

Modifiable cardiovascular risk factors in women with polycystic ovarian syndrome

a cross-sectional study

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Introduction

Cardiovascular disease (CVD) is the leading cause of death among women in the Netherlands and other European countries[1,2]. In 2010, the proportion of CVD in the total absolute mortality of women was 29.6% in the Netherlands[3]. Certain characteristics or lifestyles, hereafter labeled cardiovascular risk factors (CVRF), can increase the risk of CVD. According to the World Health Organization there are 21 CVRF. The CVRF can be divided into modifiable CVRF like the use of tobacco, stress, hypertension, abnormal blood lipids, diabetes and obesity, and non-modifiable CVRF like age, gender, socio-economic status and race[4]. In this article, modifiable CVRF means that the results fall in the range that lifestyle changes are indicated. Since the modifiable CVRF are derived from an unhealthy lifestyle, it is important to reduce these risks.

An increased risk of CVD is associated with specific gynaecological syndromes such as polycystic ovarian syndrome (PCOS)[5]. The prevalence of PCOS is approximately 15% when the Rotterdam criteria are applied[5,6]. Women are diagnosed with PCOS when they comply to two out of the following three Rotterdam criteria: ovarian dysfunction, excess of male hormones and multiple cysts in the ovaries[7]. Multiple studies recommend interventions to reduce modifiable CVRF for women with PCOS[5,6].

Systematic reviews and meta-analysis show that women with PCOS have an increased risk on obesity, diabetes mellitus type 2, abnormal blood lipids and stress[8-11]. Verhulst et al. (2010) performed an evaluation of 456 Dutch women diagnosed with PCOS to establish their cardiovascular risk. Ninety percent of women (mean age 29) with PCOS had an increased cardiovascular risk profile in the reproductive age (age between 18-45 years), meaning that lifestyle or medical interventions are recommended. Women with PCOS need lifestyle interventions to reduce weight (47.8%), blood pressure (43.6%), blood lipids (67.1%) and smoking tobacco (19.5%)[6]. Weight loss is the main target of recommended lifestyle interventions to reduce modifiable CVRF for women with PCOS, examples of interventions are diet and exercise[5,12]. Lifestyle interventions are effective in reducing overweight and abdominal obesity in women with PCOS[13].

Despite the fact that several studies have resulted in knowledge about the need of interventions for women with PCOS, information is needed to optimize lifestyle interventions. Prior to the development of interventions, the whole CVRF profile of women needs to be examined first. In

this study, the CVRF profile implies that every modifiable CVRF needs investigation at the frequency of women with PCOS who need a lifestyle intervention. Frequencies of the modifiable CVRF stress, alcohol use and diabetes are unknown for Dutch women. Also, information on the occurrence of combinations of modifiable CVRF is missing. Despite the declines in CVD, the prevalence of CVD varies among subgroups[2]. For example, more African American and Hispanic women are overweight and African women are more likely to have hypertension[5]. The CVD risk increases with age and lower education[5,14] To improve fertility of women with PCOS, diet and lifestyle changes are first recommended[5]. No literature was found about the difference in incidence of modifiable CVRF in women with and without reproductive goals. Frequencies of modifiable CVRF are unknown for subgroups of Dutch women with PCOS related to the characteristics age, race, socioeconomic status and reproductive goals. This information can be used to determine whether interventions focused on specific subgroups or modifiable CVRF should be developed for Dutch women with PCOS.

Problem statement

Research is needed to obtain knowledge for the development of interventions for women with PCOS in the reproductive age, because of their increased risk to develop CVD. The frequencies of women who need lifestyle changes should be investigated for all modifiable CVRF. Furthermore, information about the occurrence of combinations of CVRF as well as the occurrence of CVRF in subgroups has to be investigated for women with PCOS. These findings could help to identify which CVRF and subgroups should be the focus in future interventions, with the aim to prevent CVD in this high risk population. With these results, healthcare professionals, including nurses, can give care that is more in line with the needs of women with PCOS.

Aim

The aim of this study was to examine the CVRF profile and modifiable CVRF in women with PCOS. These findings are expected to be used in future lifestyle interventions to reduce modifiable CVRF and the risk of CVD in women with PCOS.

Research questions

1. Which modifiable CVRF and combinations of risk factors are seen in a cohort of Dutch women with PCOS?

2. Which modifiable CVRF are seen in subgroups of age, ethnicity, reproductive goals and socioeconomic status?

Method

Design

This study employed a cross-sectional design using data of the cycle disorders, oligo-amenorrhea (COLA) study. The population of the COLA study consisted of women with irregular or absent menstrual periods. Data of 3,196 women were collected between January 2004 to April 2013.

Participants

Participants for this study were recruited from the COLA study. A convenience sample was used in the COLA study, in which all possible patients with irregular or absent menstrual periods were included. A targeted sample was used for this study, participants were included if they were diagnosed with PCOS and were in the reproductive age (18-45 years) at the time of screening. Women were excluded if they were diagnosed with another cycle disorder. These criteria have been chosen because interventions for women with PCOS in the reproductive age need to be developed. All women of the COLA cohort signed informed consent for future research.

Data collection

Only data from the COLA study focusing on eleven CVRF were used for a secondary analysis in this study. The modifiable CVRF were hypertension, abnormal blood lipids, lipoprotein, tobacco use, alcohol use, obesity, diabetes mellitus and psychosocial stress. The investigated non-modifiable CVRF were advancing age, low socioeconomic status (SES) and race.

The data of participants of the COLA study were collected during a consultation with a physician-researcher. Prior to the consultation, participants received an informational letter and a standardized questionnaire including questions about general information, medical history, family history, menstrual cycle, pregnancy and CVD. There were eight questions about general information, including one question on age, one on race and one on education. There were eleven questions about medical history, including one on smoking and one on alcohol. Since 2008, participants of the study received the State-Trait Anxiety Inventory (STAI) form. The STAI measures psychosocial stress, particularly on anxiety[15]. The STAI is a reliable and valid instrument and consists of two components, the first part measures the state-anxiety and the second part measures the trait-anxiety[16]. During the consultation blood pressure, body mass

index (BMI) and waist circumference were collected by physical examination. Data collection of fasting blood glucose and blood lipids: triglyceride levels, high-density lipoprotein (HDL) and low-density lipoprotein cholesterol (LDL) were determined by blood tests. The diagnosis PCOS was made by physicians during a meeting using the collected data.

Data were collected by physician-researchers and entered into the database by researchers. To prevent that data were interpreted differently or handwriting was misread researchers were trained by physician-researchers.

Subgroup variables

Frequencies of modifiable CVRF of women with PCOS were investigated for the subgroups age, race, SES and reproductive goals. The questions about race consisted of the following answer possibilities: 'Caucasian', 'Negroid', 'Mediterranean', 'Asian', 'Hindu' or 'other'. Answer possibilities of reproductive goals were 'yes' or 'no'. The answers to these questions were not changed for analysis in this study. The ages collected in the COLA study were divided into the following categories '18-22', '23-30', '31-39' and '40-45' years. This classification was based on the age of students (18-22), the reduction in fertility from the age of 30 years, the increasing risk of CVD with age and the menopause[5,17]. The variable education was used to measure SES. Participants could choose among the answer possibilities: 'academic education', 'higher professional education', 'middle-level applied education', 'high school' and 'elementary education'. For the analysis, level of education was divided into two levels of SES; no higher professional or academic education, and higher professional or academic education.

Variables of modifiable CVRF

In this study, modifiable CVRF means that lifestyle changes were indicated. Cut-off values were used to determine whether lifestyle changes were indicated. The cut off values published in the Evidence-Based Guidelines for Cardiovascular Disease Prevention in Women were used for the modifiable CVRF tobacco use, alcohol use, and obesity[18]. Women had a modifiable CVRF when smoking one or more cigarettes per day, drinking more than seven alcoholic drinks per week and having a waist circumference of 89 cm or larger. A BMI greater than 25 kg/m² was considered overweight and above 30 kg/m² was considered obese[18]. The National Cholesterol Education Program published criteria for diagnosing metabolic syndrome[19]. Metabolic syndrome is diagnosed when women have three of the following risk factors: BMI greater than 30 kg/m², triglyceride level 1.7 mmol/L or higher, HDL-cholesterol level less than 1.3 mmol/L, blood pressure 130/85 mm HG or higher and fasting plasma glucose level 6.1 mmol/L or higher.

In this study, these values were used to determine if women had hypertension, abnormal blood lipids or diabetes mellitus. A score above 34 of the STAI was positively correlated with anxiety[15].

Statistical analysis

The outcome values of the collected modifiable CVRF were all recoded into nominal or ordinal variables based on the cut-off values. SPSS version 19 was used to analyze the means, frequencies and percentages of the occurrence of CVRF, the occurrence of CVRF in combinations and in subgroups. Sample size calculation was not necessary, all data of 871 women were used for analysis. With the chi-square test was analyzed whether there was a statistically significant association between women with and without modifiable CVRF and the subgroups of SES and reproductive goals. The Kruskal Wallis test was used for this analysis for the subgroups of age and race. The chi-square test could not be used for age and race, because some expected cell frequencies were less than five. A *p* value of less than 0.05 was considered significant.

The following data were missing: 15% of blood lipids, 20% of tobacco use and 65% of education. Less than 10% of the other data were missing. As data of the STAI were collected since December 2008, completed data were known of respectively 313 women and 295 women. The frequencies were calculated on actual numbers. No imputation procedure was used for de missing data, due to the large number of missing values.

Ethical review

The medical research ethics committee of Utrecht reviewed the study protocol (number 13/101) and determined that full ethical review was not necessary. No additional procedures for informed consent were needed, because the secondary analysis in this study was an extension of questions and publications addressed in the COLA study (numbers 12/506, 12/618).

Results

The COLA database consisted of data of 3,196 women. In the current study 2,315 women were excluded because they were not diagnosed with PCOS, 97 signed no informed consent and the age of 19 women was unknown or younger than 18 years. In this study, 891 women were included (see figure 1).

Characteristics of the participants

The characteristics of the study sample are presented in table 1. The mean age of the women

was 28.4 ± 5.1 years, 461 women belonged to the age group of 23-30 years. The majority, 749 women were of Caucasian race. The education level of 318 women was known, 184 of the women had higher professional or academic education. Most women ($n=640$) had reproductive goals.

Frequency of women with modifiable CVRF

Of the 891 women, 730 had at least a risk for one of the modifiable CVRF. The group of women without modifiable CVRF consisted of 136 women. There were no missing values in the group of women without modifiable CVRF. Data of the STAI were not included to analyze the frequency of women without CVRF, due to the fact that this was not screened before December 2008. A chi-square test was conducted between women with and without CVRF and education level, there was a statistically significant association ($X^2=4.058$, $p=0.04$). There was not a statistically significant association between women with and without modifiable CVRF and reproductive goals ($X^2=3.208$, $p=0.07$). With the Kruskal Wallis test was analyzed that there was no significant association between women with and without modifiable CVRF and age ($X^2=1.490$, $p=0.69$) and race ($X^2=4.246$, $p=0.52$)(Table 1).

Frequencies of modifiable CVRF

The percentages of a high score on the STAI (>34), high BMI (≥ 25 kg/m²), large waist circumference (≥ 89 cm), and abnormal HDL level (≤ 1.29 mmol/L) were the highest in the cohort. The frequencies of a score higher than 34 were seen in 178 women on the state-anxiety and in 169 women on the trait-anxiety. Overweight was observed in 181 women and 223 women were obese. In total, 404 women had a CVRF because of a high BMI. The average of the BMI was 27.3 ± 6.6 kg/m². The waist circumference of 309 women was more than 89 cm. A low HDL level (≤ 1.29 mmol/L) was observed in 297 women. Figure 2 shows the frequencies and percentages of the occurrence of CVRF.

Combinations of modifiable CVRF

A combination of the modifiable CVRF BMI and waist circumference was observed in 289 women. The combination of a high BMI and low HDL was seen in 225 women. On the state-anxiety and trait-anxiety 136 women scored higher than 34. Table 2 shows which combinations of CVRF were seen in the cohort.

Modifiable CVRF in subgroups

Table 3 shows the distribution of modifiable CVRF for the different subgroups of age, race, SES

and reproductive goals. In all subgroups, 40% of the women had a BMI higher than 25 kg/m², except the age category of 18-22 years, women of Hindu race and women without reproductive goals. The subgroups of women of the age category 40-45 years, women of Mediterranean and Negroid race, and women without higher professional or academic education scored 40% or higher on a large waist circumference and an abnormal HDL level. Women of the age categories 18 to 30 years, with a higher level of SES and without reproductive goals had less often CVRF.

Discussion

The results of this study give new understanding of the occurrence of CVRF in women with PCOS, the occurrence of combinations of CVRF and the occurrence of CVRF in subgroups. The major findings were the highest frequencies of the modifiable CVRF psychosocial stress, obesity and abnormal HDL level. Remarkable combinations of CVRF were not found. Higher percentages on the occurrence of CVRF were found for women in the age category 31 to 45 years and in the subgroup without higher professional or academic education especially on obesity and HDL level. Women with reproductive goals had more often modifiable CVRF, which differed less than in the subgroups of SES and age.

The results of the cross-sectional study of Verhulst et al. (2010) were consistent with this current study in which, in addition alcohol use, diabetes and anxiety were included[6]. Furthermore, since 2008 the COLA cohort has enlarged. In a study conducted in America (N=106), obesity and abnormal HDL level were also most observed in women with PCOS[20]. Weight loss is the main target of recommended lifestyle interventions to reduce CVRF for women with PCOS[5]. The results of this current study confirm that reduction of weight must be one of the main targets of interventions. Results of a systematic review of 106 studies showed that 61% of the women with PCOS had overweight and 54% had abdominal obesity[8]. These percentages are higher than the percentages found in this study. The percentage of a large waist circumference (35.2%) is particularly low, because the literature shows that women with PCOS have especially abdominal obesity influenced by testosterone[21,22].

Literature shows, that women with low SES have more CVRF than women with high SES[14,23]. In this current study women with and without CVRF were not equally distributed across the subgroups of SES. Women with higher education had less often modifiable CVRF. However, 65% of the data of SES were missing, firm conclusions could not be drawn.

Remarkable is that almost 60% of the 318 women had a college education or university degree in the cohort. On average, 42% of the Dutch women have this educational level between the age of 25 to 34 years[24]. A possible explanation could be that women are older when they graduate at college or university and therefore have reproductive goals later in life. The fertility declines after the age of 30 years[17] which leads to seeking of medical attention because of fertility or menstrual problems.

A systematic review shows that occurrence of different modifiable CVRF varies in subgroups of race[25]. Results of this current study are consistent with the systematic review. The results of the subgroups of this study are difficult to compare to research conducted in other countries, because these women all live in the Dutch society. In 2012, the Dutch population consisted of 12.0% of non-Western immigrants[26]. In the cohort of this study, 14.8% was of Mediterranean, Asian, Negroid, Hindu or other race. The distribution of the percentages of the races in the cohort, is similar to the situation in the Netherlands. However, because of the many missing values and the SES level that not correspond to the population, generalization of the results is not quite possible.

A risk caused by high scores on psychosocial stress was mostly observed. A score higher than 34 on the state-anxiety (56.7%) was almost as often observed on the trait-anxiety (57.3%). Although, data of the STAI were only known for 300 women, the results were consistent with the literature. A meta-analysis showed that women with PCOS have higher risk for developing psychological difficulties caused by acne, hirsutism, obesity and potential infertility[11]. Livadas et al. (2011) measured anxiety of Caucasian women with PCOS with the STAI; 76 of the 130 women had moderate or severe anxiety[27]. The percentage of anxiety (58.5%) was even higher than in this current study[27]. These results show, that it is essential that future interventions focus more on psychosocial stress. Another study, conducted in Athens, compared the outcome of the STAI of healthy women with women with PCOS. The results showed that it was 1.08 times more likely for the PCOS group to have psychosocial stress than healthy women[28]. No information was found about the STAI scores of healthy Dutch women.

Study limitations and strengths

A strength of this study was the focus on eleven CVRF in a large cohort and that analyses were done on combinations of CVRF and subgroups. Limitations were that data of the STAI were not collected from 2004 and the high number of missing values. For example, for unclear reasons data of blood lipids were not included in the database from October 2010 to June 2012. This

has led to a bias in the calculation of the percentages of the distribution of the modifiable CVRF psychosocial stress and abnormal blood lipids for subgroups in table 3. Probably, these percentages would have been higher if there were no missing data. Fauser et al. (2012) recommended data collection of physical activity and nutrition for a CVD risk assessment[5]. However, these data were not available in the database. These two CVRF are classified as major modifiable by the WHO. All other major modifiable CVRF were included in the database[4].

Clinical implications

The results of this study showed all frequencies of modifiable CVRF of women with PCOS, as well as combinations and frequencies of modifiable CVRF in subgroups. Obesity is already an important target of recommended lifestyle interventions. According to the results, HDL and psychosocial stress should also be important components of interventions. The subgroups of the age category 31-45 years and women with low SES had most often modifiable CVRF, which is important knowledge for the clinical practice.

Conclusions

This cohort study has given more understanding into the CVRF profile of Dutch women with PCOS. The modifiable CVRF psychosocial stress, obesity and abnormal HDL were most often observed. These results correspond to the literature. Remarkable combinations of modifiable CVRF were not found. The results and literature showed that lifestyle interventions that focus on women with a low SES, age between 31-45 years and psychosocial stress are needed. However, because of the missing data, more research should be conducted in the Netherlands to draw firm conclusions on stress and education for the Dutch population with PCOS.

Recommendations

Many data of education were missing and data of the STAI were only known of a part of the cohort. However, other literature also shows that women with low SES have more CVRF and that women with PCOS suffer more from psychosocial stress[11,14,23,27,28]. More research is needed to investigate whether these results are also applicable for the Dutch population. If continuing research will confirm the results of the current study it is recommended to develop different interventions for the subgroup of women without higher professional or academic education. Further, it is recommend to develop separate interventions for the age categories.

Investigation is needed to show which interventions have the best result to reduce obesity and stress, and increase the HDL level in women with PCOS.

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Exclusion N = 2,302

- 2,186 not diagnosed with PCOS
- 82 gave no informed consent
- 15 informed consent unknown
- 13 age younger than 18 years
- 6 age unknown

Inclusion N = 891

Figure 1. Flowchart of women who met inclusion/exclusion criteria of the study population

Table 1. Characteristics of the sample

Subgroups	All women N = 891	Women with at least one CVRF ¹ n = 730	Women without CVRF ² n =136	p-value
Age n (%)				0.69
18 - 22	126 (14.1)	102 (14.0)	22 (16.2)	
23 - 30	461 (51.7)	375 (51.4)	73 (53.7)	
31 - 39	291 (32.7)	242 (33.2)	40 (29.4)	
40 - 45	13 (1.5)	11 (1.5)	1 (0.7)	
Race n (%)				0.52
Caucasian	749 (85.2)	607 (84.2)	120 (89.6)	
Mediterranean	63 (7.2)	57 (7.9)	7 (5.2)	
Asian	20 (2.3)	16 (2.2)	3 (2.2)	
Negroid	14 (1.6)	14 (1.9)	0 (0.0)	
Hindu	8 (0.9)	7 (1.0)	1 (0.7)	
Other	25 (2.8)	20 (2.8)	3 (2.2)	
SES n (%)				0.04
No higher professional or academic education	134 (42.1)	121 (46.5)	5 (23.8)	
Higher professional or academic education	184 (57.8)	139 (53.5)	16 (76.2)	
Reproductive goals n (%)				0.07
Yes	640 (72.6)	531 (73.4)	89 (65.9)	
No	242 (27.4)	192 (26.6)	46 (34.1)	

P-values for equal distribution of women without and with modifiable CVRF in subgroups. Chi-square was used for SES and reproductive goals. Kruskal Wallis test was used for age and race.

¹ STAI was included.

² STAI was not included

³ Missing values: race n=12, SES n=573, reproductive goals n=9

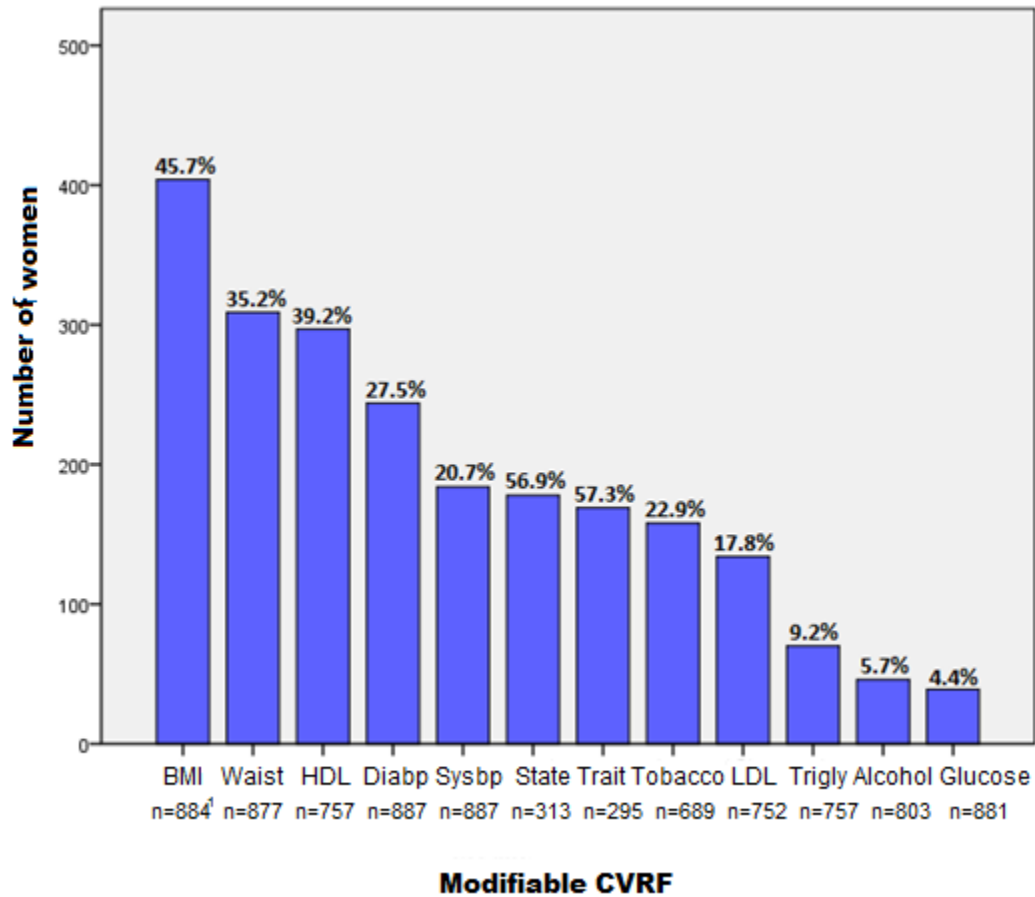


Figure 2. The frequencies of women with modifiable CVRF

BMI: body mass index, BP: blood pressure, HDL: high-density lipoprotein, LDL: low-density lipoprotein, state: state anxiety, trait: trait anxiety

¹ n = total number of available data for the specific modifiable CVRF

Table 2. Frequencies of women that were having a combination of two modifiable CVRF

Modifiable CVRF (n)	BMI ≥25 kg/m² (404)	Waist ≥89 cm (309)	HDL ≤1.29 mmol/L (297)	Diastolic bp ≥85 mmHG (244)	Systolic bp ≥135 mmHG (184)	State anxiety >34 (178)	Trait anxiety >34 (169)	Tobacco use (158)	LDL ≥3.5 mmol/L (134)	Triglyceriden ≥ 1.70 mmol/L (70)	Alcohol ≥8 drinks/ week (46)	Fasting glucose ≥6.2mmol/L (39)
BMI ≥25 kg/m² (404)		289	225	151	117	83	72	82	84	63	7	24
Waist ≥ 89 cm (309)	289		181	133	101	64	57	65	74	55	7	23
HDL ≤1.29 mmol/L(297)	225	181		101	78	56	52	68	80	58	8	20
Diastolic bp ≥ 85 (244)	151	133	101		131	46	45	39	52	36	11	13
Systolic bp ≥ 135 (184)	117	101	78	131		38	36	30	36	27	7	8
State anxiety >34 (178)	83	64	56	46	38		136	38	22	11	7	10
Trait anxiety >34 (169)	72	57	52	45	36	136		33	19	11	7	11
Tobacco use (158)	82	65	68	39	30	38	33		31	20	15	7
LDL ≥ 3.50 mmol/L(134)	84	74	80	52	36	22	19	31		26	4	6
Triglyceriden ≥1.70mmol/L(70)	63	55	58	36	27	11	11	20	26		1	7
Alcohol ≥8drinks/week(46)	7	7	8	11	7	7	7	15	4	1		1
Fasting glucose ≥6.2mmol/L(39)	24	23	20	13	8	10	11	7	6	7	1	

BMI: body mass index, BP: blood pressure, HDL: high-density lipoprotein, LDL: low-density lipoprotein.

Table 3. The distribution of modifiable CVRF for the subgroups age, race, SES and reproductive goals

Subgroups	BMI ≥25 kg/m ² (n =404)	Waist circumference ≥ 89 cm (n =309)	HDL ≤1.29 mmol/L (n = 297)	Diastolic bp ≥ 85 mm HG (n =244)	Systolic bp ≥ 135 mm HG (n =184)	State anxiety >34 (n = 178)	Trait anxiety >34 (n = 169)	Tobacco use (n =158)	LDL ≥ 3.50 mmol/L (n = 134)	Triglyceride ≥ 1.70 mmol/L (n = 70)	Alcohol use ≥ 8 drinks / week (n =46)	Glucose ≥ 6.2 mmol/L (n = 39)
Age												
18 – 22 (n =126)	48 (38.1) ¹	38 (30.2)	45 (35.7)	20 (15.9)	16 (12.7)	33 (26.2)	28 (22.2)	31 (24.6)	15 (11.9)	8 (6.3)	10 (7.9)	2 (1.6)
23 – 30 (n = 461)	206 (44.7)	153 (33.2)	137 (29.7)	126 (27.3)	99 (21.5)	91 (19.7)	94 (20.4)	88 (19.1)	59 (12.8)	27 (5.9)	21 (4.6)	20 (4.3)
31 – 39 (n = 291)	140 (48.1)	112 (38.5)	106 (36.4)	94 (32.3)	67 (23.0)	53 (18.2)	46 (15.8)	39 (13.4)	55 (18.9)	34 (11.7)	15 (5.2)	17 (5.8)
40 – 45 (n = 13)	10 (76.9)	6 (46.2)	9 (69.2)	4 (30.8)	2 (15.4)	1 (7.7)	1 (7.7)	0 (0.0)	5 (38.5)	1 (7.7)	0 (0.0)	0 (0.0)
Race												
Caucasian (n =749)	314 (41.9)	245 (32.7)	230 (30.7)	209 (27.9)	164 (21.9)	145 (19.4)	142 (19.0)	140 (18.7)	114 (15.2)	49 (6.5)	45 (6.0)	30 (4.0)
Mediterranean (n =63)	47 (74.6)	30 (47.6)	34 (54.0)	12 (19.0)	10 (15.9)	16 (25.4)	11 (17.5)	9 (14.3)	10 (15.9)	12 (19.0)	0 (0.0)	7 (11.1)
Asian (n =20)	10 (50.0)	8 (40.0)	4 (20.0)	7 (35.0)	4 (20.0)	3 (15.0)	3 (15.0)	1 (5.0)	5 (25.0)	3 (15.0)	0 (0.0)	1 (5.0)
Negroid (n =14)	10 (71.4)	8 (57.1)	11 (78.6)	7 (50.0)	2 (14.3)	3 (21.4)	2 (14.3)	2 (14.3)	3 (21.4)	2 (14.3)	0 (0.0)	0 (0.0)
Hindu (n =8)	3 (37.5)	1 (12.5)	6 (75.0)	3 (37.5)	0 (0.0)	1 (12.5)	1 (12.5)	0 (0.0)	1 (12.5)	1 (12.5)	0 (0.0)	1 (12.5)
Other (n =25)	13 (52.0)	11 (44.0)	8 (32.0)	4 (16.0)	2 (8.0)	10 (40.0)	10 (40.0)	5 (20.0)	0 (0.0)	1 (4.0)	1 (4.0)	0 (0.0)
SES²												
Level 1 (n =134)	83 (61.9)	70 (52.2)	62 (46.3)	36 (26.9)	27 (20.1)	43 (32.1)	35 (26.1)	30 (22.4)	20 (14.9)	15 (11.2)	0 (0.0)	11 (8.2)
Level 2 (n =184)	69 (37.5)	47 (25.5)	41 (22.2)	35 (19.0)	25 (13.6)	47 (25.5)	46 (25.0)	20 (10.9)	17 (9.2)	8 (4.3)	10 (5.4)	5 (2.7)
Reproductive goals												
Yes (n =640)	316 (49.4)	236 (36.9)	231 (36.1)	194 (30.3)	147 (23.0)	125 (19.5)	116 (18.1)	112 (17.5)	103 (16.1)	58 (9.1)	24 (3.8)	30 (4.7)
No (n =242)	83 (34.3)	68 (28.1)	62 (25.6)	48 (19.8)	34 (14.1)	52 (21.5)	53 (21.9)	46 (19.0)	27 (11.2)	11 (4.5)	21 (8.7)	9 (3.7)

BMI: body mass index, BP: blood pressure, HDL: high-density lipoprotein, LDL: low-density lipoprotein.

¹ The frequencies are followed by (percentages) are based on the total size of the subgroup as reported in the first column.

² SES level 1: elementary education, high school, middle-level applied education

SES level 2: higher professional or academic education