve üstü	37 p	☐

Example Surinamese female brochure in Dutch

Hebt u meer risico op hart- en vaatziekten, suikerziekte en nierschade...?

DOE DE RISICOTEST!

U hebt er recht op!

Example Moroccan male brochure in Arabic

هل أنت أكثر عرضة للإصابة بالأمراض القلبية الوعائية، داء السكري أو أمراض الكلى...؟

إختبر مستوى الخطورة!

لك الحق في ذلك!

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Determinants of participation in a cardiometabolic health check among underserved groups

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ABSTRACT

Cardiometabolic diseases affect underserved groups disparately. Participation in health checks is also lower, widening health inequalities in society. Two-stage screening (non-invasive health risk assessment (HRA) and GP consultations for high-risk individuals) seems cost-effective, provided that drop-out rates are low in both steps. We aimed to explore the process of decision-making regarding HRA participation among underserved groups (45–70y): native Dutch with a lower socioeconomic status (SES), Turkish, Moroccan, and Surinamese participants. We conducted a cross-sectional questionnaire study. The questionnaire comprised the following determinants: a self-formulated first reaction, a structured set of predefined determinants, and the most important barrier(s) and facilitator(s) for HRA completion. We used univariable and (stepwise) multivariate logistic regression analyses to assess which determinants were associated with HRA completion. Of the 892 participants in the questionnaire, 78% (n=696) also completed the HRA. Moroccans and patients from GP practices with a predominantly non-Western population less often completed the HRA. A lower SES score, wanting to know one's risk, not remembering receiving the invitation (thus requiring a phone call), fear of the test result and/or adjusting lifestyle, perceived control of staying healthy, wanting to participate, and perceiving no barriers were associated with completing the HRA. We conclude that our ‘hard-to-reach’ population may not be unwilling to participate in the HRA. A more comprehensive approach, involving key figures within a community informing people about and providing help completing the HRA, would possibly be more suitable. Efforts should be particularly targeted at the less acculturated immigrants with an external locus of control.

INTRODUCTION

Cardiometabolic diseases (cardiovascular disease, diabetes, and kidney disease) are leading causes of death in high-income countries (1). An increased risk of cardiometabolic disease is associated with a lower socioeconomic status (SES) and ethnicity (2, 3). Among ethnic minorities in the Netherlands, cardiovascular disease is particularly prevalent among Surinamese and Turkish people (4 - 6). Turkish, Moroccan, and especially Hindustani Surinamese people have a higher risk of developing diabetes (7). To early identify individuals with an increased risk of cardiometabolic disease, health checks are implemented worldwide (8 - 10). Several studies concluded that two-stage screening could be a cost-effective strategy (11, 12). Two-stage screening usually refers to a non-invasive risk stratification tool, followed by a blood test during an assessment by a healthcare professional. The Dutch cardiometabolic health check imbedded in primary care follows this two-stage approach, comprising a short health risk assessment (HRA) to be completed at home, and two prevention consultations (PCs) with the GP for high-risk individuals according to the HRA (13). This approach implies that patients can refrain from participation on two separate occasions (14). High drop-out rates may induce an even greater problem among underserved groups, as ethnicity and SES are inversely related to health check attendance (15). These groups usually have greater difficulties in making an informed decision about participation (16). Presumably, higher participation rates in stage one (as a result of more informed decision-making) lead to higher participation rates in stage two. To increase informed decision-making about HRA completion, insight into its determinants plays a pivotal role. Few studies specifically investigated reasons for participation in cardiometabolic health checks of underserved groups. Studies reporting determinants in these populations exclusively focus on physical assessments at a doctor's office, not two-stage screening with risk stratification as a first step. Therefore, we conducted prior qualitative research on determinants of hypothetical HRA completion (17). These determinants were mainly of a cognitive nature and included (flawed) risk perceptions, health negligence, (health) illiteracy, and language barriers. With the current study we aim to explore the process of actual decision-making about HRA completion. Research questions were: (1) what are participants' self-formulated first reactions regarding the invitation?; (2) what predefined determinants play a role in completing the HRA?; (3) what are participants' most important barriers and facilitators?; and (4) which of the aforementioned determinants are associated with actual HRA completion?

METHODS

Design and study population

This cross-sectional study is part of a larger study investigating reach and participation of underserved populations in the Dutch cardiometabolic health check.

Between May 2012 and December 2013, patients from six general practices were invited to participate. The six practices were located in The Hague and surroundings, and encompassed both large group as well as solo practices, and urban as well as rural environments. Patients had to be native Dutch with a lower SES or Turkish, Moroccan, or Surinamese. Ethnicity is not registered by GPs in the Netherlands, this was estimated by the researchers based on family name, and was subsequently checked by the GP. The GP also selected the native Dutch patients with a lower SES, which was afterwards corroborated with a neighbourhood SES score (average income, proportion of individuals with a low income, with a low education, and without a paid job) (18). These attributes are captured in one parameter: the socioeconomic status (SES) score and has been shown to be associated with deprivation in a community (19). This score is assessed every four years by interviewing persons representing nearly each street in the Netherlands. The average SES score in the Netherlands is 0.17. Categorization of the SES scores was as follows: average to higher SES (score N 0); lower to average SES (score 0 till −1.9); lower SES (score −2 till −3.9); lowest SES (score≤−4). Patients had to be 45–70 years old except for the Hindustani Surinamese. Their lower age limit was 35 years because of their genetically increased risk of diabetes. Exclusion criteria were: having (had) cardiometabolic disease, using drugs against cardiometabolic disease, or having had a complete cardiometabolic risk inventory less than a year ago (Appendix A). All patients who met the eligibility criteria (n= 1644) were invited.

Three culturally targeted and personalized invitation steps were tested following an increasingly (cost-)intensive ‘funnelled’ design: (1) all patients received a postal invitation; (2) non-reached were approached by telephone; (3) finally non-reached were approached face-to-face by their GP (Appendix B). The latter step was not included as participation rates were very low. Postal materials were provided in Dutch, and in Turkish/Arabic for

Turkish/Moroccan patients, and included the questionnaire and the HRA simultaneously in one package. Patients were called by Turkish, Arabic, and Berber (oral-only language) speaking research assistants.

Ethical approval was given by the Committee Medical Ethics from the Leiden University Medical Center. The study followed an ‘opt-out procedure’ where patients could sign a response form when not interested in participation. The design and results of the larger study have been described in detail elsewhere (20).

The study population of this study consisted of those patients who completed the determinants questionnaire (n = 892), divided into two groups: HRA completers and non-completers. Postal responders filled out a self-administered written questionnaire and telephone responders answered the questionnaire by phone.

The questionnaire

The postal- and telephone-administered questionnaires followed the same structure and were based on our previous work (17). This qualitative study was embedded in a theoretical framework based on the I-change model (Fig. 1), which aims to explain health behaviours and has been applied in studies among native and immigrant populations (21 - 24). The most important determinants in the qualitative study were turned into (simply formulated) questions. The questionnaire was pilot-tested among the target population. We incorporated three steps in the questionnaire: (1) a self-formulated first reaction regarding the invitation for the health check, (2) a structured set of predefined determinants that the participant could indicate to be of importance to his/her HRA completion, (3) most important barrier(s) and most important facilitator(s) regarding HRA completion (Appendix C).

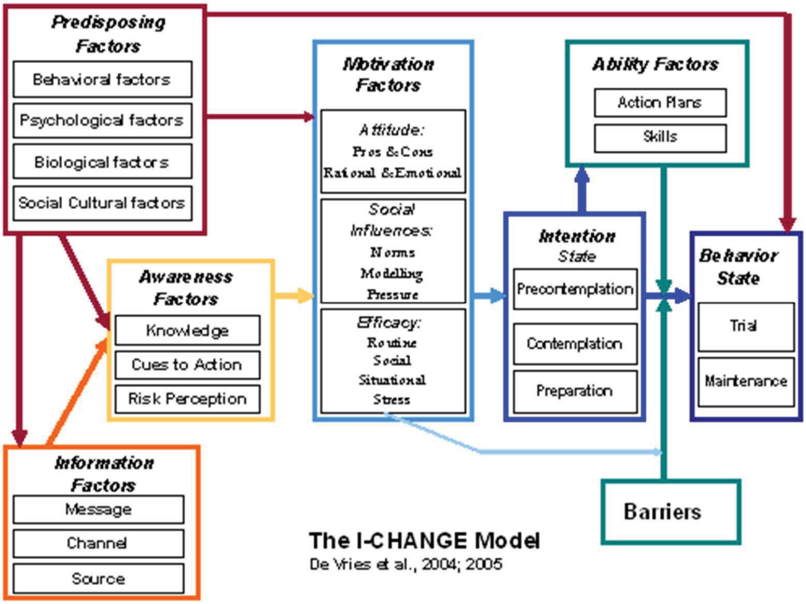

Figure 1. The I-change model, from http://www.maastricht-university.eu/hein.devries/interests/change

Step one: self-formulated first reaction

The questionnaire started with one (open answer) question prompting participants to express their thoughts about the invitation. Any reaction was possible: from positive to negative attitudes regarding the initiative, and from practical barriers to positive social influences. This and the open answer questions of step three were coded inductively and converted into a code tree. Coding was performed by the first author and randomly double coded by the second author. Both authors categorized the codes in the code tree conform the I-change model constructs (Appendix D). Codes and constructs were entered into SPSS. The first reactions were then computed into dichotomized variables representing the different reactions (0 = not mentioned, 1 = mentioned).

Step two: structured set of predefined determinants

The questionnaire continued with a structured set of predefined (multiple-choice) determinant questions. These determinants were categorized under the appropriate I-change construct (see Results, Table 3). Most questions consisted of three answer categories (mostly ‘no’, ‘a little’, ‘yes’), which were dichotomized for a better distribution.

Step three: most important barriers and facilitators

The final two (open answer) questions aimed to unravel what participants perceived to be the most important barrier(s) and facilitator(s) for HRA completion. The telephone questions were rephrased to match the willingness to complete the HRA: e.g. when the participant indicated to be willing to complete the HRA, the barrier(s) question was rephrased as ‘what could be a disadvantage for you of completing the HRA?’. Coding of these questions was performed as described under step one.

Measures

Primary outcome measure was HRA completion (no/yes). Patient characteristics were: gender, ethnicity, age, and SES score. We also looked at the predominant patient population of a GP practice: native Dutch with a lower SES, mixed, or non-Western immigrants.

Data analyses

Descriptive analyses were used to describe the patient population. Differences regarding sociodemographic characteristics between the patients in the postal versus the telephone step were assessed by means of t-tests and ANOVA.

(Univariable) Logistic regression analyses were performed to explore the associations with HRA completion. First, we assessed the influence of the first reactions variable as a categorical variable (reference group: not having provided a reaction); second, the influence of the structured set of predefined determinants; third, the most important barriers and facilitators. The facilitators and barriers were included jointly in the regression model as patients could report more than one barrier or facilitator. Significant associations with HRA-completion ($p < 0.05$) from these initial analyses were included in a final stepwise multivariate logistic regression model. By adding the various constructs in a stepwise manner, we investigated which associations remained significant when adjusting for each other. The first step included the relevant sociodemographic variables (model 1). Each consecutive step added the significant determinants from respectively self-formulated first reactions (model 2), predefined determinants (model 3), and most important barrier(s) and facilitator(s) (model 4).

Because the number of telephone participants who did not complete the HRA was very low, stratified analyses for the telephone step could not be performed. Only strategy-dependent or very notable differences between postal and telephone participants are highlighted in the text.

RESULTS

Demographics

Of the 1644 eligible patients, 1125 responded to the invitation (response rate: 68%) by either completing the HRA or answering that they did not want to participate. Of those who responded to the invitation, 892 participated in the questionnaire (participation rate: 79%). Among the postal responders (n = 681), this percentage was 92% (n = 624); among the telephone responders (n = 444), it was 60% (n = 268) (Fig. 2). Not surprisingly, the questionnaire participants differed from the non-participants regarding all demographic factors except for age (data not shown). The non-participants were more often male ($p < 0.001$), Moroccan or Surinamese ($p < 0.001$), from a GP practice with a predominantly non-Western patient population, and with a lower SES score ($p = 0.039$).

Telephone participants were more often from a GP practice with a predominantly non-Western patient population and had a lower SES score than postal participants (Table 1). Gender, ethnicity, and age were similarly distributed between postal and telephone participants.

Of the questionnaire participants, 78% completed the HRA. Among the postal questionnaire participants, the completion rate was 71%, among the telephone questionnaire participants, it was 94%. A minority of the patients (7%) who did not fill out the questionnaire did complete the HRA.

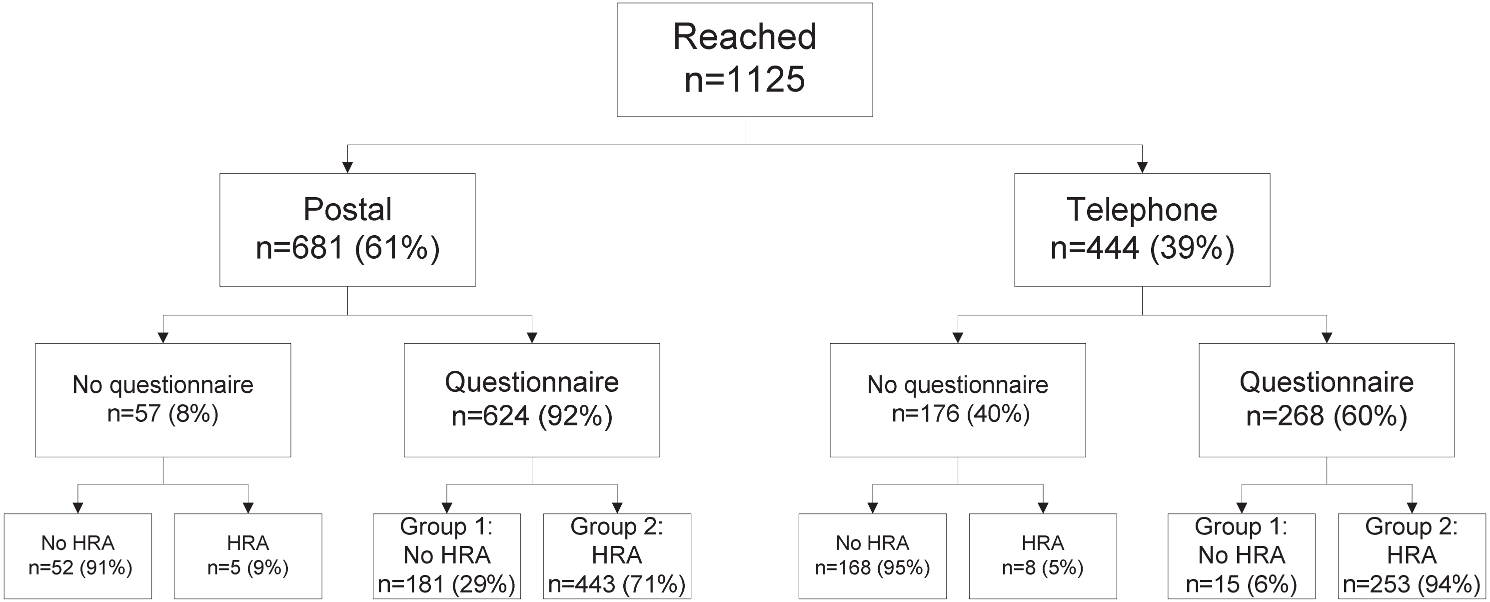

Figure 2. Flowchart of individuals reached by mail or telephone and their participation in the questionnaire and in the health risk assessment (HRA).

The decision making process

Step one: self-formulated first reaction to the invitation

Table 2 presents the association of the self-formulated first reactions with HRA completion. In this table, we describe the frequencies of the different first reactions. The first reaction variables were entered into a univariable regression analysis (reference group: not having provided a reaction) to explore which reactions were most important for HRA completion.

In total, 13% of the participants did not provide a first reaction, most often when they did not complete the HRA. When a first reaction was provided, usually it was a positive or rational attitude (‘good’ or ‘useful’). A positive attitude towards the invitation was associated with HRA completion, as well as expressing the intention to complete the HRA.

Paradoxically, those who mentioned negative information factors not remembering having received an invitation) and barriers to participating (having no time) were more likely to complete the HRA. This was mainly due to the telephone participants who did not remember the postal invitation or said to have had no time to participate, but were apparently able or willing to answer it when approached by phone (separate analyses on postal participants only, ORs not significant anymore: negative information factors $p = 0.627$, barriers $p = 0.477$, data not shown).

Table 1. Sociodemographic characteristics of all questionnaire participants, and stratified by those reached by postal and telephone invitation

	Total (n=892)		**Postal (n=624)**		**Telephone (n=268)**		
	n (%)	**mean (SD)**	**n (%)**	**mean (SD)**	**n (%)**	**mean (SD)**	***p* value**
Gender							
Male	441 (49)		314 (50)		127 (47)		.207
Female	451 (51)		310 (50)		141 (53)		
Ethnicity							
Dutch	264 (30)		193 (31)		71 (27)		.179
Turkish	207 (23)		148 (24)		59 (22)		
Moroccan	169 (19)		120 (19)		49 (18)		
Surinamese	252 (28)		163 (26)		89 (33)		
Age (years)		50 (6.7)		51 (6.6)		49 (6.5)	.247
30-44	111 (12)		60 (10)		51 (19)		
45-49	344 (39)		235 (38)		109 (41)		
50-54	226 (25)		162 (26)		64 (24)		
55-59	115 (13)		90 (14)		25 (9)		
60-64	63 (7)		51 (8)		12 (5)		
65+	33 (4)		26 (4)		7 (3)		
Predominant GP practice population							
Dutch	226 (25)		165 (26)		61 (23)		**.024**
Mix	127 (14)		99 (16)		28 (10)		
Non-Western	539 (60)		360 (58)		179 (67)		
SES score		-2.0 (2.5)		-1.9 (2.4)		-2.2 (2.6)	**.043**
Average to higher (> 0)	283 (32)		204 (33)		79 (29)		
Lower to average (0 till -1.9)	202 (23)		144 (23)		58 (22)		
Lower (-2 till -3.9)	130 (15)		94 (15)		36 (13)		
Lowest (≤ -4)	277 (31)		182 (29)		95 (35)		

Table 2. Descriptive and multivariate logistic regression analyses regarding step one: self-formulated first reaction in response to the HRA invitation, for postal and telephone participants (n=892), coded according to I-change model constructs

I-change construct	HRA completers, %n with this reaction n=696	HRA non-completers, %n with this reaction n=196	OR (95% CI) of completing the HRA	Main exemplification
Not answered	10.3	23.5	1.00	
Information factors; positive	13.2	8.2	1.89 (1.08-3.32)*	'Initiative GP/researcher/other'
Information factors; negative	4.6	1.0	6.44 (1.49-27.90)*	'Cannot remember/have not received invitation'
Awareness factors; positive	12.9	10.2	1.39 (0.83-2.35)	'Obtain insight into risks', 'importance prevention', 'health/healthy aging'
Awareness factors; negative	3.0	3.6	1.06 (0.44-2.58)	'More useful for others'
Motivation factors; positive/rational attitude	57.8	55.1	1.53 (1.06-2.20)*	'Good', 'positive', 'important'
Motivation factors; negative/emotional attitude	2.9	4.6	0.88 (0.38-2.06)	'Unnecessary'
Motivation factors; positive social influences	1.1	0	NA	'Action linkage: help from others'
Intention state; precontemplation	1.7	3.6	0.69 (0.26-1.88)	'Not wanting to participate'
Intention state; contemplation	14.4	8.2	2.30 (1.29-4.08)**	'Wanting to participate'
Barriers	4.2	0.5	13.88 (1.85-104.21)*	'No time'
Ability factors	3.7	3.1	2.10 (0.82-5.40)	'Having no barriers'
Other	4.3	2.6	2.33 (0.87-6.26)	Not specified

CI: Confidence interval. NA: Not applicable. * p<.05. ** p<.01

Step two: structured set of predefined determinants

Table 3 presents the influence of the predefined determinants on HRA completion, analysed by means of univariable logistic regression. Missing values varied from n = 4 (locus of control question) to n = 34 (social influences question), but were usually limited. The HRA completers were more likely than the non-completers of wanting to know their risk, of thinking that staying healthy can be controlled, and of having others finding it important for them to participate. Postal participants having one or more health complaints less often completed the HRA (separate analyses on postal participants only: OR 0.68, 95% CI 0.48–0.97, data not shown), while for the group as a whole (postal and telephone participants) we found no association.

Step three: most important barrier(s) and facilitator(s)

Table 4 presents the most important barrier(s) and facilitator(s) and their relation with HRA completion. A regression analysis was conducted including both the barriers and facilitators to assess which of them were significantly related to HRA-completion. Almost half of the participants did not answer the most important barrier(s) question and were less likely to complete the HRA. Those who did answer most often reported having no barriers (37%) or having a negative or emotional attitude (29%). Positive awareness factors (‘obtaining insight into risks’) were most often mentioned as important facilitator(s) (77%).

Participants who indicated fear (mainly for the test result) to be their most important barrier or who perceived no barriers (hence, ability factor) more often completed the HRA. Participants who expressed obtaining insight into risks and finding it important as their most important facilitator more often completed the HRA.

Table 3. Descriptive and univariable logistic regression analyses of step two: structured set of predefined determinants of HRA completion, for postal and telephone participants (n=892)

	HRA completers, %n agreement with factor, n= 696	**HRA non-completers, %n agreement with factor, n=196**	**OR (95% CI) of completing the HRA**	**Corresponding question[a]**
Information factors; guidance	74.6	70.1	1.25 (0.88-1.78)	‘Do you trust you will get the guidance you need if you have an increased risk?’
Awareness factors; prior experience	25.2	28.4	0.85 (0.59-1.21)	‘Have you ever done a health check for cardiovascular disease, diabetes, or kidney disease before?’
Awareness factors; health complaints	52.7	60.2	0.74 (0.53-1.02)	‘Do you have one or more health complaints at the moment?’
Awareness factors; perceived risk	54.6	59.6	0.82 (0.59-1.13)	‘Do you think the chance of getting these diseases is average to high?
Awareness factors; knowing risk	91.2	85.6	1.73 (1.07-2.80)*	‘Do you want to know what your chance of these diseases is?’
Motivation factors; fear test result	23.4	28.5	0.77 (0.54-1.10)	‘Are you afraid of the test result?’
Motivation factors; fear adjusting lifestyle	25.9	32.0	0.74 (0.53-1.05)	‘Are you afraid that you have to adjust your lifestyle habits?’
Motivation factors; locus of control	59.2	46.2	1.69 (1.23-2.33)***	‘Do you think you can control staying healthy?’
Motivation factors; social influences	67.7	59.9	1.40 (1.00-1.96)*	‘Do others find it important for you to participate?’

CI: Confidence interval. NA: Not applicable. [a] Occasional slight adjustments in formulation so all questions are answered with yes/no. * p<.05. ** p<.01. *** p<.001.

Table 4. Descriptive and multivariate logistic regression analyses regarding step three: most important barrier(s) and facilitator(s) of HRA completion, for postal and telephone participants (n=892)

	HRA completers, %n with this barrier / facilitator n=696	**HRA non-completers, %n with this barrier / facilitator n=196**	**OR (95% CI) of completing the HRA**	**Main exemplification**
Not answered	38.2	62.2	1.00	
Information factors; negative	3.3	4.1	1.10 (0.48-2.55)	‘Privacy’
Awareness factors; negative	12.5	11.2	1.62 (0.97-2.86)	‘No health complaints’
Motivation factors; negative/emotional attitude	18.4	8.2	3.39 (1.94-5.38)***	‘Fear for the test result’, ‘Afraid to have to adjust lifestyle habits’
Motivation factors; negative social influences	0.4	0	NA	‘Action linkage: no help from others’
Intention state; precontemplation	0.6	0.5	0.95 (0.10-9.38)	‘Not wanting to participate’
Barriers	4.0	5.1	1.06 (0.50-2.26)	‘No time’
Ability factors	23.6	10.2	3.57 (2.15-5.95)***	‘Having no barriers’
Other	2.2	2.0	1.56 (0.51-4.79)	
Not answered	11.6	24.5	1.00	
Information factors; positive	4.5	5.1	1.18 (0.53-2.60)	‘Knowledge development GP/researcher/ other’, ‘Trust in guidance’
Awareness factors; positive	68.0	57.1	1.67 (1.16-2.39)**	‘Obtain insight into risks’, ‘healthy aging’
Awareness factors; negative	4.0	4.6	1.22 (0.55-2.72)	‘Already health complaints / already ill / receiving treatment’
Motivation factors; positive/rational attitude	18.1	12.8	1.63 (1.01-2.62)*	‘Important’
Motivation factors; negative/emotional attitude	1.4	0.5	3.64 (0.46-28.97)	‘Worries about health’
Motivation factors; positive social influences	1.9	0.5	3.82 (0.49-29.68)	‘Important for offspring
Motivation factors; negative social influences	0.1	1.0	0.20 (0.02-2.39)	‘Social pressure’
Intention state; contemplation	7.9	9.2	0.80 (0.45-1.42)	‘Wanting to participate’
Ability factors	2.9	4.6	0.85 (0.37-1.95)	‘Having no facilitators’
Other	2.3	3.1	0.90 (0.34-2.40)	

CI: Confidence interval. NA: Not applicable. *p<.05. **p<.01. ***p<.001

Stepwise model of determinants for HRA completion

Significant associations with HRA-completion ($p < 0.05$) from the initial analyses were included in a final stepwise multivariate logistic regression model. Step one of the stepwise model showed that the probability of HRA completion was highest among participants with a lower SES (score−2 till−3.9), and lowest among Moroccan participants and patients from non-Western GP practices (Table 5). Each consecutive model added the significant determinants from respectively self-formulated first reactions (model 2), predefined determinants (model 3), and most important barrier(s) and facilitator(s) (model 4). In model 2, the self-formulated first reactions significant in the initial analyses remained significantly associated with HRA completion when adjusted for characteristics of model 1, except for the positive/rational attitude. In model 3, the significant association between HRA completion and wanting to know one's risk and perceived control over staying healthy remained significant. Positive social influences were no longer significantly associated with HRA completion. In the final model the negative information factors and the contemplation state remained the only significant first reactions associated with HRA completion. The significant associations from model 3 were supplemented with fear regarding the test result and reporting no barriers, which both remained positively associated with HRA completion. The Nagelkerke R square indicates that 24% of the variance was explained by the final model.

Table 5. Stepwise multivariate logistic regression analyses presenting associations with HRA completion for postal and telephone participants, OR (95% CI)

Variable	**Model 1** **OR (95% CI)**	**Model 2** **OR (95% CI)**	**Model 3** **OR (95% CI)**	**Model 4** **OR (95% CI)**
Ethnicity Dutch [a]	1.00	1.00	1.00	1.00
Turkish	0.58 (0.30-1.10)	0.51 (0.26-1.01)	0.47 (0.23-0.95)*	0.61 (0.29-1.27)
Moroccan	0.44 (0.250.78)**	0.40 (0.22-0.73)**	0.35 (0.19-0.66)**	0.38 (0.20-0.74)**
Surinamese	0.89 (0.46-1.73)	0.80 (0.40-1.58)	0.68 (0.34-1.38)	0.82 (0.39-1.72)
GP practice Dutch [a]	1.00	1.00	1.00	1.00
Mix	0.70 (0.37-1.33)	0.70 (0.36-1.35)	0.69 (0.35-1.34)	0.67 (0.33-1.34)
Non-Western	0.45 (0.23-0.88)*	0.44 (0.22-0.88)*	0.43 (0.21-0.87)*	0.33 (0.16-0.69)**
SES score Average to higher (> 0) [a]	1.00	1.00	1.00	1.00
Lower to average (0 till -2)	1.54 (0.92-2.57)	1.41 (0.83-2.39)	1.52 (0.88-2.60)	1.69 (0.96-2.96)
Lower (-2 till -3.9)	1.82 (1.01-3.29)*	1.87 (1.02-3.43)*	1.87 (1.01-3.46)*	2.13 (1.12-4.07)*
Lowest (≤ -4)	1.14 (0.69-1.88)	1.11 (0.66-1.88)	1.12 (0.66-1.91)	1.20 (0.69-2.09)
Self-formulated first reaction[b]:				
Not answered		1.00	1.00	1.00
Information factors; positive		2.24 (1.23-4.06)**	2.13 (1.17-3.88)*	1.76 (0.94-3.31)
Information factors; negative		6.75 (1.53-29.79)*	6.98 (1.56-31.20)*	6.57 (1.29-33.43)*
Motivation factors; positive/rational attitude		1.45 (0.98-2.15)	1.38 (0.92-2.05)	1.22 (0.80-1.88)
Intention state; contemplation		2.34 (1.27-4.30)**	2.24 (1.22-4.12)*	2.19 (1.16-4.13)*
Barriers		9.19 (1.20-70.22)*	7.95 (1.04-61.04)*	4.56 (0.57-36.70)
Predefined determinants:				
Awareness factors; knowing risk			2.36 (1.28-4.34)**	1.99 (1.02-3.88)*
Motivation factors; locus of control			1.61 (1.13-2.30)**	1.63 (1.12-2.36)*
Motivation factors; social influences			1.25 (0.86-1.82)	1.20 (0.81-1.77)
Most important barrier(s)[b]:				
Not answered				1.00
Motivation factors; negative/ emotional attitude				3.25 (1.69-6.25)***
Ability factors				3.85 (2.14-6.95)***
Most important facilitator(s)[b]:				
Not answered				1.00
Awareness factors; positive				1.12 (0.72-1.74)
Motivation factors; positive/rational attitude				1.38 (0.81-2.35)
Nagelkerke R square	0.07	0.15	0.17	0.24

OR: Odds ratio. CI: Confidence interval. [a] Reference category. [b] All answer categories are included, only those significant in first step are presented. * p<.05. ** p<.01. *** p<.001

DISCUSSION

Conclusion

More than three quarters of the questionnaire participants also completed the HRA, mostly patients in the lower SES group. Those who did not were more often of Moroccan origin or from a non-Western GP practice. The self-formulated first reactions were generally positive and many participants expressed the wish to participate. Barriers formulated as first reaction were mostly not remembering receiving the postal invitation or not having (had) time, thus requiring a phone call. Although positive at first, when HRA non-completers further considered participation they more often did not want to know their risk and were less certain of their ability to control staying healthy. Most of the completers reported having no barriers at all. Some of them ventilated fear for the test result, but this did not prevent them from completing the HRA.

Strengths and weaknesses

To our knowledge, this is the first study exploring the decision making process of underserved populations regarding their completion in the first stage (HRA) of a cardiometabolic health check. The main strength of the study is the exertion to study both HRA completers and non-completers in the context of actual decision-making, reducing potential hypothetical bias. Given the lower levels of (health) literacy levels among these underserved groups, questionnaire missings were limited. This study was embedded in an encompassing theoretical framework. We chose this model as health check attendance can be seen as a health behavior and in that sense be studied with this comprehensive model. In addition to our positive experiences in explaining determinants of hypothetical HRA completion (17) we conclude that the I-change model is also valuable in explaining determinants of actual HRA completion.

Some limitations should be noted. First, given the lower (health) literacy levels of our populations, it is debatable whether the participants were able to formulate their answers in a way that really reflected their opinions. Those with the lowest literacy levels may have more often skipped questions that were difficult for them to fill out (i.e. the open answer questions). The open answer questions were also more often skipped by the HRA non-completers. Related to this is the fact that we tried to make the postal and telephone questionnaire as similar as possible. It cannot be denied, however, that during the telephone questionnaire our populations may have more easily elaborated on their answers when compared to the self-administered questionnaire. Also, our rephrasing of the barriers/facilitators question may have resulted in slight differences in information obtained, but not rephrasing would have led to unnatural conversations as the research assistant would not react to the willingness already expressed by the participant. Second, all GP practices were located in The Hague and surroundings. It is, therefore, debatable whether the findings from these practices are generalizable to other practices in the Netherlands, let alone other countries. Nevertheless, we do not expect major differences with other practices with similar lower SES/ethnic groups. We expect the major differences to occur between ethnic groups, and between socioeconomic strata. Increasing the chance of generalizability was the fact that we included both large group as well as solo practices, and urban as well as rural environments. Third, potential residual confounding may have been present due to possible errors in the estimation of ethnicity based on last name and because the SES score was a neighbourhood score and not an individual score. Fourth, in the larger study we have not reached 30% of the patients, of whom we have no information on determinants of their HRA non-completion whatsoever. Aiming to reduce health inequalities, obtaining insight into the determinants of particularly these non-participants is important. Fifth, we used a cross-sectional study design. This means that we cannot conclude that the correlates we found caused the HRA completion. We can conclude that some differences exist between HRA completers and non-completers. Finally, it is possible that our simultaneously sending a questionnaire for research purposes led to distrust among some individuals, as we have shown before to be a potential problem for these vulnerable groups (17). With this simultaneous sending and our structured design of the questionnaire we might also have enabled participants to reflect on participation and to make an informed decision about HRA completion. However, we have no control group, nor a measure for informed decision making, allowing us to draw a conclusion about whether we have succeeded.

Comparison with other studies

We aimed to explore the process of decision making regarding HRA completion among underserved populations. Most first reactions provided were positive, possibly because patients felt obliged to react positively or to provide some excuse for not having completed the HRA. Which raises the question on the value of these reactions for explaining HRA participation. In the final model, most of the associations of these positive first reactions with participation disappeared. The only negative first reaction (not remembering/receiving the invitation) remained significantly associated with HRA participation. This implies that this determinant may not have been used as an excuse, and follow-up by telephone may actually be crucial.

Despite the generally positive self-formulated first reactions, still about a quarter did not complete the HRA. A qualitative investigation among non-responders to the NHS health check concluded that participants viewed the health check positively, but lacked personal relevance (25). They concluded that, perhaps, people considered themselves in good health or had regular contact with primary care for their health complaints. To promote personal relevance and more informed decision making, it has been proposed to provide more personalized risk communication and using telephone/verbal methods (25, 26). In the current study, patients with health complaints less often participated in the postal HRA, but not so in the telephone HRA. This indicates that personalized risk communication by telephone may increase personal relevance. It has been found that up to 40% of non-participants in cardiovascular screening would reconsider their participation decision when given additional information (27).

The argument of not wanting to know one's risk is in line with findings of other studies (28, 29). The current study adds that participation in a health check is influenced by a perceived lack of control over staying healthy. This external locus of control may also imply that the HRA non-completers were the less acculturated minorities, as they more often feel that the doctor, God, or a higher power could help prevent cardiometabolic disease, rather than they themselves (30). Indeed, HRA completion was lowest in non-Western GP practices, situated in neighbourhoods with stronger non-Western communities, with generally lower acculturation rates. Additionally, Turkish and Moroccan immigrants had the lowest HRA completion rates and have been found to be less acculturated than Surinamese immigrants, and less often participate in Dutch society (31). Efforts should, therefore, be particularly targeted at the less acculturated immigrants, emphasizing the modifiability of cardiometabolic disease through lifestyle changes and boosting the confidence in their own abilities.

Interestingly, the most important barrier expressed by the completers was fear of the test result. However, as the results of the predefined set of determinants showed, many were not actually scared of the test result. This barrier may, thus, have been a potential barrier imagined to be applicable to others in the same situation. On the other hand, these participants may have participated despite of their anxiety so that in case of a high-risk test result, they would at least know that they would experience the benefits of early diagnosis (32, 33). Indeed, a large majority of these HRA completers expressed their most important facilitator to be obtaining insight into risks.

Implications and future research

To explore the influence of perceived personal relevance on informed decision making, future studies should focus on personalized/verbalized cardiometabolic risk communication, emphasizing the modifiability of cardiometabolic risk factors and boosting the confidence of these underserved groups. Most of our underserved participants, often depicted as ‘hard-to-reach’, had a positive attitude towards the cardiometabolic health check. This, combined with the strongest correlates being not remembering having received an invitation and having had no time (thus requiring a phone call), gives rise to the idea that these groups may not be hard-to-reach in the sense that they are unwilling to complete the HRA. The results of this pragmatic intervention provide interesting leads for follow-up by means of a controlled study. Special efforts should then be made at those ‘hardest-to-reach’. Amore comprehensive approach, including the involvement of key figures within a community informing people about and providing help with the HRA (reducing the amount of time needed) would possibly be more suitable for these groups. Efforts should be particularly aimed at the less acculturated immigrants.

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Conflicts of interest

The authors declare that there are no conflicts of interest.

Authors' contributions

MC, SD, WG, and AS filed the proposal for this study. The design, execution, and analysis were mainly done by IG and MC, in close collaboration with the research team. The paper was written by IG and critically revised by all authors. All authors had full access to all of the data in the study and can take responsibility for the integrity of the data and the accuracy of the data analysis. IG is guarantor.

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Ethical approval

This study was approved by the Medical Ethical Committee of Leiden University Medical Center (P11.151).

Transparency document

The Transparency document associated with this article can be found, in online version.

Acknowledgments

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APPENDIX A

Exclusion criteria

Having (had) one or more of the following diseases (in ICPC codes):
o K74 ANGINA PECTORIS
o K75 ACUTE MYOCARDIAL INFARCTION
o K76 OTHER CHRONIC ISCHEMIC HEART DISEASES
o K77 CONGESTIVE HEART FAILURE
o K78 ATRIAL FIBRILLATION/-FLUTTER
o K79 PAROXYSMAL TACHYCARDIA
o K82 COR PULMONARY
o K83 VALVE DISEASE NOT RHEUMATIC/NOS
o K84 OTHER HEART DISEASES
o K86 HYPERTENSION WITHOUT ORGAN DAMAGE.
o K87 HYPERTENSION WITH ORGAN DAMAGE.
o K89 TRANSIENT CEREBRAL ISCHEMIA/TIA
o K90 CEREBROVASCULAR ACCIDENT (CVA) [EX.TIA]
o K91 ATHEROSCLEROSIS [EX.CORON.,CEREBR.]
o K92 OTHER DISEASES PERIFERAL ARTERIES
o T90 DIABETES
o T93 LIPID DISORDER
o U88 GLOMERULONEPHRITIS/NEFROSIS
o U99 OTHER DISEASES URINARY TRACT

Use of one of the following drugs (in ATC-classifications):
o A10 ANTIDIABETICS
o B01/C01/C02/C03/C07/C08/C09 ANTIHYPERTENSIVES
o C10 ANTILIPAEMICS

Complete risk profile with a maximum of one year old with a known measurement for all of the following factors:
o Smoking status
o Comments on characteristics of diet
o Physical activity
o Alcohol use
o BMI
o Waist circumference
o Systolic blood pressure
o Fasting glucose
o LDL

APPENDIX B

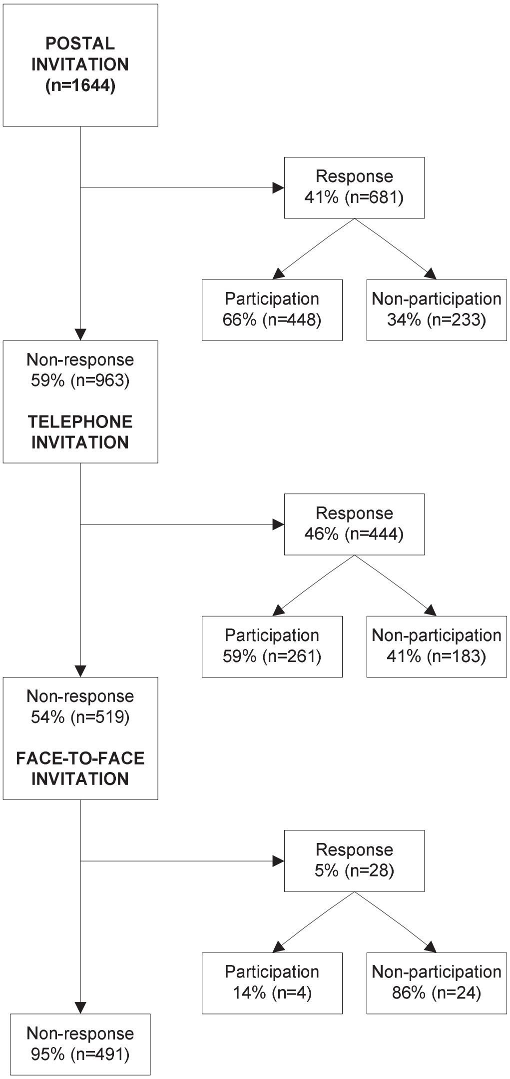

Figure B1. Results of response and participation in three culturally targeted and personalized invitation steps following an increasingly (cost-)intensive 'funnelled' design

APPENDIX C

Question	Answer options
1. What is your first reaction about this invitation?	Open
2. Have you ever done a health check for cardiovascular disease, diabetes, or kidney disease before?	No (or for something else) - Yes, *more* than 1 year ago - Yes, *less* than 1 year ago
3. Are you afraid of the result?	No - A little - Yes
4. Are you afraid that you have to adjust your lifestyle habits?	No - A little - Yes
5. Do you trust you will get the guidance you need if you have an increased risk?	No - A little - Yes
6. Do you have health complaints at the moment?	None - One - A couple
7. How high do you think your chance is of getting these diseases?	Small - Average - High
8. Do you want to know what your chance of these diseases is?	No - Dubiety - Yes
9. Do you think you can control staying healthy?	No - Partly - Yes
10. Do others find it important for you to participate?	No - Little - Yes
11. What is the most important reason for you *not* to participate in the HRA? Of course, this may be another reason than what has been mentioned above. *Also fill out this question if you do participate in the HRA!*	Open
12. What is the most important reason for you to *do* participate in the HRA? Of course, this may be another reason than what has been mentioned above. *Also fill out this question if you do not participate in the HRA!*	Open

APPENDIX D

Code tree assigned to I-change constructs

Predisposing factors

None.

Information factors; positive

Healthcare professional
- o Initiative GP/researcher/other
- o Attention from GP/researcher/other
- o Knowledge development GP/researcher/other
- o Trust in guidance
- o Relationship with GP

Information factors
- o Had understood it
- o Taking the target population into account
- o (Remembered) Having received it

Information factors; negative

Healthcare professional
- o No treatment options
- o Privacy issues

Obligation
- o Feeling of obligation
- o No Feeling of obligation

Information factors
- o Had not understood it
- o Language barrier
- o (Health) Illiteracy
- o Not (remembering) having received it
- o Doubts about content aspects
- o Judgment about materials

Awareness factors; positive

Importance prevention

Health status
- o Obtain insight into risks
- o Obtain certainty about health
- o (Being) Health(y)
- o Healthy aging
- o Believes to be low-risk and wants to know risk
- o Believes to be high-risk and wants to know risk
- o Decrease risks
- o Risk perception with regard to family history
- o Risk perception with regard to lifestyle
- o Never too old
- o Previous experience with a health check
- o No previous experience with a health check

Awareness factors; negative

Health status
- o Too old

- o Already health complaints/already ill/receiving treatment
- o No health complaints
- o Convinced of own health

Social environment
- o More useful for others

Motivation factors; positive/rational attitude

Positive
- o Nice
- o Good
- o Useful
- o Okay
- o Surprising
- o Interesting
- o Happy
- o Relieved
- o Can do no harm
- o Curious
- o Sensible
- o Important
- o Necessary
- o Satisfied
- o Enthusiastic
- o Grateful
- o Positive

Normal/neutral

Health status
- o Not afraid to have to adjust lifestyle habits

Locus of control
- o Believes to control staying healthy

Fear
- o No fear
- o No fear for the test result

Motivation factors; negative/emotional attitude

Negative
- o Not good
- o Not important
- o Unreliable
- o Not interested
- o Don't feel like it
- o Not necessary
- o Strange
- o Doubt
- o Negative

Health status
- o Afraid to have to adjust lifestyle habits
- o Worries about health
- o Ignoring/denial

Healthcare professional
- o Guinea pig

Locus of control
- o Believes not to control staying healthy
- o Religious beliefs

Fear
- o Fear for the test result
- o Fear for the consequences of the test result
- o Fear for doctors/hospitals

  - o Panic/agitation
  - o Fear

Own responsibility

Motivation factors; positive social influences

Social environment
  - o Action linkage: help from others
  - o Important for offspring
  - o Others find it important

Motivation factors; negative social influences

Social environment
  - o Social pressure
  - o Gossip

Intention state; precontemplation

(Non-)Participation
  - o Not wanting to participate
  - o Doubts about participation

Intention state; contemplation

(Non-)Participation
  - o Wanting to participate
  - o Need

Ability factors

Time
  - o Takes little time

Not applicable/none

Barriers

Time
  - o No time
  - o Other priorities
  - o Job
  - o Forgot it
  - o Holidays/in home country/sick

Money issues

Other

Health status
  - o Pregnant

Psychological problems
Other

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5

Determinants of participation in a prevention consultation at the GP, as part of a two-stage cardiometabolic health check among underserved populations

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Submitted

ABSTRACT

Cardiometabolic disease affects underserved groups disparately. Participation in health checks is also lower, widening health inequalities in society. Two-stage screening (non-invasive health risk assessment (HRA) and practice consultations (PC) for high-risk individuals) seems cost-effective, but PC attendance is a vulnerable component. To investigate which determinants play a role in PC attendance, we compared attenders with non-attenders in underserved groups (45-70y): native Dutch with a lower socioeconomic status, Turkish, Moroccans, and Surinamese.

This study was conducted in six general practices in deprived neighborhoods in the Netherlands. Data were obtained during the HRA and during an interview following the PC. After a quantitative comparison between PC attenders and non-attenders, qualitative interview data were coded inductively, counted, and compared in a quantitative way.

Of those with a high-risk HRA score, 71% (n=148) attended the PC, least often native Dutch. We interviewed 91 high-risk participants, of whom 73% (n=66) attended the PC. We found no significant differences between PC attenders and non-attenders in HRA risk parameters or HRA total score. When asked during the HRA, later PC attenders significantly more often trusted getting the guidance they need when at increased risk, and more often experienced health complaints. During the interview following the PC, PC attenders more often experienced health complaints (mainly native Dutch), more often had others finding it important for them to participate (mainly native Dutch), and more often felt obliged to attend (mainly Turkish). The qualitative data added that many participants found it unclear whose responsibility it was to make an appointment for the PC.

Risk communication should cover risk perceptions regarding (lack of) health complaints and should target the close social environment. If feasible, the responsibility of making an appointment should be shifted towards the healthcare provider. The role of personal feelings of obligation should be studied.

INTRODUCTION

Cardiometabolic disease (CMD), such as cardiovascular disease (CVD), diabetes mellitus (DM), and kidney disease, is a leading cause of death in high-income countries (1). An increased risk of CMD is associated with a lower socioeconomic status (SES) and ethnicity (2, 3). Among ethnic minorities in the Netherlands, CVD is particularly prevalent among Surinamese and Turkish people (4-6). Turkish, Moroccan, and especially Hindustani Surinamese people have a higher risk of developing DM (7). To early identify individuals with an increased risk of CMD, health checks are implemented in various countries (8-10). Several studies concluded that two-stage screening could be a cost-effective strategy (11, 12). Two-stage screening usually refers to a non-invasive risk stratification tool, followed by blood tests during an assessment by a healthcare professional. The Dutch cardiometabolic health check imbedded in primary care follows this two-stage approach, comprising a short health risk assessment (HRA) to be completed at home, and two prevention consultations (PC) with the GP for individuals at high-risk according to the HRA (13). Although this approach is efficient, as only individuals who may be at risk according to the first stage are invited for the second stage, it may have drawbacks concerning the possible drop-out risk. This approach implies that patients can refrain from participation on two separate occasions (14). High drop-out rates may be an even greater problem among underserved groups, as ethnicity and SES are inversely related to health check attendance (15). Few studies specifically investigated reasons for (non-)participation in cardiometabolic health checks of underserved groups. Studies reporting determinants in these populations until now exclusively focused on physical assessments at a doctor's office, not on two-stage screening with risk stratification as a first step. Therefore, we conducted prior qualitative research on determinants of hypothetical PC participation after a high-risk score on the HRA (16). It has been reported that being at risk symbolically alters health identity and may produce vulnerability, uncertainty, and anxiety (17). In line with this, we found that most determinants of (hypothetical) PC participation were of an affective nature, and included risk denial, fear of the outcome and its potential consequences (lifestyle changes and medication prescription), and disease-related stigma. To investigate which determinants played a role in actual (non-hypothetical) PC attendance among those who completed the first stage (the HRA) and had a high-risk HRA score, we compared the attenders with the non-attenders of the second stage (PC) regarding: (1) patient and practice characteristics; (2) individual HRA risk parameters and HRA total score; (3) patient-reported determinants of attendance.

METHODS

Design and study population

This mixed-method study was part of a larger study investigating response and participation of underserved populations in the Dutch cardiometabolic health check (18).

Between May 2012 and December 2013, patients from six general practices in deprived neighbourhoods were invited to participate. Patients had to be either native Dutch with a lower SES or of Turkish, Moroccan, or Surinamese origin. Ethnicity is not registered by GPs in the Netherlands, therefore, this was judged by the researchers based on family name, and checked by the GP. The GP also selected the native Dutch patients with a lower SES, which was afterwards corroborated with a neighbourhood SES score (average income, proportion of individuals with a low income, with a low education, and without a paid job) (19). Here, a low status score means a low neighborhood SES. Patients had to be 45-70 years old except for the Hindustani Surinamese, whose lower limit was 35 years because of their genetically increased risk of DMII. Exclusion criteria were: having (had) CMD, using CMD medication, or having had a complete cardiometabolic risk inventory less than a year ago. In total, 1644 patients were invited to participate in the health check. Patients could then decide to complete the HRA and the accompanying questionnaire on determinants of their HRA participation (see paper on determinants of HRA completion (20)). Patients calculated their own HRA risk score; and those with a high-risk score (n=208) were advised to attend the PC. During the PC, measurements on height, weight, blood pressure, fasting glucose, and cholesterol were done, leading to a 10-years risk estimation for cardiometabolic disease (13). All of those 208 high-risk patients were approached by telephone for an interview on determinants of their PC attendance. Patients were called by (Turkish, Arabic, and Berber speaking) research assistants, and received up to four call attempts. All who answered were asked to participate in the interview: either at the time of the call or at a more convenient time of their preference. We used two scripts for the interview: one for PC attenders and one for non-attenders. The status of attender versus non-attender was determined beforehand based on the GP's medical record. A participant was considered an attender when at least two cardiometabolic parameters (such as smoking status, or cholesterol levels) were measured by the GP less than a year ago. For this, it did not matter whether this was done as part of an unrelated consultation or not. Both scripts started with an introduction as to the goal of the interview and the duration. Patients were asked for their verbal informed consent and received a €10,- gift certificate for their participation.

Ethical approval was given by the Committee Medical Ethics from the Leiden University Medical Center (registration number P11.151). The study followed an 'opt-out procedure' where patients could sign a response form when not interested in participation. The design and results of the larger study have been described in detail elsewhere (18).

Correlates of PC attendance

We compared PC attenders and non-attenders as described in the three research questions and made comparisons for the whole high-risk population and for the sample of participants who took part in the interview.

Patient and practice characteristics

Patient characteristics used to describe and compare the populations were: gender; ethnicity (native Dutch / Turkish / Moroccan / Surinamese); age (30-44 / 45-49 / 50-54 / 55-59 / 60-64 / 65+); and SES score (>0 / 0 to -2 / -2 to -4 / <-4). We also looked at the predominant patient population of a GP practice (native Dutch with a lower SES, non-Western, or ethnically mixed).

Individual HRA risk parameters and HRA total score

To assess whether specific components of the HRA were more strongly associated with PC attendance, we compared the individual HRA risk parameters between PC attenders and non-attenders. The HRA risk parameters were: age (categories as above); smoking status (no / yes); BMI (underweight / healthy weight / overweight / obese); waist circumference (healthy / unhealthy); family history of CVD (no / yes); family history of DM (no / yes). We also compared the HRA total score between attenders and non-attenders (for the calculation of this score, see appendix). A high-risk score was a HRA total score of 30 or more for men and 35 or more for women. The maximum score for both men and women was 66.

Patient-reported determinants of attendance

To find out what determinants played a role in PC attendance, we quantitatively assessed this in a structured way at two separate moments (simultaneously with the HRA and at the time of the interview following the PC) and we qualitatively assessed this during the interview following the PC.

The quantitative assessment consisted of a structured set of predefined determinants (described in table 3). Two additional PC-specific questions were asked at the time of the interview following the PC: one about fear of medications/treatment/doctors/hospitals and one about feeling obliged to attend the PC after receiving a high-risk HRA score. The questions were multiple-choice questions, mostly consisting of three answer categories (‘no’, ‘a little’, ‘yes’), which were dichotomized for a better distribution. Participants could provide a clarification with every multiple-choice answer.

The qualitative assessment consisted of a recall of the reactions people felt upon receiving the high-risk HRA result, and the most important barriers and facilitators regarding their PC attendance. Regarding the barriers, PC attenders were asked to recall their doubts about attending the PC, whereas the PC non-attenders were asked about the most important reason why they had not attended the PC. Regarding the facilitators, PC attenders were asked about the most important reason why they had attended the PC and for suggestions to make it more attractive to attend the PC. PC non-attenders were asked for solutions to the most important barriers to PC participation they had provided previously.

Data analyses

Differences regarding patient and practice characteristics and HRA parameters between PC attenders and non-attenders were assessed by means of chi-square and ANOVA analyses. For the HRA total score, we reported medians and interquartile ranges and Mann-Whitney U tests to detect differences between PC attenders and non-attenders. We used chi-square analyses to compare the PC attenders with the non-attenders regarding the dichotomized predefined determinants, assessed at the time of the HRA and following the PC. With multivariate logistic regression analyses we assessed the influence of relevant patient and GP practice characteristics on the association between determinants and PC attendance. As PC attenders and non-attenders differed in ethnicity and GP practice (table 1) we corrected for these characteristics in a multivariate model. We did this separately for ethnicity and GP practice as they were significantly correlated (*r*=-0.543, p<0.001). We considered associations to be significant when p<0.05.

The qualitative data of the interview were drawn up in notes. These notes were coded inductively by IG and discussed with MC. Codes were grouped for the PC attenders and non-attenders separately, were counted, and further discussed qualitatively.

RESULTS

Participant and practice characteristics

Of the 208 participants with a high-risk HRA score who were advised to attend the PC, a little over two thirds (n=148) did (table 1). Those patients who did not attend the PC were more often native Dutch, while participants from practices with a predominantly non-Western patient population more often attended the PC.

We managed to interview 91 of the 208 high-risk participants. Among the interviewed were significantly more Surinamese than Turkish and Moroccans (p=0.024) and significantly fewer participants from GP practices with an ethnically mixed patient population than GP practices with a native Dutch patient population (p=0.012) (data not shown). Of the 91 participants whom we interviewed, almost three quarters (n=66) was a PC attender. The sample interviewed was similar to the whole high-risk group: PC non-attenders were more often native Dutch, while PC attenders were more often from practices with a predominantly non-Western patient population.

Individual HRA risk parameters and HRA total score

We found no significant differences in HRA risk parameters between PC attenders and non-attenders (table 2), although PC attenders in the whole high-risk group more often tended to have a family history of DM (p=0.054). The HRA total score did not significantly differ between PC attenders and non-attenders. We also looked at the differences between PC attenders and non-attenders for those who took part in the interview. Again, we did not find significant differences in HRA risk parameters or the HRA total score, although the PC attenders more often tended to have a family history of CVD (p=0.060).

Table 1. Patient and GP practice characteristics attending versus not attending the PC for the high-risk participants, and for the sample interviewed

	High-risk patients (n=208)			**Sample interviewed (n=91)**		
	Non-attendance PC (n=60), n (%)	**Attendance PC, (n=148), n (%)**	***P* value**	**Non-attendance PC (n=25), n (%)**	**Attendance PC, (n=66), n (%)**	***P* value**
Gender						
Female	26 (43)	51 (34)	0.230	9 (36)	27 (41)	0.669
Male	34 (57)	97 (66)		16 (64)	39 (59)	
Ethnicity						
Native Dutch	37 (62)	45 (30)	**<0.001**	17 (68)	21 (32)	**0.016**
Turkish	9 (15)	47 (32)		4 (16)	19 (29)	
Moroccan	10 (17)	30 (20)		2 (8)	9 (14)	
Surinamese	4 (7)	26 (18)		2 (8)	17 (26)	
Age (years)	Mean: 56 (±7.4)	Mean: 56 (±6.2)	0.295	Mean: 57 (±6.2)	Mean: 55 (±5.9)	0.697
30-49	12 (20)	27 (18)		4 (16)	13 (20)	
50-54	8 (13)	40 (27)		4 (16)	17 (26)	
55-59	17 (28)	34 (23)		7 (28)	19 (29)	
60-64	13 (22)	30 (20)		7 (28)	13 (20)	
65+	10 (17)	17 (11)		3 (12)	4 (6)	
Predominant practice population						
Native Dutch	28 (47)	34 (23)	**<0.001**	17 (68)	18 (27)	**0.001**
Ethnically mixed	14 (23)	24 (16)		2 (8)	8 (12)	
Non-Western	18 (30)	90 (61)		6 (24)	40 (61)	
SES score	Mean: -1.3 (±2.1)	Mean: -2.0 (±2.4)	0.097	Mean: -1.0 (±2.0)	Mean: -1.9 (±2.5)	0.287
> 0	20 (33)	46 (31)		10 (40)	24 (36)	
0 to -2	22 (37)	34 (23)		9 (36)	15 (23)	
-2 to -4	9 (15)	26 (18)		2 (8)	9 (14)	
< -4	9 (15)	42 (28)		4 (16)	18 (27)	

Table 2. HRA parameters and HRA total score for high-risk participants attending versus not attending the PC, and those interviewed attending versus not attending the PC

	High-risk patients (n=208)			**Sample interviewed (n=91)**		
	Non-attendance PC (n=60), n (%)	**Attendance PC (n=148), n (%)**	***P* value**	**Non-attendance PC (n=25), n (%)**	**Attendance PC (n=66), n (%)**	***P* value**
Age (years)						
30-49	5 (8)	22 (15)	0.478	2 (8)	11 (17)	0.560
50-54	12 (20)	35 (24)		6 (24)	15 (23)	
55-59	17 (28)	39 (26)		6 (24)	22 (33)	
60-64	14 (23)	34 (23)		8 (32)	13 (20)	
65+	12 (20)	18 (12)		3 (12)	5 (8)	
Smoking						
No	27 (45)	65 (44)	0.887	9 (36)	29 (44)	0.493
Yes	33 (55)	83 (56)		16 (64)	37 (56)	
BMI						
Under- / healthy weight	16 (27)	27 (18)	0.344	8 (32)	13 (20)	0.405
Overweight	27 (45)	72 (49)		9 (36)	31 (47)	
Obesity	16 (27)	49 (33)		7 (28)	22 (33)	
Waist circumference						
Unhealthy	49 (82)	117 (79)	0.671	20 (8)	49 (74)	0.567
Healthy	11 (18)	31 (21)		5 (20)	17 (26)	
Family history of CVD						
No	41 (68)	85 (57)	0.176	18 (72)	32 (48)	0.060
Yes	19 (32)	61 (41)		7 (28)	32 (48)	
Family history of DM						
No	40 (67)	77 (52)	0.054	15 (60)	30 (45)	0.192
Yes	19 (32)	68 (46)		9 (36)	34 (52)	
HRA risk score	Median: 39 IQR: 10	Median: 38 IQR: 8	0.654	Median: 39 IQR: 10	Median: 38 IQR: 7	0.249

IQR: Interquartile Range

Patient-reported determinants of attendance

The quantitative assessment

At the time of the HRA, only the PC attenders in the interviewed sample significantly more often trusted to get the guidance they would need in case of an increased risk, when compared to non-attenders (table 3), also after correcting for ethnicity and GP practice (table 4). At the time of the interview attenders and non-attenders did not significantly differ in their trust in guidance anymore.

At the time of the HRA and also at the time of the interview, the PC attenders had more often experienced health complaints than the non-attenders. The vast majority of these health complaints were not related to CMD. This association disappeared when correcting for ethnicity and for GP practice, at the time of the HRA (not at the time of the PC). This was mainly because the native Dutch less often attended the PC, but those who did more often had health complaints.

At the time of the interview following the PC, the PC attenders indicated they more often had others finding it important for them to participate (mainly their children and/or spouse). This association disappeared when correcting for ethnicity and for GP practice. This was mainly because native Dutch less often attended the PC, but those who did more often discussed this decision with others and more often had others finding it important for them to attend.

For different reasons, the PC attenders more often felt obliged to attend the PC, such as because they had participated in the first stage (the HRA) already, because the GP asked them to, or because of their own health. This association disappeared, however, when correcting for ethnicity and for GP practice, mainly because the Turkish more often had this feeling than other groups.

The qualitative assessment

When asked about their first reaction upon receiving the high-risk HRA result, several PC attenders (n=23) and non-attenders (n=13) reported that they were already aware of or had expected a high-risk test result. A similar group of attenders (n=17) and a number of non-attenders (n=5) reported they had not been aware of the high-risk test result at the time and had not expected it.

For the PC non-attenders, the most frequently reported barrier was their lack of symptoms (n=8). Additional barriers were having forgotten to make an appointment or not having given this high priority (n=4).

Table 3. Structured set of predefined determinants at the time of the HRA for PC attenders versus non-attenders, and at the time of the interview for PC attenders versus non-attenders

	At the time of the HRA						At the time of the interview		
	All high-risk patients (n=208)			Sample interviewed (n=91)			Sample interviewed (n=91)		
	Non-attendance PC (n=60), n (%)	Attendance PC, (n=148), n (%)	*P* value	Non-attendance PC (n=25), n (%)	Attendance PC, (n=66), n (%)	*P* value	Non-attendance PC (n=25), n (%)	Attendance PC, (n=66), n (%)	*P* value
Do you trust to get the guidance you need if you have an increased risk?									
No	18 (30)	34 (23)	0.234	11 (44)	8 (12)	**0.001**	4 (16)	10 (15)	0.942
Yes	39 (65)	111 (75)		13 (52)	57 (86)		21 (84)	55 (83)	
Do you have one or more health complaints at the moment?									
No	29 (48)	48 (32)	**0.025**	14 (56)	20 (30)	**0.020**	17 (68)	18 (27)	**<0.001**
Yes	29 (48)	97 (66)		10 (40)	44 (67)		8 (32)	47 (71)	
Are you afraid of the test result? Or, for PC: are you afraid of actually being ill?									
No	45 (75)	101 (68)	0.230	18 (72)	44 (67)	0.506	20 (80)	41 (62)	0.105
Yes	13 (22)	45 (30)		6 (24)	21 (32)		5 (20)	25 (38)	
Are you afraid that you have to adjust your lifestyle habits?									
No	35 (58)	87 (59)	0.897	16 (64)	39 (59)	0.415	20 (80)	53 (80)	0.974
Yes	22 (37)	57 (39)		7 (28)	26 (39)		5 (20)	13 (20)	
Are you afraid of medications/treatment/ doctors/hospitals?									
No	NA	NA	NA	NA	NA	NA	22 (88)	53 (80)	0.389
Yes	NA	NA		NA	NA		3 (12)	13 (20)	
Did others find it important for you to participate?									
No	22 (37)	49 (33)	0.550	10 (40)	22 (33)	0.560	18 (72)	32 (48)	**0.044**
Yes	34 (57)	92 (62)		14 (56)	41 (62)		7 (28)	34 (52)	
Did you feel obliged to attend the PC?									
No	NA	NA	NA	NA	NA	NA	21 (84)	40 (61)	**0.034**
Yes	NA	NA		NA	NA		4 (16)	26 (39)	

NA: Not applicable

Table 4. Multivariate analyses presenting associations with PC attendance at the time of the HRA and at the time of the interview, corrected for ethnicity and GP practice

	At the time of the HRA		**At the time of the PC**
	All high-risk patients (n=208), OR (95% C.I.)	**Sample interviewed (n=91), OR (95% C.I.)**	**Sample interviewed (n=91), OR (95% C.I.)**
Do you trust to get the guidance you need if you have an increased risk?[a]	NA	**6.03 (2.02-17.97)**	NA
Corrected for ethnicity	NA	**13.44 (3.04-59.45)**	NA
Corrected for GP practice	NA	**11.94 (2.82-50.45)**	NA
Do you have one or more health complaints at the moment?[a]	**2.02 (1.09-3.76)**	**3.08 (1.17-8.11)**	**5.55 (2.04-15.09)**
Corrected for ethnicity	1.40 (0.72-2.75)	2.16 (0.76-6.12)	**5.24 (1.82-15.08)**
Corrected for GP practice	1.66 (0.86-3.18)	2.62 (0.92-7.45)	**4.78 (1.65-13.80)**
Did others find it important for you to participate?[a]	NA	NA	**2.73 (1.01-7.41)**
Corrected for ethnicity	NA	NA	2.48 (0.66-9.29)
Corrected for GP practice	NA	NA	2.28 (0.79-6.60)
Did you feel obliged to attend the PC?[a]	NA	NA	**3.41 (1.05-11.08)**
Corrected for ethnicity	NA	NA	2.70 (0.75-9.75)
Corrected for GP practice	NA	NA	2.78 (0.79-9.75)

OR: Odds Ratio. NA: Not applicable. [a] Reference category is the answer 'no'

Facilitators for attendance would be improving the information provision about whose responsibility it is to make an appointment, or shifting the responsibility towards the GP, and offering smooth logistic procedures (such as the possibility of evening consultations) (n=4 for all three facilitators).

When asked for final comments the vast majority of PC non-attenders indicated the intention to schedule an appointment for the PC.

The majority of PC attenders could not come up with a barrier (n=21). Those who could mainly reported unawareness of the high-risk test result (n=5), unawareness of their responsibility to make an appointment for the PC (n=8), and time issues (n=7).

Most attenders also had difficulties coming up with facilitating factors (n=11). Those who could reported the same factors as the non-attenders: clear information about responsibility for making an appointment (n=5), shifting the responsibility towards the GP (n=8), and smooth logistic procedures (n=7). Additionally, positive risk perceptions were mentioned as facilitators, mainly lifestyle-related (n=5), obtaining insight into risks (n=5), and a wish for healthy aging (n=6).

DISCUSSION

Principal findings

More than two thirds of the participants with a high-risk HRA score attended the second stage of the health check (the PC). These attenders more often came from GP practices with a predominantly non-Western patient population, whereas non-attenders were more often native Dutch. PC attenders and non-attenders did not differ in their HRA risk parameters, nor in their HRA total score. PC attenders, and especially the native Dutch, more often experienced health complaints than non-attenders; they also more often had children and/or a spouse finding it important for them to attend; and more often felt obliged to attend. At the time of the HRA, PC attenders more often trusted to get the guidance they would need in case of an increased risk. When actually faced with an increased risk, the non-attenders had equal trust to get the guidance they need in comparison with the attenders. Those interviewed indicated that the information provision about whose responsibility it was to make the appointment should be more clear or altogether shifted towards the GP.

Strengths and weaknesses

To our knowledge, this is the first study exploring determinants of attendance of underserved populations regarding their attendance in the second stage (PC) of a two-stage cardiometabolic health check. Insight in the determinants of these underserved high-risk groups may help to decrease health inequalities within society. The main strength of the study is our exertion to include both PC attenders and non-attenders. Considering the lower levels of (health) illiteracy levels among these underserved groups, questionnaire missings were limited. Additionally, questionnaire data were supplemented with interview data. An explanation for our relatively high attendance rate was that both the questionnaire and the interview could be done in one's native language when desired.

Some limitations of this study should be noted. First and most importantly, we wrote down HRA scores in the GP's medical records, after which some GP practices decided to call their high-risk patients and invite them for the PC. We have no insight in how many patients were called or whether GP's brought this HRA score up during an unrelated consultation and, subsequently, scheduled a PC. Nevertheless, given the large number of participants in the interview who were unaware of their high-risk score or their responsibility of making an appointment, we tentatively conclude that this did not happen frequently. Second, patients had to calculate their own HRA risk score and, consequently, make an appointment for the PC in case of a high risk. Both actions may be a bridge too far for these vulnerable groups, and could potentially increase the PC attendance rate when dealt with. Finally, registration of the PC as a specific PC consultation by GP's was poor. It was usually impossible to decide whether measurements were conducted in the context of the PC or not. Our classification of PC attenders and non-attenders for the interview was, therefore, slightly arbitrary. When participants indicated that our classification of them was wrong, we asked for more information, and switched to a different script when necessary.

Comparison with other studies

PC attendance in our study was considerably higher than in a pilot study among the general GP practice population (21) and comparable to two other studies about the Dutch cardiometabolic health check (22, 23). In the latter two studies, high-risk patients were invited to attend the PC. Both in the pilot study and our study, the patient was responsible for scheduling this appointment. Additionally, native Dutch were less inclined to attend the PC in our study, and the study population of the other studies were largely composed of native Dutch. Our results show that it is feasible to achieve an attendance rate among 'hard-to-reach' underserved groups that is higher or comparable to the general population. PC attendance in our study was also higher than in the British NHS health check in deprived, culturally diverse settings, where it was less than 50% (8, 24). In these studies, patients were risk-stratified beforehand and only high-risk patients (based on already known data) were invited. We risk-stratified patients afterwards, based on their HRA. Patients who were faced with their calculated high-risk HRA score were possibly more inclined to attend the PC. Additionally, these patients may have been more motivated to participate in stage two (the PC) as they had already decided to participate in stage one (the HRA).

The native Dutch with a lower SES refrained most often from PC participation. We have described before that the native Dutch more often complete the HRA than the non-Western groups (20), so why do they less often attend the PC? After the initial small effort of completing the HRA, the native Dutch participants may have dreaded comments on their lifestyle habits. We know from the literature that these groups tend to rely less on the GP for lifestyle advice (25). Additionally, these Dutch participants less often experienced health complaints, which may have hampered the acceptance of the high-risk HRA outcome as it may not have fit their illness representations (26). Those native Dutch who did attend the PC, were more often driven by health complaints and were more often encouraged by their social environment to attend. Another explanation may be a high willingness especially among Turkish and Moroccans to visit the GP to receive medical tests (16). It may also be that the reason the non-Western groups less often completed the HRA was that they did not experience health complaints (20). Whereas for the native Dutch completing the HRA was less of an effort, but attending the PC when not seeing the need (when feeling healthy) was. Surprisingly, we found no differences in HRA parameters between PC attenders and non-attenders. We had expected to find that individuals with an unhealthy lifestyle, such as smoking, would be more reluctant to attend the PC, wanting to avoid comments on their unhealthy behavior (25). Possibly, the explanation of non-Western immigrants wanting to receive medical tests outweighed the fact that one's lifestyle would be commented on.

At the time of the HRA, PC attenders had more trust in getting the guidance they would need in case of an increased risk than non-attenders. At the time of the interview, however, the large majority of PC attenders still trusted in getting the guidance they would need, but now the large majority of non-attenders also did. During the interviews it became clear that many PC non-attenders were not unwilling to attend, but had simply not understood that they were responsible for making the appointment themselves. Even those who had attended the PC indicated that the information provision on this topic should be more clear. A recent study on the risk communication of GPs on the Dutch cardiometabolic health check also concluded that few participants with low health literacy levels seemed to understand and/or appreciate the advice to visit their GP when at increased risk (27). The researchers communicated real-life personal risks, however, subsequent decisions participants made in this study were only hypothetical. The researchers conclude that if people would actually (non-hypothetically) be invited by their own GP and perform the test at home, they would possbily be more convinced of the need to visit their GP in case of an elevated risk. Testing this in a real-life setting is exactly what we have done and these researchers hypothesis proved not to be true. Leaving the patient in charge of making that appointment, thus, seems unadvisable, at least for these underserved groups.

The finding that PC attenders more often felt obliged to attend is interesting. A previous study described that Turkish patients felt obliged to go for hepatitis B screening, which was explained by a feeling of obligation to act upon the invitation from a medical organisation and a Muslim's duty to take care of one's body (28). Moreover, participants in this study indicated that making the screening obligatory would not only increase participation rates, it would also reduce the gossip associated with the taboo surrounding the screening: who does and does not attend and what is the outcome? Making the cardiometabolic screening mandatory is impossible and undesirable, but it would be interesting to investigate whether this personal feeling of obligation might be an interesting angle for future risk communication.

Implications and future research

Attendance rates of underserved groups in a two-stage cardiometabolic health check were comparable to attendance rates of the general population. This makes a two-stage screening also feasible for underserved populations. To further increase PC attendance, it seems advisable to shift the responsibility of making an appointment away from the individual towards the healthcare provider. If not feasible, risk communication should more clearly state that it is the individual's responsibility to schedule an appointment. It should also address illness perceptions in which individuals do not accept a high-risk result as long as they do not experience any health complaints, and it should additionally target the close social environment of the individual as they influence a person's decision to attend or not. The role that personal feelings of obligation may play in this respect should be studied.

APPENDIX

HRA risk score calculation for men		
What is your age? I am:	30 – 44 years	0 p
	45 – 49 years	13 p
	50 – 54 years	17 p
	55 – 59 years	22 p
	60 – 64 years	33 p
	65 years or older	37 p
Do you smoke?	No	0 p
	Yes	9 p
What is your BMI?	Underweight	0 p
	Healthy weight	0 p
	Overweight	4 p
	Obesity	12 p
What is your waist circumference?	Less than 94 cm	0 p
	94 cm or more	3 p
Has your father, mother, brother, or sister had a cardiovascular disease before the age of 65?	No	0 p
	Yes	1 p
Does your father, mother, brother, or sister have diabetes type 2?	No	0 p
	Yes	4 p
	HRA total score =	… p

Score less than 30 and all answers **black**: no increased risk
Score less than 30 and one or more answers red: slightly increased risk
Score of 30 or more: increased risk

HRA risk score calculation for women

What is your age? I am:	30 – 44 years	0 p
	45 – 49 years	10 p
	50 – 54 years	16 p
	55 – 59 years	23 p
	60 – 64 years	29 p
	65 years or older	37 p
Do you smoke?	No	0 p
	Yes	9 p
What is your BMI?	Underweight	0 p
	Healthy weight	0 p
	Overweight	4 p
	Obesity	7 p
What is your waist circumference?	Less than 80 cm	0 p
	80 – 87 cm	2 p
	88 cm or more	6 p
Has your father, mother, brother, or sister had a cardiovascular disease before the age of 65?	No	0 p
	Yes	4 p
Does your father, mother, brother, or sister have diabetes type 2?	No	0 p
	Yes	3 p
	HRA total score =	… p

Score less than 35 and all answers **black**: no increased risk
Score less than 35 and one or more answers red: slightly increased risk
Score of 35 or more: increased risk

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6

Risk factors detected and follow-up actions conducted among ‘hard-to-reach’ groups durings the practice consultation of the Prevention consultation: cross-sectional GP record study

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ABSTRACT

Background

The guideline for Dutch GPs *PreventieConsult module Cardiometabool risico (PC)* follows a two-stage approach: (1) an (online) health risk assessment (HRA), (2) additional tests at the general practice for participants with a risk score above the cut-off value. Prerequisites for cost-effectiveness are approaching high-risk groups (lower socioeconomic status (SES) or immigrants) and retaining as many participants as possible in both stages. We investigated in the high-risk patients who went to the GP for additional tests, what risk factors were recorded, and what subsequent actions were undertaken.

Methods

Cross-sectional GP record study in six GP practices in deprived areas of The Hague and surroundings. Between 05-2012 and 12-2013, we invited 1645 patients. Target population: native Dutch with a lower SES, Turkish, Moroccan, and Surinamese (45-70yrs; Hindustani 35-70yrs) with a risk score above the cut-off value (n=208). GP record data were derived from the CVRM-protocol, laboratory data, and GP log.

Results

The number of indicated additional tests conducted was relatively high (71%, n=148), but least so among the native Dutch. Because of incomplete recordings, we could calculate the PC risk score of consultation data for only 3% (n=4) of the participants, which was above the cut-off value for all. We could calculate the CVRM score for 44% (n=66) of the participants, of whom 39% (n=26) fell in the ‘yellow’/’red’ box of the risk table. Medication was prescribed in 20% (n=29) of the cases: from 5% (n=7) oral antidiabetics to 11% (n=17) statins. Lastly, 69% (n=44) of the smokers received a quit-smoking advice, and 36% (n=53) of the participants received other lifestyle advice.

Discussion

It is possible to reach a participation rate among ‘hard-to-reach’ groups comparable to or even higher than among the general population. Focus of attention is that the GP should not only record patient data covered by the classic guidelines but also the other risk factors associated with cardiometabolic disease (like family history), and the (lifestyle) advices provided.

Possibly, appropriate compensation will promote adequate recording of data and follow-up actions, especially important for vulnerable groups. The crucial role that the GP plays especially for these groups is all the more important now the PC has been replaced by the *Persoonlijke Gezondheidscheck* [Personal Health Check], implemented more broadly than in primary care.

WHAT IS KNOWN? WHAT IS NEW?

1. The guideline for Dutch GPs, The Prevention Consultation, module Cardiometabolic risk (PC), follows a two-stage approach: (1) (online) risk assessment, (2) additional (lab) tests at the GP for participants with a risk score above the cut-off value (practice consultations).
2. Inequalities in health gains from screening need to be prevented by targeting high-risk groups (low socioeconomic status (SES) or non-Western immigrants) and retaining as many individuals as possible in both stages.
3. By means of a stepwise invitation strategy it is possible to accomplish a practice consultation participation rate of 71% among ‘hard-to-reach groups’, which is comparable to or even higher than among the general population.
4. Due to incomplete GP consultation recordings we could calculate the PC risk score for a very small percentage of participants only.
5. We could calculate the CVRM score for 44% (n=66) of the participants, of whom 39% (n=26) fell in the ‘yellow’/’red’ box of the risk table.
6. Medication was prescribed to 20% (n=29) of the participants: from 5% (n=7) oral antidiabetics to 11% (n=17) statins, 69% (n=44) of the smokers received a quit-smoking advice, and 36% (n=53) of the participats received other lifestyle advice.

INTRODUCTION

The guideline for Dutch GPs, The Prevention Consultation, module Cardiometabolic risk, was introduced in 2010, complementing existing guidelines. This guideline described the active and systematic detection of, and the care for, individuals with an increased risk of cardiovascular disease, diabetes type 2, and chronic kidney damage. It focused on so-called indicated prevention (1). Recently, the Prevention Consultation (PC) has been replaced by the Personal Health Check (PHC), which also includes a COPD risk test and the so-called Prevention Compass. Additionally, it incorporates the implementation possibilities beyond primary care (2).

The PC follows a two-stage approach: (1) participants complete the (online) health risk assessment (HRA), (2) individuals with a risk score above the cut-off value receive the advice for additional (lab) tests at the GP's office. Although the separate components are evidence-based, the cost-effectiveness of the whole method still needs to be established. Certain studies conclude that two-stage screening can be cost-effective (3, 4). Screening is particularly useful when it reaches not only the 'worried well' but especially the vulnerable, hard-to-reach groups, who more often have an increased risk. Among others, these groups are the non-Western immigrants and natives with a low socioeconomic status (SES) (5-8). A non-Western descent and a low SES are associated with lower health check attendance (8). This selective attendance results in inequalities in health gains which can potentially be achieved by screening. Additionally, retaining as many participants as possible in both stages of the screening process is of great importance. Previous studies about the PC among the general GP population showed substantial drop-out rates, and these rates are potentially higher among groups already harder to reach (7).

To investigate the yield of the PC among aforementioned vulnerable groups, we conducted the CHECK'D (*Cultural Health check Evaluating Cardiometabolic and Kidney Disease*) study. With this study we aimed to increase the participation rates of hard-to-reach high-risk groups in both stages of the Prevention Consultation by means of a (culturally) adjusted stepwise invitation strategy (9). In this paper we report a substudy within CHECK'D: a GP record study in which we investigated what risk factors were found among participants with a high-risk HRA result, and what follow-up actions were conducted. Our research questions were: 1) What risk factors were recorded by the GP? 2) Among what percentage of the patients did the GP/practice nurse conduct follow-up actions (prescription of medication and providing quit-smoking and other (lifestyle) advices)?

METHODS

Study population and design CHECK’D

This cross-sectional GP record study is part of a larger study called CHECK’D. The CHECK’D study was a pragmatic primary care intervention with a stepwise invitation strategy. Between May 2012 and December 2013, we invited 1645 native Dutch with a low SES and non-Western immigrants (Turks, Moroccans, and Surinamese) for participation in the PC. These patients came from six GP practices in deprived neighbourhoods in The Hague and surroundings. We estimated ethnicity on the basis of last name and this was checked by the participating GPs. The GPs selected the native Dutch with a low SES. This was verified by us on group level with a SES status score based on postal code (10). This SES score is a measure for the social status of a neighbourhood. Participants were between 45-70 years old, except for the Hindustani Surinamese, who were invited from the age of 35 years because of their increased risk of diabetes type II (DMII) from an early age. Exclusion criteria were: known cardiometabolic disease; use of antihypertensives, lipid-lowering drugs, or antidiabetics; or an already completed cardiometabolic risk profile of less than a year old. We deployed a culturally-adapted, personalized, stepwise invitation strategy for participation in the HRA: (1) all patients received a written invitation; (2) non-responding patients were approached by telephone; (3) telephone non-responders were approached by their GP when they attended a (non-related) consultation. Written materials were send both in Dutch as well as in Turkish/Arabic to Turkish/Moroccan patients. Turkish and Moroccan patients were called by Turkish, Arabic, and Berber speaking research assistants. During the first practice consultation, physical measurements (weight, height, and blood pressure) were carried out and a referral for lab tests (fasting glucose and cholesterol levels) was provided. Also, the answers of the HRA were checked with the participants. During the second practice consultation, the results of the lab tests were discussed, the 10-year risk of cardiometabolic diseases was calculated, lifestyle advice was provided, and (if necessary) medication was prescribed. For the ease of interpretation of the results we will refer to the two practice consultations as if it were one consultation. Participation in the study followed an ‘opt-out procedure’: patients could return a reply card on which they indicated that they did not want to participate. The CHECK’D study was approved by the medical ethical committee of the LUMC (registration number P11.151). The design and the results of the CHECK’D study have been described in detail elsewhere (9).

Study population and design of this study

Of the 1645 individuals invited, 713 completed the HRA, of whom 29% (n=208) had a risk score above the cut-off value: the study population for this paper. After completing the HRA, these high-risk patients received the test result straight away and were adviced to visit their GP for a practice consultation.

The first author (IG) visited the participating GP practices early 2014 and noted how many patients had attended the practice consultations, as well as the GP record data of these alleged high-risk patients. This data came from the CVRM guideline (provided that this was used), lab results, and the log. Noted data were the date of the practice consultation and the relevant cardiometabolic parameters: smoking status, height, weight, waist circumference, family history of cardiovascular diseases (CVD) and/or DMII, blood pressure, cholesterol ratio, fasting glucose, cardiometabolic medications prescribed (antihypertensives, statins, oral antidiabetics), and quit-smoking, and other lifestyle advices provided. We used these data to calculate the percentage of patients of whom the HRA was checked by the GP and the percentage of patients of whom the parameters from the CVRM and DMII guidelines had been recorded. Besides that, IG noted what factors may have played a role in non-attending the practice consultation (e.g. changing GP practice) from the GP records of no-shows.

Data analysis

We investigated differences in (patient) characteristics (ethnicity, age, SES score, and HRA result) between attenders and non-attenders by means of t-tests and ANOVAs. We present the risk factors in frequency tables: both the HRA parameters checked during the practice consultation (1) as well as the recorded data based on the CVRM and DMII guidelines (11, 12). We present the follow-up actions in the form of medication prescribed and advices provided descriptively.

RESULTS

Approximately 2/3 of the high-risk patients (n=208) attended the practice consultation [**Table 1**]. Native Dutch with a low SES attended the practice consultation less often than patients from non-Western descent. In 78% (n=47) of the no-shows, we found no indications in the GP records of possible reasons for their non-attendance. For the other non-attenders, mental health problems, changing GP practice, mental retardation, not wanting follow-up actions, or a combination of these factors potentially played a role.

Table 1. Characteristics of participants in the practice consultation

	High-risk patients according to the HRA (n=208)		
	Non-attenders practice consultation (n=60), n (%)	**Attenders practice consultation, (n=148), n (%)**	***p* value**
Ethnicity			
Native Dutch	37 (62)	45 (30)	**<0.001**[a]
Turkish	9 (15)	47 (32)	
Moroccans	10 (17)	30 (20)	
Surinamese	4 (7)	26 (18)	
Age (years)	Mean: 56 (±7.4)	Mean: 56 (±6.2)	0.078
30-44	2 (3)	0 (0)	
45-49	10 (17)	27 (18)	
50-54	8 (13)	40 (27)	
55-59	17 (28)	34 (23)	
60-64	13 (22)	30 (20)	
65+	10 (17)	17 (11)	
SES score[b]	Mean: -1.3 (±2.1)	Mean: -2.0 (±2.4)	0.097
> 0	20 (33)	46 (31)	
0 tot -2	22 (37)	34 (23)	
-2 tot -4	9 (15)	26 (18)	
< -4	9 (15)	42 (28)	
HRA result[c]	Mean: 40 (±7.3)	Mean: 39 (±6.3)	0.491

[a] Practice consultation attendance was lower among native Dutch than among other ethnicities.
[b] A lower SES score represents a lower social status of a neighbourhood.
[c] A lower HRA result represents a lower estimated risk of cardiovascular disease, diabetes type 2, and chronic kidney damage (range: 0-66).

[**Table 2**] presents the HRA parameters of the patients who attended the practice consultation. These were the answers the patient had filled out in the HRA, which should be checked by the GP. Notable was the large number of non-recorded data: varying from 35% (n=52) missing smoking status data to 87% (n=129) missing waist circumferences. Due to all these missing data, we could calculate the formal PC risk score for 3% (n=4) of the participants only. All four individuals had a risk score above the cut-off value.

Table 2. Parameters needed to calculate the PC risk score (HRA parameters checked during the practice consultation)

	Attenders practice consultation, (n=148), n (%)
Age[a]	
30-45	0 (0)
45-49	23 (16)
50-54	38 (26)
55-59	37 (25)
60-64	31 (21)
65+	16 (11)
Missing	3 (2)
Smoking status[a]	
No smoker	32 (22)
Smoker	64 (43)
Missing	52 (35)
BMI	
Underweight	3 (2)
Healthy weight	14 (9)
Overweight	31 (21)
Obese	30 (20)
Missing	70 (47)
Waist circumference	
Healthy	2 (1)
Unhealthy	17 (11)
Missing	129 (87)
Family history CVD	
No	35 (24)
Yes	19 (13)
Missing	94 (64)
Family history DMII	
No	9 (6)
Yes	26 (18)
Missing	113 (76)
PC risk score	
No increased risk	0 (0)
Slightly increased risk	0 (0)
Increased risk	4 (3)
No conclusion possible	144 (97)

[a] These parameters are also needed for calculating the CVRM risk score (see table 3), but are not listed twice.

[Table 3] presents the parameters based on the GP guidelines CVRM and DMII. Although the missing data was not as notable as for the PC parameters, still many parameters were unknown: varying from 20% (n=29) missing glucose levels to 35% (n=52) missing smoking status data. We were able to calculate the CVRM risk score for almost half of the participants. Of these individuals, approximately two out of five (39%, n=26) had an (slightly) increased risk (‘yellow’ or ‘red’ box in the risk table (11)). Of those patients with a known glucose level, 23% (n=27) had impaired glucose tolerance or diabetes: relevant in the context of the DMII guideline. In part, these were the same patients who fell under the CVRM guideline. Regarding the follow-up actions during the practice consultation: medication was prescribed to 20% (n=29) of all patients. Oral antidiabetics were prescribed to 5% (n=7) of the patients, antihypertensives to 8% (n=12), and statins to 11% (n=17). Of those patients who were recorded by the GP to be a smoker (n=64), 69% received a quit-smoking advice. In total, 36% (n=53) of the patients received a lifestyle advice regarding nutrition or physical activity or a referral to a dietician or a physical activity coach.

Table 3. Parameters needed to calculate the CVRM risk score and needed to classify according to the DMII guideline

	Attenders practice consultation, (n=148), n(%)
Age[a]	
Smoking status[a]	
Systolic blood pressure	
<120 mmHg	22 (15)
120 tot 140 mmHg	51 (34)
140 tot 160 mmHg	23 (16)
160 tot 180 mmHg	11 (7)
≥ 180 mmHg	4 (3)
Missing	37 (25)
Total cholesterol/HDL ratio	
≤ 4	62 (42)
5	24 (16)
6	16 (11)
7	6 (4)
≥ 8	6 (4)
Missing	34 (23)
CVRM risk score	
No increased risk	40 (27)
Slightly increased risk	17 (12)
Increased risk	9 (6)
No conclusion possible	82 (56)
Fasting glucose	
Normal	92 (62)
Impaired	15 (10)
Diabetes	12 (8)
Missing	29 (20)

[a] These parameters are also needed for calculating the PC risk score and are, thus, already listed in table 2.

DISCUSSION

Answer to the research question

Two out of three patients with a HRA score above the cut-off value actually attended the practice consultation. Many of the HRA parameters were not checked by the GP/practice nurse during the practice consultation, or if they were checked they were not recorded, resulting in a lot of missing data. Of the small number of patients of whom all data was known, everyone had a risk score above the cut-off value. Risk factors for which the GP/practice nurse proceeded to follow the classic guidelines were recorded best, even though still approximately a quarter of the data were missing. More than a quarter of all patients fell into the CVRM guideline and also almost a quarter fell into the DMII guideline (in part the same individuals). Medication was prescribed to one out of five participants. Of all patients, 1/3 received lifestyle advice regarding nutrition or physical activity, or a referral to a dietician or physical activity coach. More than 2/3 of the smokers received a quit-smoking advice.

Strengths and weaknesses

Strength is that we set up the logistics of this study completely according to the practice guideline of the PC, which is useful for the PHC as well. We (culturally) adapted the design and accompanying materials to the specific target populations (9). We obtained the required data in different ways from the GP records.

A limitation of the study was that we estimated ethnicity based on last name, since this is not registered in the Netherland. ‘Mixed’ marriages could have resulted in the incorrect exclusion of non-Western women married to a native Dutch man, and of native Dutch women married to a non-Western man. However, the GPs checked the lists with last names, which makes the likelihood of this bias small.

Even though the GP record study should be a factual reflection of the execution of the practice consultation, we have not obtained insight in what actually has happened during the practice consultation due to the inadequate recordings. We suspect that some components of the PC may have been executed/discussed, but not recorded.

The number of patients provided by the different GP practices varied, in particular because of the varying practice sizes. As a result, possible selection bias cannot be ruled out.

Additionally, the quality of the recordings differed substantially between the GP practices. However, the number of patients and practices were too small to stratify the data. Finally, the willingness of GPs to participate in the study may have resulted in an overly optimistic picture.

Consequences of the results and results of previous research

Participation in the practice consultation in our study was considerably higher than in the pilot study of Nielen *et al* among the general GP practice population (13). It was comparable to two other studies about the PC in which also about 2/3 attended the practice consultation (14, 15). In the latter two studies high-risk patients were invited for participation in the practice consultation. Both in Nielen's pilot and in our study the patient was responsible for making an appointment. Our results show that it is feasible to achieve a participation rate among 'hard-to-reach' groups that it is comparable to the general population, which also holds for the new PHC. We specifically targeted high-risk groups (native Dutch wit a low SES and non-Western immigrants). Study materials were based on exisiting materials of the Dutch Association of GPs but were further developed for these high-risk groups specifically. The materials are suitable and available for GP practices with a (large) proportion of these high-risk patient populations.

Participation in the practice consultation in our study was also higher than that in the British NHS health check, which was less than 50% there (16, 17). In these studies, patients were risk-stratified beforehand and only high-risk patients were invited. In our study, this risk-stratification took place on the basis of a patient's HRA. As a result, HRA completers with a high-risk result were possibly also more inclined to attend the PC as well.

Our detection rates of patients needing care according to a guideline were higher than what was found in studies among the general population. For example, 8% of our patients were diagnosed with diabetes, whereas in the 3 other Dutch studies this percentage varied from 1-3% (13-15). The number of patients who, after the practice consultation, fell in the 'red' box of the CVRM risk table was 6% in our study, comparable to the 3-6% that was found in other studies (14, 15).

A notable finding is that parameters used within the existing guidelines (CVRM and DMII) had less missing data than the parameters used only within the PC. In part, this may be explained by us entering the HRA results in the GP records. Perhaps GPs thought it unnecessary to verify the data, or they did not record deviations between their measurements and the HRA results.

Another possible explanation is that adequate recording of parameters for the CVRM and DMII guidelines is directly related to the financial reimbursement. In a recent Dutch study Nouwens *et al* showed that cardiovascular risk indicators were monitored better for contracted, and, thus, financed diabetes care than for the (at the time) uncontracted, unfinanced COPD care (18). An additional financial incentive for adequate implementation of the PHC will, most likely, improve the quality of the follow-up care. GPs in the United Kingdom (UK) record lifestyle (advices) better than GPs in other European countries, explained in the literature by the fact that they are financially well rewarded for this within their "Quality and Outcome Framework (19). This study showed that the smoking status of a staggering 97% of patients in the UK was recorded, relative to 65% in our study. A quit-smoking advice was given in 85% of the cases in the UK, whereas in our study this was 69%. Our percentage is even relatively high for Dutch standards: a study among Dutch patients who visited their GP showed that in 56% of the cases the GP had informed about their smoking status and that in 44% of the cases a quit-smoking advice was given (20). Dutch research showed that the lack of scientific evidence and the perceived workload (time invested) are the most important barriers to implementation of the PC, next to the uncertainty about the financial reimbursement (21). An ongoing large-scale study must provide the evidence of the cost-effectiveness of the PC (22). Our study shows that adoption of the PC must be combined with thorough implementation arrangements, for example about recording and follow-up of non-responders.

The British also provided other lifestyle advice (nutrition and/or physical activity) more often than the GPs in our study. Notable in our study was, again, the inadequate recordings: often only 'lifestyle advice given' was noted in the GP records. This makes it impossible to continue the counselling in follow-up consultations. Additionally, an occasional referral to a dietician and/or physical activity coach was noted: whether or not community facilities/interventions were used remained unclear. This is a challenge for the new PHC: making use of the numerous community initiatives and adequate GP recording of (the use of) these initiatives. During our study, no protocol for lifestyle advice existed. As a result, content and responsibilities were unclear. Currently, the Healthcare modules Lifestyle have been published by the Dutch Association of GPs (23). There are Modules available about alcohol, physical activity, smoking, and nutrition. There are also guidelines regarding general aspects of lifestyle advice: self-management, immigrants and low literacy, social map, and collaboration. Especially the second and third are documents that can play an important role in the further implementation of the PC among these groups.

Recommendations

To achieve the goals set for the new PHC the vulnerable groups require special attention, because they are often harder to reach and more often have an increased risk. Our study shows that GPs can play an important role in approaching these high-risk groups (selective prevention). Unfortunately, the active involvement of GPs is no longer an explicit part of the PHC (24). Even though this new design of the PHC facilitates the implementation outside primary care, it may hinder the important role of the GP in approaching high-risk groups.

A second important implication of this study is that GPs need to improve their recording of existing risk factors and lifestyle advices provided, especially when they fall outside the classic guidelines. The current inadequate recording does not only limit scientific research, but definitely also limits adequate guidance and follow-up of patients with existing risk factors. Finally, from the results of this study we can conclude that an active role of GPs in the early detection and follow-up of underserved high-risk groups warrants additional reimbursements.

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7

General discussion

GENERAL DISCUSSION

Underserved groups have a poorer (quality-adjusted) life expectancy and an increased risk of cardiometabolic disease. These are the same groups shown to be least likely to attend health checks. This differential uptake of health checks may lead to suboptimal health gains from cardiometabolic screening and contributes to the widening of health inequalities in society. Increasing participation in a health check by improving informed decision-making among these underserved groups is eminent. The aim of this dissertation was, therefore, to obtain insight into the (psychosocial) determinants of participation of underserved groups in both stages of the Dutch cardiometabolic health check (Prevention consultation, module cardiometabolic risk) as well as into the actual response and participation rates in the two stages.

MAIN FINDINGS OF THIS THESIS

During focus group discussions with vulnerable groups (**chapter 2**), potential reasons for not completing the health risk assessment (HRA) were mainly cognitive: (flawed) risk perceptions, health negligence, (health) illiteracy, and language barriers. A face-to-face invitation from a reliable source and a community outreach to raise awareness were perceived as factors facilitating participation. Reasons for not attending the practice consultations (PC) overlapped, but were also more affective: risk denial, fear about the outcome, its potential consequences (lifestyle changes and medication prescription), and disease-related stigma.

The actual response rate among vulnerable groups to an invitation for a cardiometabolic health check was 70% (n=1152), of whom 62% (n=712) completed the HRA (**chapter 3**). Of these 712 HRA participants, 29% (n=207) were considered high-risk, of whom 59% (n=123) attended the PC.

The HRA participation rate was lowest among patients from GP practices with a predominantly non-Western patient population (**chapter 4**). The HRA participation rate was primarily accomplished through the postal and telephone invitations, while the added value of a face-to-face invitation by the GP was negligible (**chapter 3**). Reasons for completing the HRA were: wanting to know one's risk, not remembering receiving the postal invitation (thus requiring a phone call, after which they participated), paradoxically: fear of the test result and/or need for adjustment of lifestyle, perceived control of staying healthy, and wanting to participate (**chapter 4**).

The PC participation rate was lowest among native Dutch with a low SES (**chapter 5**). HRA risk parameters did not differ between PC attenders and non-attenders. Reasons for PC attendance were: trust in getting the guidance needed in case of an increased risk, experiencing health complaints, having others finding it important for them to participate, feeling obliged to attend. Many participants found it unclear whose responsibility it was to make an appointment for the PC.

The GP records of the PC attenders were incomplete: in only 3% (n=4) of the cases the GP had verified all HRA parameters, which were indeed all above the cut-off (**chapter 6**). For 44% (n=66) of the cases we could calculate the cardiovascular risk, which indicated a (slightly) increased risk for 39% (n=26) of the PC attenders. The GPs prescribed medication to 20% (n=29) of the PC attenders, 36% (n=53) received lifestyle advice, and 69% (n=44) of the smokers received a quit smoking advice.

REFLECTION ON MAIN FINDINGS

Reach

With this study, we have managed to reach 70% of our target population whom we provided the opportunity to make an informed decision about participation in a cardiometabolic health check. Still, this means that we did not manage to reach 30% of our target population. From chapter 3 and 4 we know that reach and HRA participation rates were lowest among those from GP practices with a predominantly non-Western patient population, specifically Turkish and Moroccans. These practices were situated in neighbourhoods with stronger non-Western communities, with generally lower acculturation rates. It has been reported that less acculturated minorities more often feel that the doctor, God, or a higher power could help prevent disease, rather than they themselves (external locus of control) (1). A perceived lack of control was indeed seen more often among HRA non-completers than among completers (chapter 4). Additionally, Turkish and Moroccan immigrants have been found to be less acculturated than Surinamese immigrants, and less often participate in Dutch society (2). These observations give rise to the hypothesis that it may be the least acculturated immigrants, with an external locus of control, whom we have not reached despite our extra efforts.

HRA participation

The response rate to the invitation for our cardiometabolic health check was 70% (n=1152), of whom 62% (n=712) completed the HRA. Thus, the HRA participation rate in the overall study population (n=1690) was 42%. This was lower compared to what was found in other studies in the Netherlands (3-5). Those studies found completion rates of 75%, 69%, and 55% respectively. This is most likely explained by the lower percentage of underserved populations in those studies, and their use of an additional online HRA. In those studies, the HRA score was not calculated by patients themselves, as it was in our study. A pilot study of the Dutch cardiometabolic health check in which, identical to our study, participants had to calculate their own risk score, found a lower HRA participation rate than we did, namely 33% (6). This gives rise to the idea that finding out the HRA result from the GP may have worked as an ‘incentive’ to return the HRA.

PC participation

Of the 207 participants who were considered high-risk according to the HRA, 59% (n=123) attended the PC. This PC participation rate was lower than what was found in other studies in the Netherlands (3-5). Those studies found attendance rates of 72%, 69%, and 73% respectively. The pilot study of the Dutch cardiometabolic health check found a lower PC participation rate, namely 36% (6). In the previous paragraph we suggested the hypothesis that finding out an indication of the personal risk seems to be an incentive for returning the HRA. Our PC participation results may imply the same: not providing an indication of the personal risk will result in the incentive of finding out the test result when attending the PC, thus, increasing PC participation rates. Additionally, participants may not have been aware of their responsibility for making the appointment for the PC themselves. From the interviews in chapter 5 we learned that in a large proportion of the cases the non-attenders were not unwilling to attend but had simply not understood that they had a high-risk or that it was their responsibility to make the appointment for the PC.

Our PC participation rate was higher than what was found in studies on the British NHS health check in deprived, culturally diverse settings (7, 8). It should be noted, however, that of their patients, only high-risk individuals (based on already known data) were invited. Our patients were risk-stratified afterwards, based on their HRA. Patients who were faced with their calculated high-risk score were possibly more inclined to attend the PC. Additionally, these patients may have been more motivated to participate in stage two (the PC) as they had already decided to participate in stage one (the HRA).

Method of invitation

Based on findings from our qualitative research (**chapter 2**) and from the literature we had expected the face-to-face invitation strategy by the GP to be most successful (9). The literature suggests that, if used as a separate strategy, face-to-face invitation methods are more effective in reaching underserved groups. We found that, if used as an additional step in a multi-step strategy, the added value of the face-to-face invitation was negligible. Given the related labour-intensity and costs, a multi-step approach combining mailed materials and telephone approaches seems most recommendable. Suggestions to increase the effectiveness of this multi-step approach will be discussed later in the Implications section.

Reasons for (not) participating in the health check

An important aspect of non-participation was flawed risk perceptions. Both in our qualitative study and in our subsequent intervention study we found that a lack of personal relevance in participating in the health check was due to the individual not experiencing any health complaints. One possible solution for this problem is to raise public awareness about the often asymptomatic nature of cardiometabolic disease (10). Another, probably more effective, way to increase personal relevance is to individually tailor the invitation for the health check to important risk factors from the individual's already known cardiometabolic risk profile (age, smoking status, BMI, etc.) (11).

From our focus group discussions and the literature we knew that many individuals would fear the outcome of a health check and would not want to know their risk (12, 13). Interestingly, we saw in chapter 3 that reported fear of the test result was not consistent when asked in a different manner. When asked for the most important barrier in an open-answer fashion, the participants reported fear of the test result. However, when asked in a multiple-choice manner many respondents turned out not to be scared of the test result. Consequently, this barrier may have been a potential barrier imagined to be applicable to others in the same situation, not to the person self. On the other hand, these individuals may have participated despite of their anxiety so that in case of a high-risk test result, they would at least know that they would experience the benefits of early diagnosis (14, 15). Indeed, a large majority of the participants expressed their most important facilitator to be obtaining insight into risks.

Our findings suggest that beside the internal motivation of wanting to know one's risk, external motivations play an important role as well. A well-known example of this is having significant others, such as family members, finding it important for them to participate, described in chapter 2 and 5, as well as in the literature (16-18). A different and contrasting aspect of these social influences is the fear of gossip and social stigma surrounding medical affairs, such as screening. Relatively new is the phenomenon of a personal feeling of obligation, which is not well-described in the literature. In chapter 2 we found that mainly the native Dutch had an aversion of feeling forced to participate, whereas in chapter 5 we found that mainly the Turkish felt obliged to participate. In a Dutch study on hepatitis B screening, this phenomenon was explained by a feeling of obligation to act upon the invitation from a medical organisation, and a Muslim's duty to take care of one's body (19). Participants in our study indicated that making the screening obligatory would not only increase participation rates, it would also reduce the gossip associated with the taboo surrounding the screening.

Increasing the yield of the PC

In chapter 6 we found that the GP records of the PC attenders were very incomplete. For these kinds of prevention programs to work, follow-up of those at risk is crucial. Not surprisingly, the classic cardiovascular and diabetes parameters for which specific care is reimbursed in the Netherlands were much better recorded. The number of cases in which nutrition or physical activity advice was provided substantially fell behind the quit-smoking advices. In the UK, all types of lifestyle advice is better registered in the GP records than in every other European country, likely because GPs are financially rewarded for this in their Quality and Outcomes Framework (20). This framework has, however, been cause of much debate recently.

Although it has reduced socioeconomic inequalities in the delivery of care, it is also related to problems: larger practices getting systematically higher payments than smaller practices for the same level of quality; problems with defining the codes so that people with less specific codes vanished from the registers and subsequently receiving worse care; and a high administrative burden (21). Two advisors of the Quality and Outcomes Framework state that it was not a magic bullet to improve quality and reduce variation, but that quality and safety improvement require multiple strategies (combining persuasion, collaboration, and close alignment of professionals and managers, with the more technical elements of a quality improvement initiative), sustained over time (21). Other European countries, like the Netherlands, should look at what worked in this Framework and adopt these factors to improve the quantity and the quality of GP record registrations.

IMPLICATIONS

In 2015, the Prevention consultation blended into the new “Persoonlijke Gezondheidscheck” (Personal Health check). The Personal Health check also incorporated tools such as the COPD risk assessment and “PreventieKompas” [Prevention Compass]. The latter is an online tool providing employees the opportunity to identify lifestyle, psychological, physical, and family aspects increasing the risk of illness, with the aim to decrease or prevent occupational absenteeism and incapacity. Questionnaires and (optional) supplementary physical examinations and/or lab tests define one’s (online) health report (figure 1). The health report presents modifiable health factors and modifiable disease processes. An individual can click on each of the modifiable health factors and disease processes and receive information about one’s status with regard to that factor. Along with this information one receives practical advice as well as referrals to facilities in the community for follow-up examinations or interventions. In line with its predecessor (the Prevention Consultation), the Personal Health check also offers evidence based risk assessments and interventions only, thereby providing a scientifically sound response to the fragmented supply of (sometimes unreliable) health checks. The Personal Health check is available as an online tool online, and is provided by an individual’s GP, employer, or municipality. An individual can also take the initiative to visit the website and complete some (basic) modules him- or herself.

Figure 1. Health report of the Personal Health check
[Beïnvloedbare gezondheidsfactoren] Modifiable health factors: physical activity; smoking; nutrition; motivation for a healthy lifestyle; weight and waist circumference; blood pressure; cholesterol; alcohol; resilience; glucose; physical occupational balance; and occupation capacity.
[Beïnvloedbare ziekteprocessen] Modifiable disease processes: heart and vascular system; kidneys, lungs, psyche; and mental occupational balance.

Below, we will describe what has changed since the Prevention consultation became part of the Personal Health check, and what the implications of our findings are for the deployment of cardiometabolic screening initiatives such as the Personal Health check. Also, we will discuss the implications of our findings for future research. And finally, we will summarize what the implications of our findings for prevention among underserved groups in general are.

Implications for screening among underserved groups

Method of invitation

The 70% reach of our target population was most likely attributable to the low-cost (culturally) adapted and personalized postal invitation strategy with follow-up telephone call. The postal invitation strategy was the standard method of invitation at the time. We found that the follow-up telephone call increased the number of people making a decision about participation. This is in line with a Danish study among non-participants in cardiovascular screening, in which 40% changed their initial decision after receiving additional information about risks and screening (22). The Personal Health Check, relies solely on an online method. This does not seem to fit the underserved groups as good as it fits non-immigrants and those with a higher SES. In a decade's time, the use of e-health services overall has increased: access to the internet increased, as well as the number of people who used an e-health service (23). However, immigrants and those living in low SES neighbourhoods are still less likely to use e-health services. What is worse, disparities by ethnicity and SES seem to widen over time (23). Focusing solely on online methods, therefore, will rather increase health inequalities than reduce them.

Invitation strategies for screening initiatives have relied to a large extent on traditional methods: postal, telephone, face-to-face, online, etc. We believe, however, that reach can be increased, especially among underserved groups, by expanding these basic strategies with a more comprehensive community approach (24-26). This approach can include, and may not be limited to: mouth-to-mouth publicity from key figures, and family and friends advising to participate or participating themselves; community workers explaining what to expect from the health check and the potential benefits; health check participation in a well-known location within the community, preferably with (supported) internet access provided, leading to more flexible drop-in, a more informal location and staff, and more opportunities to receive, understand, and ask questions about (the results of) the health check; involving family and friends in the patient's lifestyle advice and/or treatment to increase acceptance and diminish the stigma associated with 'being different' (ill or high-risk); key figures within the community, such as an Imam, helping to eliminate some of the taboo as well during their sermons (24-26).

Setting

The Prevention Consultation was especially embedded in primary care, whereas the Personal Health check is also embedded in settings outside primary care, such as the occupational environment and the home environment (in case health insurance companies or municipalities provide this service). Also for the Personal Health check high-risk patients will remain visiting their GP for a practice consultation. The reason for a focus on recruitment outside primary care is that structural financing remains a problem in the primary care setting. One of the main reasons is the current lack of evidence concerning the cost-effectiveness of the Prevention Consultation. However, the social business case, based on the Social Return On

Investment method, has shown to be positive (27). Every euro invested the Prevention Consultation yields €2,38 in social value (such as prolonged occupational participation and reduced burden of disease). Unfortunately, the costs and benefits are not equally distributed among stakeholders (figure 2): primary healthcare professionals invest more money than they get in return. Therefore, the healthcare insurance companies have been approached to embrace the Personal Health check, because a large proportion of the benefits are theirs. Some health insurance companies now offer their clients the opportunity to participate in the Personal Health check with supplementary insurance arrangements. We believe that this will less often benefit the underserved groups, as people with a lower income (usually those with a lower SES) less often choose for a supplementary insurance policy (28). Also, certain employers now offer their employees a voucher for the Personal Health check. Unfortunately, people with a low and middle educational level, usually those with a lower SES, are twice as often unemployed as people with a high educational level (29). Non-Western immigrants are even three times as often unemployed as native Dutch (29). Finally, municipalities have been approached to play a role in the implementation of the Personal Health Check. It is at this time unclear whether municipalities will put extra efforts in underserved groups. If they will, this provides excellent opportunities. Municipalities are well aware of their most deprived neighbourhoods and can target these communities specifically. The social business case also calculated the cost/benefit ratio of a combined primary care/municipal health service effort (27). In that scenario, the municipal health service would take care of the guidance towards the first stage (HRA) of the Prevention Consultation; primary care professionals would take care of the second stage (PC). The social business case of this scenario remained negative: GP practices would still have to invest more than they would receive in return. However, our studies add certain elements that may turn this business case positive (thus, the (social) yield is larger than the money invested), at least when deployed to reach underserved groups. First, the municipal health services are well suited to provide the community outreach described above. Secondly, the trusting relationship with the GP as authority to provide screening such as this (24, 30). Finally, structural reimbursement for the implementation of the Personal Health Check is likely to increase the number of participating GP practices, which in turn will decrease the overall costs (27).

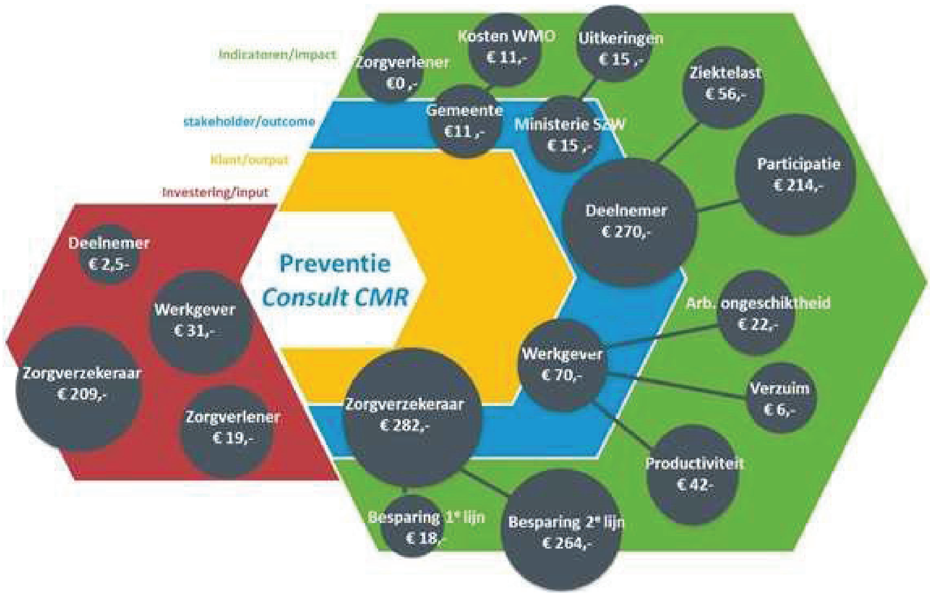

Figure 2. Social Return On Investment (SROI) overview of social and economic costs and benefits of the Prevention Consultation
[Investering/input] Investment/input from health insurance company (€209,-), employer (€31,-), healthcare professional (€19,-), and participant (€2,5).
[Klant/output] Customer/output, the Prevention Consultation.
[Stakeholder/outcome] Stakeholder/outcome, health insurance company (€282,-), participant (€270,-), employer (€70,-), Ministry of Social Affairs (€15,-), and municipality (€11,-).
[Indicatoren/impact] Indicators/impact in the form of savings in hospital care (€264,-), participation (€214,-), burden of disease (€56,-), productivity (€42,-), occupational incapacity (€22,-), savings in primary care (€18,-), savings in social benefits (€15,-), savings in costs from the Social Support Act (€11,-), and absenteeism (€6,-).

Appointment for the PC

We found (in chapter 3) that almost 60% of those with an increased risk according to the HRA attended the PC. This means that about 40% of those who are advised to attend the PC did not do this. As we described above, this may in part have been the lack of 'incentive' of finding out the test result from the GP, and in part the unawareness of the own responsibility of making an appointment for the PC. A prerequisite of cost-effectiveness of the cardiometabolic health check is PC attendance of as many high-risk participants as possible: lifestyle changes and risk reductions purely based on a high-risk HRA result are highly unlikely. Under the heading Implications for future research hereunder, the issues with regard to the (lack of) evidence regarding cost-effectiveness are further described. Shifting the responsibility of making the appointment for the PC towards the GP, and disclosing the HRA result in the ensuing consultation seem promising in optimizing health gains from screening.

Naturally, the practical implications regarding, for example, privacy and technical aspects of such a measure need to be carefully sorted out first.

Implications for future research

Hardest-to-reach

As we described above, our observations give rise to the hypothesis that it may be the least acculturated immigrants, with an external locus of control, whom we have not reached despite our extra efforts. It would be an interesting challenge to investigate whether the least acculturated groups in the Netherlands are indeed the 'hardest-to-reach' among the underserved groups. Non-response research is difficult, and it may be virtually impossible to ever reach everyone within a certain population. An important question to ask is, therefore, how much extra effort do we want to invest in these groups who really are the hardest-to-reach among the underserved groups? What is the cut-off for accepting which proportion of the Dutch population will never be reached? Setting a clear cut-off for reach may be undesirable, however, striving for engaging in a dialogue with every individual in a study (or other project) population seems plausible. Less acculturated immigrants have been shown to have a higher perceived susceptibility to disease (1). Perceived susceptibility has been correlated with taking preventive action. This may provide a unique opportunity for healthcare professionals to start the dialogue, and provide the individual with the correct information about the modifiability of cardiometabolic risk factors. The concept of (culturally) tailoring would be interesting to further study in this context. The two most important elements of tailoring are: 1) it is directed toward individuals, not groups (which is called 'targeting' in that case); and 2) it is based on known (i.e. measured) differences that exist between individuals (31). Although culture is a shared group characteristic, individuals can have varying levels of certain cultural beliefs. Tailoring a health-related message may, thus, also be based on relevant cultural elements that are more compelling to some than others. The findings of our studies may be used to further investigate the effect of the cultural tailoring we used to promote informed decision-making among underserved groups to participate in a cardiometabolic health check. For this, the 'black box' of tailoring needs to be systematically unravelled and incorporated in the design of a future study. A useful framework would be that of Hawkins *et al* who propose a 2 x 3 matrix of two classes of goals and three strategies of tailoring in which some strategies match better to some goals than to others (32). The two classes of goals comprise: 1) enhancing cognitive preconditions for message processing; and 2) enhancing message impact through modifying behavioural determinants of goal outcomes. The three tailoring strategies comprise: 1) personalization to increase attention or motivation to process messages by conveying, explicitly or implicitly, that the communication is designed specifically for ‘you’; 2) feedback to present individuals with information about themselves, obtained during assessment or elsewhere; and 3) content matching to direct messages to individuals’ status on key theoretical determinants (knowledge, outcome expectations, normative beliefs, efficacy, and/or skills) of the behaviour of interest.

Risk perceptions

We saw in our studies that many (flawed) risk perceptions are present among underserved groups, one of the most prominent being that individuals feel healthy because of the often asymptomatic nature of cardiometabolic disease and, thus, are less motivated to take action. Besides tailoring risk information to the individual, it has been justly pointed out in the literature that risk factor control is a multidimensional challenge of which patient motivation is only one element (33). It requires knowledge of the disease and its precursors and is strongly influenced by the environment in which patients live. Promising results have been shown to increase an individual’s adherence to preventive cardiovascular (drug) therapies when coronary artery calcium imaging was used in addition to risk stratification (34, 35). Cost-effectiveness of this approach has not been established but it may also provide an interesting lead to raise public awareness. Strategies from cancer awareness campaigns may provide an interesting basis. For example, the international body of literature supports pictorial cigarette pack warnings as much more effective than text-only warnings (36). A similar approach to visualize asymptomatic cardiometabolic risk to raise public awareness may warrant future research.

Cost effectiveness

One of the most important questions to ask, however, is whether screening - and more specifically two-stage screening - is (cost-)effective for underserved groups. Although the components of the Dutch cardiometabolic health check are evidence-based and validated, its overall cost-effectiveness is still under study (37). As a result, there has been much debate about whether to screen for cardiometabolic disease and, if so, what approach works best. Those who support (two-stage) cardiometabolic screening argue that, although the cost-effectiveness of the Dutch cardiometabolic health check has not been shown, there is sufficient international literature indicating the cost-effectiveness of a two-stage screening. For example, Khunti *et al* state that a risk stratification tool followed by a screening blood test is the most cost-effective method of screening for diabetes and abnormal glucose tolerance (38). Also, Pandya *et al* state that non-laboratory based cardiovascular risk assessment can be useful as the initial component of a multistage screening approach in primary cardiovascular disease prevention, potentially avoiding 25-75% of laboratory testing (39). A risk stratification tool as a first step is simple, fast, inexpensive, non-invasive, and reliable (40, 41). Additionally, pilot studies using a two-stage screening approach report satisfactory response and yield (3, 4, 42, 43).

Those who do not support (two-stage) cardiometabolic screening argue that the questionnaire as first risk stratification tool is an obstacle for patients and that a higher response rate can be obtained when individuals are invited for a consultation directly (44). They also argue that the current lack of insurance compensation for costs made (such as the €10,- start-up costs of the Personal Health Check, and the costs of the additional laboratory tests) disadvantage the underserved groups unequally. Non-Caucasians and people with a low SES are less future-oriented, which affects their health and disease management in various ways, for example, by feeling less susceptible to the consequences of disease (45, 46). If that is the case, then why pay costs for a situation (unknown disease) perceived to be unlikely? Health behaviour competes for people’s time and energy (and money!) against other activities. Taken into account their increased disease and mortality risks and their decreased investment in health behaviour, the final inequality in health outcomes is greater than the initial inequality in socioeconomic conditions (47). Then, there is the argument that risk scores are too much driven by age: those younger than 45 years hardly ever have increased risk, while those older than 60 almost always have. Population risk rates are translated into personal risks leading to medicalization of a group of people who are not (yet) ill. This absolute risk approach is said to lead to overdiagnosis and overtreatment of the elderly at the expense of younger people (48, 49). Focus should therefore not be on risk stratification tools, but on modifiable risk factors of all individuals, young and old. Lastly, a systematic review did not show that health checks reduce morbidity or mortality, neither overall nor for cardiovascular causes, although they increased the number of new diagnoses (50). However, a couple of remarks to these findings should be made. First, changes in risk factors or delivery of preventive services were not investigated. Second, most of the included trials were from years ago and consequently diagnosis and treatment differed from what would be used today. Third, as many physicians already screen for cardiovascular risk factors in patients whom they judge to be at risk during a consultation for an unrelated issue, many people at high-risk may have already been identified. This dilutes the potential benefits from systematic screening. Finally, individuals participating in an health check more often have a higher socioeconomic status, a Western origin, lower cardiovascular risk, less cardiovascular morbidity, lower mortality, and are more often health-conscious (42, 50-52).

Thus, the high-risk two-stage approach to cardiometabolic disease prevention in its current form seems to widen health inequalities and is an example of the "Inverse Care Law". This Inverse Care Law states that *the availability of good medical care tends to vary inversely with the need for it in the population served. Those in the poorest health gain the lowest net health benefits from intervention. This disadvantage can occur at every stage in the process, from the person's beliefs about health and disease, and actual health behaviour, to presentation, screening, risk assessment, negotiation, participation, program persistence, to treatment adherence* (53). Consequently, focus should be on underserved groups.

The cost-effectiveness of the high-risk two-stage approach specifically targeting underserved groups is currently under study, both in the Netherlands as elsewhere (37, 53).

Implications for prevention in the future

In the previous paragraph we argued that cardiometabolic screening should be more directed at underserved groups. However, we believe that this is not enough to tackle the health gap. A coordinated approach combining cardiometabolic screening targeting underserved groups with population-based prevention approaches may be most effective in tackling the ever-growing health gap between groups in a society. Is the time right for such a combined approach?

The Government's focus on own responsibility

As we described above, the current political environment in the Netherlands has a focus on curative (not preventive) healthcare, and relies to a large extent on a person's own responsibility (an 'active patient' or 'active civilian'). Policy documents contain terms such as "the patient as partner", "self-management", and "autonomous control". In 2011, a new definition of health was developed by Huber *et al.*: *The ability to adapt and self-manage in the face of social, physical, and emotional challenges of life* (54). This definition fits the current opinion that people should and are capable of playing an active role regarding their health. In 2006, the idea of active patients taking their own responsibility received another boost by the introduction of the Healthcare Law (‘Zorgverzekeringswet’) and the Healthcare Market Law (‘Wet Marktordening Gezondheidszorg’): individuals were all of a sudden customers or clients in the competitive healthcare market. The idea was that when people chose their insurance company they would consciously look at the quality of the healthcare purchased by insurers. However, each year only a limited number of people actually change insurance companies and if they do so, financial considerations play the most important role (55). Also, even though the government is capable of coercive measures against unhealthy behaviour, such as fines and taxes, these measures are not broadly implemented because they would go against the right of self-determination. Finally, an unhealthy lifestyle is a substantial source of tax revenues for the government, for example, from cigarettes and alcohol. This deliberate lack of focus on preventive measures is clearly demonstrated by the healthcare expenditures. In 2011, slightly more than 89 billion euros was spent on healthcare, of which only a fraction was spent on prevention in healthcare: namely a little over 2,5 billion euros (3%) (56). And this number is falling: in 2007 some 13 billion euros was spent on prevention, of which 3 billion euros was spend within healthcare (57). And this was even a 2% decline since 2003. The majority of the prevention expenditures (10 billion euros) is, thus, spend outside healthcare, for example, on air pollution control and promoting road safety. Healthcare prevention expenditures (3 billion euros) were largely (83%) spent on illness prevention (vaccination, screening, and preventive medication), whereas health promotion measures such as lifestyle education received only 17%.

Health literacy as an essential prerequisite for own responsibility

Unfortunately, not everyone is equally capable of taking their own responsibility for a healthy life(style). The World Health Organization considers health literacy to be a fundamental predictor of health inequalities (58). Definitions of health literacy vary, from basic reading and language skills (literacy) to a more complex conglomeration of literacy levels, psychological, and social skills. Almost half of the Dutch individuals finds it (very) difficult to play an active role in managing their health and illness, especially those with a lower education (59-61). Efforts should be put into increasing health literacy levels of those with low health literacy levels to enable them to take responsibility for managing their health and disease. At the same time, the government should invest in population-based prevention, as this type of prevention reaches a diverse population through a variety of routes that extend beyond clinics and traditional health services (62). Additionally, cost-effectiveness of population-based prevention is generally higher when the prevalence of a condition is high (which is the case for cardiometabolic disease) (62).

Combined screening and population-based prevention in Europe

A successful example comes from Sweden, where researchers combined population-based health and health sector interventions with systematic cardiovascular risk factor screening and counselling specifically aiming to evaluate the health gap between social groups (63). The researchers created local health promotion collaborations between healthcare providers, grocery stores, schools, and municipal authorities. The predicted cardiovascular mortality risk was reduced by 36% in the intervention area compared to 1% in a control community. What is more, socioeconomically less privileged groups benefited most from the program.

Also, policy advisors share the opinion of a coordinated prevention approach. In the words of Prof. Em. Vanholder, chair of the European Kidney Health Alliance: *Increasing screening of the at-risk population, promoting healthy diets and lifestyle modifications, working with industry to develop healthier food products and easier to understand food labelling, and starting early in schools to improve health literacy amongst the European population would have significant impacts in terms of public health and lead to a sustainable reduction of the prevalence of chronic diseases in Europe (64).*

Opportunities for population-based prevention in the Netherlands

As a reaction to the letter written by the Minister and State Secretary for the Ministry of Health, Wellbeing, and Sports regarding their solutions to problems with prevention in the current healthcare system, the Director of the Dutch journal ‘De Eerstelijns’ [‘The Primary care’] published some additional sustainable solutions to problems with putting prevention into practice (65):

- The government finances population-based prevention from tax revenues and the implementation is delegated to the municipalities. This local policy is monitored, publicly disclosed, and municipalities are redirected where necessary. Practice- and evidence-based e-tools are made freely available by the government through internet and applications.
- Health insurance companies finance individual prevention through a remittance to a prevention fund, which generates structural revenues. This fund is available to all insured and all citizens of a municipality, and is deployed locally in a non-competitive manner by the insurance companies in consultation with the municipalities.

- Individuals finance prevention themselves. By tax exemptions desired behaviour is encouraged and undesirable behaviour is discouraged.

These solutions demand major transformations within the current healthcare system, and require stamina of the government. However, with the ever-growing gap in (quality-adjusted) life expectancy between different groups in the Netherlands, drastic measures are called for.

CONCLUSION

Underserved groups have a poorer (health-related) life expectancy, an increased risk of cardiometabolic disease, and are least likely to attend health checks. This differential uptake of health checks leads to suboptimal health gains from cardiometabolic screening and contributes to the widening of health inequalities in society. Although the cost-effectiveness of the Dutch cardiometabolic health check is still under study, it seems advisable to focus on the underserved groups, as they have the most to gain from systematic screening. Our findings provide strategies to optimize uptake and may be used to design future studies on this topic. To further provide underserved groups the best possible opportunities for a healthy life(style), the Government should invest in population-based prevention and move away from the trend of taking own responsibility.

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8

Summary

SUMMARY

INTRODUCTION

With a high burden of cardiometabolic disease among native Dutch and non-Western immigrants in the Netherlands, their participation in preventive screening is eminent. It is, therefore, worrisome that these groups are particularly underrepresented in screening initiatives, as this may widen health inequalities in a society. To increase participation of these underserved groups in two-stage cardiometabolic screening, insight into the motivations and determinants of these groups is essential. The aim of this dissertation was to obtain insight into the psychosocial determinants of participation of underserved groups in both stages of the Dutch cardiometabolic health check (Prevention consultation, module cardiometabolic risk) as well as the actual response and participation rates in the two stages.

MAIN FINDINGS

We present a qualitative study on determinants of (hypothetical) participation in the cardiometabolic health check in **chapter 2**. With this study we aimed to investigate which determinants played a role among underserved groups to participate in the first stage (the HRA) of the health check and which determinants played a role in the second stage (the PC). To obtain insight in these determinants of hypothetical participation, we conducted 21 focus groups with non-Western immigrants, adult children from one of these descents, native Dutch with a lower SES, and healthcare professionals working with these groups. The analyses revealed that the determinants of HRA non-completion were mainly cognitive and included (flawed) risk perception, health negligence, (health) illiteracy, and language barriers. Facilitating HRA completion would be a face-to-face invitation from a reliable source and community outreach to raise awareness. Determinants of PC non-attendance were in part cognitive but were also of a more affective nature and included risk denial, fear about the outcome, its potential consequence (lifestyle changes and medication prescription), and disease-related stigma. Overall, the findings of this study indicated that the choice of invitation method seems important when designing a two-stage health check, as does training healthcare professionals in techniques to effectively handle patients' (flawed) risk perception and attitudinal ambivalence. Furthermore, focus should be on promoting informed choices by providing accurate information.

The findings of the qualitative study, as well as an extensive literature search, resulted in the design of a semi-quantitative intervention. With this intervention we aimed to investigate the actual response and participation rates and the actual determinants of participation of underserved groups in the Dutch cardiometabolic health check. In **chapter 3** we describe the response and participation rates in both the HRA and the PC. For this, we used a 'funnelled' invitation design comprising three consecutive increasingly cost-intensive culturally adapted steps: (1) a postal invitation for all eligible patients; (2) a telephone approach for postal non-responders; (3) a face-to-face approach by the GP for final non-responders. We found an overall response rate of 70% (n=1152), of whom 62% (n=712) completed the HRA. This was primarily accomplished through the postal and telephone invitations, not the face-to-face invitation. However, we found that participants from GP practices in the most deprived neighbourhoods had the lowest response and HRA participation rates. Of the HRA participants, 29% (n=207) received a high-risk score, of whom 59% (n=123) attended the PC. PC attendance was lowest among the native Dutch with a low SES. Based on these results, we concluded that underserved groups can be reached by a low-cost culturally adapted postal invitation and follow-up telephone calls, and that the added value of the more expensive face-to-face invitation was negligible. The PC participation rates were acceptable. However, to further increase reach among underserved groups, efforts should be particularly targeted at GP practices in the most deprived areas.

Chapter 4 and 5 cover the determinants among underserved groups of (actual) participation in both the HRA and the PC respectively. In **chapter 4** we describe a cross-sectional questionnaire study in which we aimed to explore the process of decision-making regarding HRA completion among underserved groups. The questionnaire comprised the following aspects: a self-formulated first reaction, a structured set of predefined determinants, and the most important barrier(s) and facilitator(s) for HRA completion. More than three quarters of the questionnaire participants (n=892) also completed the HRA (n=696). Those who did not complete the HRA were more often Moroccans and patients from GP practices with a predominantly non-Western population. Determinants increasing the likelihood of HRA completion were a lower SES score, wanting to know one's risk, not remembering receiving the invitation (thus requiring a phone call), fear of the test result and/or adjusting lifestyle, perceived control of staying healthy, wanting to participate, and perceiving no barriers. From this study we concluded that our ‘hard-to-reach’ population may not be unwilling to complete the HRA. To increase the participation rate, a more comprehensive approach, involving key figures within a community informing people about and providing help completing the HRA would possibly be more suitable, as we had already seen in the qualitative study. In addition to the advice to particularly target GP practices in the most deprived neighbourhoods as described in chapter 3, we noted that special attention should be paid to the less acculturated immigrants with an external locus of control.

In **chapter 5** we describe a quantitative and qualitative assessment of determinants of PC attendance. The aim of this study was to compare PC attenders with non-attenders in their determinants of PC participation. For this, we used questionnaire and interview data. We found that 71% (n=148) of the participants with a high-risk HRA score attended the PC, and that those participants were least often native Dutch with a lower SES. We interviewed 91 high-risk participants, of whom more than three quarters (n=66) attended the PC. We compared PC attenders with non-attenders in their HRA risk parameters and HRA total score, but found no significant differences. When asked about their determinants at the time of the HRA, later PC attenders significantly more often trusted they would get the guidance they would need in case of an increased risk and they more often experienced health complaints. When asked about their determinants at the time of the interview following the PC, the PC attenders also more often experienced health complaints, more often had others finding it important for them to participate, and more often felt obliged to attend the PC. Finally, many participants found it unclear whose responsibility it was to make an appointment for the PC. We concluded that risk communication should cover risk perceptions regarding (lack of) health complaints and it should target the close social environment of the individual. We suggested that, if feasible, the responsibility of making an appointment should be shifted towards the healthcare provider. It would be interesting to further study the role of personal feelings of obligation.

Lastly, we aimed to get some insight into the yield of the PC among underserved groups, which we describe in **chapter 6**. We performed a cross-sectional GP record study among high-risk HRA participants who went to the GP for the PC and investigated what risk factors were recorded and what subsequent actions were undertaken. What we found, first of all, that recordings were very incomplete. We could calculate the Prevention consultation risk score of consultation data for only 3% (n=4) of the participants, which was indeed above the cut-off value for all. We could calculate the CVRM score for 44% (n=66) of participants, of whom 39% (n=26) indeed fell in the ‘yellow’/’red’ box of the risk table. Medication was prescribed to one in five (n=29) of the participants. Of those who smoke, 69% (n=44) received a quit-smoking advice and 36% (n=53) of the participants received other lifestyle advice. In line with our other studies, we conclude that it is possible to reach a PC participation rate among ‘hard-to-reach’ groups comparable to or even higher than among the general population. We noted, however, that the GP should not only record patient data covered by the classic cardiovascular and diabetes guidelines, but should also record other risk factors associated with cardiometabolic disease (such as family history) and the (lifestyle) advices provided. Finally, we emphasized the important role of the GP, especially for these groups, which is all the more important now the Prevention consultation has been replaced by the Personal Health Check which is implemented more broadly than primary care.

CONCLUSION

It has been well established that underserved groups have an increased risk of cardiometabolic disease and are less likely to attend health checks. This differential uptake of health checks leads to suboptimal health gains from cardiometabolic screening and contributes to the widening of health inequalities in society. The cost-effectiveness of the Dutch cardiometabolic health check is still under study, but with the knowledge we already have it seems advisable to focus primarily on the underserved groups, as they have the most to gain from systematic screening. The findings described in this thesis provide strategies to optimize uptake and may be used to design future studies on this topic. In the general discussion we also advocate that the Government should invest in population-based prevention and move away from the trend of taking own responsibility as this may provide underserved groups the best possible opportunities for a healthy life(style).

Nederlandse samenvatting

NEDERLANDSE SAMENVATTING

INLEIDING

Autochtonen en niet-Westerse immigranten in Nederland ervaren een hoge ziektelast door cardiometabole aandoeningen. Deelname van deze groepen aan preventieve screening is bij uitstek van belang. Het is daarom zorgelijk dat met name deze groepen ondervertegenwoordigd zijn bij screeningsinitiatieven. Dit kan gezondheidsverschillen in de maatschappij vergroten. Om de deelname aan tweetraps cardiometabole screening van deze kwetsbare groepen te vergroten is het essentieel om inzicht te verkrijgen in de determinanten die daarbij een rol spelen. Het doel van dit proefschrift was inzicht vergaren in de psychosociale determinanten van deelname, evenals daadwerkelijke respons en deelname, aan beide stappen van het PreventieConsult module cardiometabool risico, onder kwetsbare groepen.

BELANGRIJKSTE BEVINDINGEN

We presenteren een kwalitatieve studie naar determinanten van (hypothetische) deelname aan het Preventieconsult in **hoofdstuk 2**. Het doel van deze studie was om te onderzoeken welke determinanten een rol speelden bij kwetsbare groepen om deel te nemen aan de eerste stap (de HRA) en welke om deel te nemen aan de tweede stap (het PC). Om inzicht te krijgen in deze determinanten, hebben we 21 focusgroepen gehouden met niet-Westerse immigranten, volwassen kinderen van niet-Westerse komaf, autochtonen met een lage SES en zorgverleners die veel met deze groepen werken. Uit de analyses bleek dat de determinanten van HRA niet-deelname met name van cognitieve aard waren, waaronder (onjuiste) risicopercepties, onachtzaamheid met betrekking tot de eigen gezondheid, lage gezondheidsvaardigheden of analfabetisme en taalbarrières. Bevorderende factoren voor HRA deelname zouden zijn: een face-to-face uitnodiging van een betrouwbare bron en een wijkgerichte aanpak om de bewustwording te vergroten. Determinanten van PC niet-deelname waren deels van cognitieve aard, maar hadden ook een meer emotioneel karakter, waaronder risico-ontkenning, angst voor de uitslag, de mogelijke gevolgen (leefstijlaanpassingen en medicijngebruik) en ziektegerelateerd stigma. Al met al geven de resultaten van deze studie aan dat de keuze voor een uitnodigingsstrategie belangrijk lijkt bij het vormgeven van een tweetraps health check, evenals het trainen van zorgverleners in technieken om op een effectieve manier om te gaan met (onjuiste) risicopercepties en ambivalenties van patiënten. Bovendien zou de focus moeten liggen op het bevorderen van het maken van geïnformeerde beslissingen door het aanbieden van accurate informatie.

De resultaten van de kwalitatieve studie, evenals een omvangrijke literatuurstudie, hebben geleid tot de vormgeving van de semi-kwantitatieve interventie. Het doel van deze interventie was om te onderzoeken wat de daadwerkelijke respons en deelname was van kwetsbare groepen aan het Preventieconsult, evenals de daadwerkelijke determinanten die hierbij een rol speelden. In **hoofdstuk 3** beschrijven we de respons en deelname aan zowel de HRA als het PC. Hiervoor gebruikten we een gesluisde ('trechter') uitnodigingsstrategie, bestaande uit drie opeenvolgende en in toenemende mate duurdere en intensievere stappen: (1) een schriftelijke uitnodiging voor alle patiënten die in aanmerking kwamen; (2) een telefonische benadering voor schriftelijke non-responders; (3) een face-to-face benadering door de huisarts voor uiteindelijke non-responders. Alle stappen waren cultureel aangepast. We vonden een totale respons van 70% (n=1152), van wie 62% (n=712) de HRA invulde. Dit werd met name bereikt door de schriftelijke en telefonische uitnodigingen, niet de face-to-face benadering. We zagen dat deelnemers van huisartspraktijken in de meest achtergestelde wijken de laagste respons en HRA deelname hadden. Van de HRA deelnemers had 29% (n=207) een hoog-risico score, van wie 59% (n=123) naar het PC ging. PC deelname was het laagst onder autochtonen met een lage SES. Naar aanleiding van deze resultaten concludeerden wij dat kwetsbare groepen bereikt kunnen worden middels een relatief goedkope, cultureel aangepaste, schriftelijke uitnodiging en follow-up telefonische benadering. Daarnaast was de toegevoegde waarde van de duurdere face-to-face benadering verwaarloosbaar. PC deelname was acceptabel, maar om deze verder te verhogen zouden inspanningen met name gericht moeten worden op huisartspraktijken in de meest achtergestelde wijken.

Hoofdstuk 4 en 5 gaan over de determinanten van kwetsbare groepen met betrekking tot (daadwerkelijke) deelname aan respectievelijk de HRA en het PC. In **hoofdstuk 4** beschrijven we een cross-sectionele vragenlijststudie welke als doel had te exploreren hoe het besluitvormingsproces van kwetsbare groepen aangaande HRA deelname in zijn werk ging. De vragenlijst bestond uit de volgende onderdelen: een zelf-geformuleerde eerste reactie, een gestructureerde set van vooraf gedefinieerde determinanten en de belangrijkste barrière(s) en bevorderende factor(en) van HRA deelname. Meer dan driekwart van de deelnemers aan de vragenlijst (n=892) vulde ook de HRA in (n=696). De HRA niet-deelnemers waren vaker Marokkaans en patiënten van huisartspraktijken met een voornamelijk niet-Westerse patiëntpopulatie. Determinanten die de kans vergrootten de HRA in te vullen waren een lagere SES score, het willen weten van het risico, het niet herinneren een uitnodiging te hebben ontvangen (dus een telefonische benadering nodig hebben), angst voor de uitslag en/of het moeten aanpassen van de leefstijl, het ervaren van controle over de eigen gezondheid, de wens deel te nemen en geen barrières ervaren. Van deze studie concluderen wij dat onze 'moeilijke bereikbare' groep niet onwelwillend tegenover HRA deelname staat. Om deelname te vergroten zou een meeromvattende aanpak wellicht geschikter zijn, zoals we ook al zagen in de kwalitatieve studie. Een aanpak die sleutelfiguren in een gemeenschap betrekt zodat zij individuen kunnen informeren en hen helpen de HRA in te vullen. In aanvulling op het advies uit hoofdstuk 3 om met name aandacht te schenken aan huisartspraktijken in de meest achtergestelde wijken, constateerden we dat inspanningen moeten worden gericht op de minder ingeburgerde immigranten met een externe locus of control.

In **hoofdstuk 5** gaan we in op een kwantitatieve en kwalitatieve beschrijving van determinanten van PC deelname. Het doel van deze studie was om de determinanten van PC deelnemers te vergelijken met die van niet-deelnemers. Hiervoor gebruikten we vragenlijst- en interviewdata. We zagen dat 71% (n=148) van de deelnemers met een hoog-risico HRA score naar het PC ging en dat autochtonen met een lage SES het minst vaak gingen. We hebben 91 hoog-risico patiënten geïnterviewd, van wie meer dan driekwart (n=66) naar het praktijkconsult was gegaan. We vergeleken de HRA risicoparameters en de HRA totaalscore van PC deelnemers met die van niet-deelnemers, maar vonden daarbij geen significante verschillen. Als men gevraagd werd naar determinanten die een rol speelden ten tijde van de HRA, gaven latere PC deelnemers significant vaker aan dat ze vertrouwen hadden in de noodzakelijke begeleiding mochten ze een verhoogd risico hebben. Daarnaast ervaarden zij vaker gezondheidsklachten. Als men gevraagd werd naar determinanten ten tijde van het interview volgend op hun PC bezoek, gaven de PC deelnemers ook vaker aan gezondheidsklachten te ervaren. Daarnaast hadden ze vaker anderen die het belangrijk vonden dat ze naar het PC gingen en ervaarden ze vaker een gevoel van verplichting om naar het PC te gaan. Ook vonden veel deelnemers het onduidelijk wiens verantwoordelijkheid het was om een afspraak te maken voor het PC. Wij concludeerden dat er in de risicocommunicatie moet worden ingegaan op risicopercepties aangaande (het gebrek aan) ervaren gezondheidsklachten en dat het ook gericht moet zijn op de nabije sociale omgeving van het individu. Daarnaast stelden we voor om, indien haalbaar, de verantwoordelijkheid voor het maken van de afspraak voor het PC, verschoven dient te worden naar de zorgverlener. Tot slot zou het interessant zijn om de rol die gevoelens van verplichting spelen verder te bestuderen in deze context.

Met onze laatste studie, welke beschreven staat in **hoofdstuk 6**, hadden wij als doel om inzicht te verkrijgen in de opbrengst van het PC bij kwetsbare groepen. We hebben een cross-sectionele dossierstudie uitgevoerd onder hoog-risico HRA deelnemers die naar het PC zijn gegaan. Bij hen hebben we onderzocht welke risicofactoren geregistreerd waren en welke vervolgacties ondernomen waren. Allereerst ontdekten we dat de dossiers erg incompleet waren. Met de beschikbare consultdata konden we slechts voor 3% (n=4) van de deelnemers de Preventieconsult risicoscore berekenen, van wie allen inderdaad een risicoscore boven het afkappunt hadden. We konden voor 44% (n=66) van de deelnemers de CVRM score berekenen, van wie 39% (n=26) inderdaad in het ‘gele’ of ‘rode’ vakje van de risicotabel viel. Eén op de vijf deelnemers (n=29) kreeg medicatie voorgeschreven. Van de rokers kreeg 69% (n=44) een stoppen-met-roken advies en 36% (n=53) van de deelnemers kreeg een ander leefstijladvies. In lijn met de conclusies die we trokken uit eerdere onderzoeken, concludeerden we dat het mogelijk is om bij ‘moeilijk bereikbare groepen’ een PC deelname te behalen die vergelijkbaar is, of zelfs hoger is dan, onder de algemene populatie. Daarbij merkten we op dat de huisarts niet alleen data zou moeten registreren die staan beschreven in de klassieke cardiovasculaire en diabetes richtlijnen, maar ook risicofactoren die geassocieerd zijn met cardiometabole aandoeningen (zoals familiaire belasting) en de leefstijladviezen die zij geven. Tot slot benadrukten we de belangrijke rol van de huisarts, met name voor deze groepen, welke nog belangrijker is geworden nu het Preventieconsult is vervangen door de Persoonlijke Gezondheidscheck die breder dan de eerstelijn wordt geïmplementeerd.

CONCLUSIE

Het is algemeen bekend dat kwetsbare groepen een verhoogd risico hebben op cardiometabole aandoeningen en dat zij minder vaak deelnemen aan screeningsinitiatieven. Deze ongelijke deelname aan health checks leidt tot suboptimale gezondheidswinst welke bereikt kan worden met cardiometabole screening en draagt bij aan de vergroting van gezondheidsverschillen in de samenleving. De kosteneffectiviteit van het PreventieConsult wordt momenteel onderzocht, maar met de bestaande kennis lijkt het raadzaam om de focus primair op de kwetsbare groepen te leggen, aangezien zij het meest te winnen hebben bij systematische screening. De resultaten die we in dit proefschrift beschrijven bieden aanknopingspunten om deelname te optimaliseren en kunnen gebruikt worden bij het vormgeven van toekomstige studies over dit onderwerp. In de algemene discussie pleiten we er ook voor dat de Overheid de trend van eigen verantwoordelijkheid nemen deels los zou moeten laten en meer zou moeten investeren in preventieve maatregelen op populatieniveau, omdat dit de kwetsbare groepen de beste kansen biedt op een gezond leven en een gezonde leefstijl.

Dankwoord en curriculum vitae

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CURRICULUM VITAE

Iris Groenenberg is geboren op 14 februari te Venlo. Haar basis- en voorbereidend wetenschappelijk onderwijs genoot zij op de School met den bijbel en het Valuascollege te Venlo. Tussen 2003 en 2007 volgde zij de bacheloropleiding Voeding en Diëtetiek aan de Hogeschool van Arnhem en Nijmegen. Vervolgens volgde zij tussen 2007 en 2009 de masteropleiding *Nutrition and Health* aan de Universiteit van Wageningen. Gedurende haar onderzoeksstage aan de Universiteit van Berkeley deed zij ervaring op met onderzoek bij kwetsbare groepen in de gezondheidszorg. Vanuit die positie startte zij in 2009 dan ook haar promotietraject op de afdeling Public Health en Eerstelijnsgeneeskunde van het Leids Universitair Medisch Centrum. Sinds 2015 werkt zij als Programmamedewerker Preventie bij de Nierstichting.


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