

Prevalence and control of cardiovascular risk factors using a German sample – Findings from the STAAB Cohort Study

Theresa Tiffe^{1,3}, Götz Gelbrich^{1,2}, Martin Wagner^{1,3}, Carolin Morbach^{3,4}, Victoria Rücker¹, Caroline Kisker⁵, Stefan Störk^{3,4*}, Peter Heuschmann^{1,2,3*}

¹ Institute of Clinical Epidemiology and Biometry, University of Würzburg, ² Clinical Trial Unit, University Hospital, Würzburg, ³ Comprehensive Heart Failure Center, ⁴ Dept. of Medicine I, Div. of Cardiology, University Hospital Würzburg, ⁵ Rudolf Virchow Center for Experimental Biomedicine, University of Würzburg

Background: Despite clear, evidence based guidelines for prevention in cardiovascular disease (CVD), European surveys have shown that the achievement to the recommended targets of cardiovascular risk factor management in high risk population is still inadequate^{1,2,3}. The current study assessed prevalence and control of risk factors and its determinants in a cross-sectional sample of the general population in a southern German city.

Methods: We used data from n=1468 participants the STAAB Cohort Study (early and asymptomatic heart failure stages A/B) aged 30-79 years of the general population of Würzburg. Subjects with established CVD (self-reported history of coronary artery disease, peripheral artery disease and stroke) were excluded (n=89). We identified the proportions of participants achieving the defined goals for risk factor control according to the European Guidelines on CVD prevention in clinical practice (version 2016): hypertension (blood pressure ≥ 140/90 mmHg), hyperlipidemia (LDL cholesterol ≥ 190 mg/dl), smoking (self-reported), overweight (body mass index > 25 kg/m²), diabetes (HbA1c ≥ 6.5%) and physically inactivity (< 210 min/week moderate or < 105 min/week strenuous activity)⁴. The influence of age, sex, education and marital status on accumulation of risk factors (0-1 vs. 2-6) was assessed by multivariable logistic regression.

Table 2: Prevalence and control of risk factors stratified by sex

	N _{Total} ⁺	Female	Male	p-value
	1379	729	650	
Blood pressure (mmHg), MD (IQR)				
Systolic	129.0 (118.0; 142.0)	123.0 (113.0; 138.0)	133.5 (123.0; 144.0)	< 0.001
Diastolic	79.0 (72.5; 85.5)	76.5 (70.5; 83.5)	81.0 (75.5; 88.0)	
Hypertension, n (%)				
Self-reported	546 (39.6)	282 (38.7)	264 (40.6)	0.47
BP ≥ 140/90 mmHg	433 (31.8)	177 (24.7)	256 (39.6)	< 0.001
Despite medication	193 (14.1)	94 (13.0)	99 (15.3)	0.24
Antihypertensive Tx	372 (27.0)	197 (27.0)	175 (27.0)	1.0
LDL- Cholesterol (mg/dl), MD (IQR)				
Hyperlipidemia, n (%)	120.0 (100.0; 146.0)	117.5 (96.8; 146.0)	123.0 (105.5; 146.0)	< 0.01
Self-reported	488 (35.4)	247 (33.9)	241 (37.1)	0.24
LDL ≥ 190 mg/dl	10.8 (149)	69 (9.5)	80 (12.3)	0.10
Despite medication	1 (0.1)	0 (0.0)	1 (0.2)	0.47
Lipid-lowering agents	112 (8.1)	47 (6.4)	65 (10.0)	0.02
Diabetes, n (%)				
Self reported	79 (5.7)	43 (5.9)	36 (5.5)	0.82
HbA1c ≥ 6.5%	51 (3.9)	22 (3.2)	29 (4.7)	0.20
Despite Antidiabetics	31 (2.3)	11 (1.5)	20 (3.1)	0.04
Antidiabetics	56 (4.1)	25 (3.4)	31 (4.8)	0.22
Physically inactive, n (%)				
Overweight	695 (66.2)	389 (71.5)	306 (60.5)	< 0.001
BMI (kg/m ²), MD (IQR)	25.5 (23.0; 28.9)	24.7 (21.9; 28.5)	26.3 (24.2; 29.1)	< 0.001
BMI > 25 kg/ m ² , n (%)	750 (55.1)	336 (46.7)	414 (64.6)	< 0.001
Despite physically activity, n (%)	208 (17.6)	75 (11.9)	133 (24.3)	< 0.001
Current smoking, n (%)	266 (19.2)	121 (16.6)	145 (22.3)	< 0.01

Results: In our sample of 1379 participants, mean age was 53.1 years (SD 11.9), and 52.9% were female. Despite anti-hypertensive medication, 14.1% of 31.8% hypertensive participants did not reach the recommended target, 3.9% had an HbA1c-Level ≥ 6.5% with an inadequate target in 2.1% and one participant (0.1%) had LDL-levels ≥ 190 mg/dl despite lipid-lowering agents. 66.2% were physically inactive, 55.1% were overweight and 19.2% current smokers. On average, participants had 1.8 risk factors (range 0-6; median: 2.0 (IQR 1.0; 3.0)). In 39.6% we found 0-1 risk factors and in 60.4% 2 or more risk factors. In a multivariable model, risk of presenting with 2 or more risk factors was associated with male sex (OR 1.75, 95%CI 1.32-2.32) and higher age (OR per decade 1.69, 95%CI 1.46-1.95).

Conclusion: Our results derived from the STAAB study indicate that there is considerable potential to improve adherence to guidelines on cardiovascular prevention in primary care, particularly in the management of hypertension, diabetes and modifiable risk factors such as overweight, physically activity and smoking. The association of age and sex–specific differences of a greater number of uncontrolled risk factors may imply that clinically orientated prevention strategies shout not only focus on biomedical risk factors. Barriers of insufficient attention to lifestyle factors and non-adherence on cardiovascular medications from the perspective of patients and health-care providers need to be further investigated.

Literature:

1. Kotseva, K., et al., *EUROASPIRE III. Management of cardiovascular risk factors in asymptomatic high-risk patients in general practice: cross-sectional survey in 12 European countries.* Eur J Cardiovasc Prev Rehabil, 2010. 17(5): p. 530-40.
2. Ludt, S., et al., *The challenge of cardiovascular prevention in primary care: implications of a European observational study in 8928 patients at different risk levels.* Eur J Prev Cardiol, 2014. 21(2): p. 203-13.
3. De Backer, G., et al., *Lifestyle and risk factor management in people at high cardiovascular risk from Bulgaria, Croatia, Poland, Romania and the United Kingdom who participated in both the EUROASPIRE III and IV primary care surveys.* Eur J Prev Cardiol, 2016.
4. Piepoli, M.F., et al., *2016 European Guidelines on cardiovascular disease prevention in clinical practice: The Sixth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of 10 societies and by invited experts): Developed with the special contribution of the European Association for Cardiovascular Prevention & Rehabilitation (EACPR).* Eur J Prev Cardiol, 2016.

Table 1: Sociodemographic status stratified by sex

	N _{Total} ⁺	Female	Male	p-value
	1379	729	650	
Age in years, n (%)				
30-39	166 (12.0)	82 (5.9)	84 (6.1)	0.62
40-49	417 (30.2)	226 (16.4)	191 (13.9)	
50-59	339 (24.6)	185 (13.4)	154 (11.2)	
60-69	340 (24.7)	180 (13.1)	160 (11.6)	
70-79	117 (8.5)	56 (4.1)	61 (4.4)	
Highest educatio in year, n (%)				
Primary (< 10 yrs)	331 (24.1)	163 (11.9)	168 (12.2)	< 0.001
Secondary (10 yrs)	411 (29.9)	257 (18.7)	154 (11.2)	
Tertiary (12 yrs)	621 (45.2)	301 (21.9)	320 (23.3)	
Unclassified	12 (0.9)	7 (0.5)	5 (0.4)	
Marital status, n (%)				
Single	337 (24.5)	117 (12.9)	160 (11.6)	< 0.001
Married	811 (59.0)	369 (28.8)	415 (30.2)	
Divorced	157 (11.4)	104 (7.6)	53 (3.9)	
Widowed	70 (5.1)	51 (3.7)	19 (1.4)	
Net income per month in Euro, n (%)				
< 1500	168 (13.2)	112 (8.8)	56 (4.4)	< 0.001
1500 to <2900	458 (35.9)	259 (20.3)	199 (15.6)	
2900 to <5000	421 (33.0)	192 (17.9)	229 (17.9)	
> 5000	229 (17.9)	99 (7.8)	130 (10.2)	

* Analyses restricted to patients without missing values in respective variables

Table 3: Odds Ratios (OR) (95%-CI) for 0-1 vs. 2-6 uncontrolled risk factors stratified by sociodemographic status (N=889)

Variables	OR (95%-CI)	p –value
Sex		
Female	1	< 0.001
Male	1.75 (1.32; 2.32)	
Age in decades		
1.69 (1.46; 1.95)	< 0.001	
Marital Status[¥]		
0.20		
Married	1	
Single	1.22 (0.86; 1.73)	
Divorced	1.58 (0.96; 2.61)	
Widowed	0.79 (0.40; 1.59)	
Education in years[¥]		
0.26		
Tertiary	1	
Secondary	1.14 (0.82; 1.60)	
Primary	1.38 (0.94; 2.35)	
Household net income per month in Euro		
0.89		
≥ 2300	1	
< 2300	1.03 (0.71; 1.48)	

¥ ORs displayed when removed from model