CHECK'D?! : determinants of participation in a two-stage cardiometabolic screening among underserved groups

Groenenberg, I.

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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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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)		2 (8)	11 (17)	
50-54	12 (20)	35 (24)		6 (24)	15 (23)	
55-59	17 (28)	39 (26)	0.478	6 (24)	22 (33)	0.560
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)		8 (32)	13 (20)	
Overweight	27 (45)	72 (49)	0.344	9 (36)	31 (47)	0.405
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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