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Moderation of alcohol intake as a recommendation in European hypertension management guidelines: a survey on awareness, screening, and clinical practice among European physicians

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Moderation of alcohol intake as a recommendation in European hypertension management guidelines: a survey on awareness, screening, and clinical practice among European physicians

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ABSTRACT

Objectives: Moderation of alcohol consumption is included as a class I, level of evidence A recommendation in the current European guidelines for the management of hypertension. We investigated screening and management of alcohol consumption in hypertensive patients by European physicians.

Design and Setting: A cross-sectional survey study conducted in two annual German meetings (German Society of Cardiology and the German Society of Internal Medicine) and two annual European meetings (European Society of Hypertension and European Society Cardiology) in 2015.

Participants: 1,064 physicians attending the European meetings were interviewed including 52.1% cardiologists, 29.2% internists, and 8.8% general practitioners.

Main outcome measures: Physician awareness and attitudes to screening and management of alcohol intake in hypertensive patients on the background of the current European guidelines for the management of hypertension.

Results: Overall, 81.9% of physicians reported to generally quantify alcohol consumption in patients. However, only 28.6% and 14.5% of participants reported taking a history on alcohol consumption in their patients with newly detected or treatment-resistant hypertension. Physicians recommended a maximum alcohol intake of 13.1±11.7 g/day for women (95% CI 12.3 to 13.8) and 19.9±15.6 g/day for men (95% CI 18.8 to 20.9). In case of moderate to high alcohol consumption 10.3% would manage only hypertension without addressing alcohol consumption, while 3.7% of the physicians would do so in case of alcohol dependency ($p<0.001$).

Conclusions: The average amount of alcohol intake per day recommended by European physicians in this survey is in agreement with the guidelines. The low frequency of physicians that specifically determine the history of alcohol consumption in patients with newly detected

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and with treatment-resistant hypertension indicates an important deficit in the management of hypertension.

ARTICLE SUMMARY "STRENGTHS AND LIMITATIONS OF THIS STUDY"

- Identifying deficits in the management of alcohol consumption among European physicians attending annual scientific meetings in the field of cardiovascular or internal medicine indicates a need to develop better future alcohol interventions.
- The majority of physicians participating in this survey were hospital-based (78.5%), although out-patient care in the ambulatory setting plays a predominate role in the long-term management of hypertension.
- Answers were self-reported in a face to face interview, which might have shifted some results upwards and led to an overestimation in our analysis.

KEY WORDS

Hypertension, alcohol management, alcohol screening, survey, guidelines, guidelines implementation.

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INTRODUCTION

High blood pressure (BP) or hypertension represents a main non-communicable risk factor for global burden of disease.[1] In 2015 the global age-standardized prevalence of raised BP was 24.1% in men and 20.1% in women,[2] affecting more than one billion subjects worldwide[3] and thus constituting a primary health concern.[3]

The harmful use of alcohol accounts for 5.1% of the global burden of disease and injury, measured in disability-adjusted life years (DALYs),[4 5] and for 3.3 million deaths every year, representing 5.9% of all deaths worldwide.[5] Among the more than 200 diseases and injuries for which alcohol causality is well established[6] we also find a linear relationship between elevated BP and alcohol consumption.[7 8] Accordingly, moderation of alcohol consumption to no more than 20–30 g of ethanol per day in men and 10–20 g of ethanol per day in women was, for the first time with a class I evidence level A, one of the six recommended lifestyle changes in the recent European Society of Hypertension (ESH) and European Society of Cardiology (ESC) guidelines for the management of arterial hypertension[9] (supplementary table 1).

Currently, BP control rates in treated hypertensive patients across Europe are insufficient, with less than 50% of the patients achieving BP goals,[10-12] and alcohol seems to be the least intervened factor in the management of hypertension.[13-15] According to the latest World Health Organization status report on alcohol and health[6] the amount of alcohol consumed in the European Region is almost twice the world average.[6] Thus, efforts aiming to improve BP control, specifically through interventions in the management of alcohol consumption, are justified. Furthermore, the impact of screening and brief interventions for alcohol use in primary care have been proven positive in many European projects,[16 17] such as the PHEPA (Primary Health Care European Project on Alcohol)[18] and the ODHIN (Optimizing Delivery of Health Care).[19 20]

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Against this background, we conducted a survey to investigate the screening and management approaches of European physicians across different specialties, workplaces, and clinical settings concerning alcohol consumption in the management of their hypertensive patients.

METHODS

The data were collected in a survey carried out at four annual congresses between April and October of 2015. Two of the meetings were German (meeting of the German Society of Cardiology [DGK][21] and the German Society of Internal Medicine [DGIM][22]), and two were European (ESH[23] and ESC[24]). Attending physicians willing to participate were interviewed in German language at the two German meetings and in English at the two European meetings. The complete questionnaire consisted of two parts; the first containing ten (supplementary table 2), and the second six questions (table 1), respectively. Basic demographic data of the participants as well as awareness and implementation of the six recommended life style changes in the 2013 ESH/ESC guidelines[9] into clinical practice were assessed through part one (supplementary table 2); the results are reported elsewhere.[25] Part two of the survey included six questions (table 1), which focused exclusively on the awareness and clinical management attitudes of European physicians regarding the role of moderation of alcohol intake in the management of their hypertensive patients.

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Table 1 Questionnaire items included in part two of the survey.

Items	Topic	Answers
Q11	**Do you quantify alcohol consumption in your patients with hypertension?**	Yes/No
Q12	**When do you ask for alcohol consumption in patients with hypertension?**	-In patients with newly detected hypertension -In patients with hypertension and very high pressure -In patients with treatment resistant hypertension -Free text answers were classified in "rarely-never"/"always-regularly" for analysis
Q13	**What actions will you take when you diagnose someone with hypertension and moderate or high alcohol consumption?**	-Manage and treat both problems yourself -Manage only hypertension -Manage only hypertension and refer to a general practitioner for the management of alcohol problems -Manage only hypertension and refer to specialist care for alcohol problems -Other (specify)
Q14	**What actions will you take when you diagnose someone with both alcohol dependence and hypertension?**	-Manage and treat both problems yourself -Manage only hypertension-Manage only hypertension and refer to a general practitioner for management alcohol problems -Manage only hypertension and refer to specialist care for alcohol problems -Other (specify)
Q15	**Which maximum amount of alcohol in g/day do you advise your female/ male patients with hypertension?**	Insert number, spontaneously answered
Q16	**How many of your hypertension patients have additional alcohol problems [in %]?**	Insert number, spontaneously answered

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Statistical analysis

Data were analysed with SPSS software (IBM SPSS Statistics 24). The number of responses available for each questionnaire item is reported, and relative frequencies are given as adjusted percentages excluding missing values. For each variable of interest comparisons within the following subgroup categories were performed: meeting (European: ESH/ESC vs. German: DGK/DGIM), place of work (hospital vs. practice), medical specialization (GP vs. cardiologists vs. internists vs. other specializations). For comparison between qualitative parameters chi-square test analyses were performed. For quantitative parameters, t-test or one-way ANOVA with Bonferroni post-hoc correction for multiple comparisons were applied. A two-sided p value <0.05 was considered statistically significant.

RESULTS

The characteristics of the participating physicians are given in table 2. Overall, 1,064 physicians (37.4% female) took part in the survey (806 at the European and 258 at the German meetings, respectively). They were predominantly cardiologists (52.1%) and internists (29.2%), while 8.8% were general practitioners (GPs); and 78.5% of all physicians were hospital-based.

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Table 2 Characteristics of participating physicians

	All meetings n=1,064	**European meetings ESC/ESH 2015 n=806 (75.8%)**	**German meetings DGIM/DGK 2015 n=258 (24.2%)**
Sex			
Women	396 (37.4%)	281 (35.0%)	115 (44.6%)
Men	664 (62.6%)	521 (65.0%)	143 (55.4%)
Missing data	4	4	0
Age category			
20-29 years	89 (8.4%)	76 (9.5%)	13 (5%)
30-39	261 (24.6%)	205 (25.6%)	56 (21.7%)
40-49	310 (29.3%)	235 (29.3%)	75 (29.1%)
50-59	274 (25.9%)	196 (24.5%)	78 (30.2%)
60 years or older	125 (11.8%)	89 (11.1%)	36 (13.9%)
Missing data	5	5	0
Nationality			
European countries	1004 (94.8%)	746 (93.1%)	258 (100%)
Non-European countries	55 (5.2%)	55 (6.9%)	0
Missing data	5	5	0
Place of work			
Practice	226 (21.5%)	130 (16.4%)	96 (37.4%)
Hospital	824 (78.5%)	663 (83.6%)	161 (62.6%)
Missing data	14	13	1
Specialization			
General practitioner	93 (8.8%)	81 (10.1%)	12 (4.7%)
Cardiologist	551 (52.1%)	443 (55.3%)	108 (42.2%)
Internist	308 (29.1%)	200 (25.0%)	108(42.2%)
Other specialization	105 (9.9%)	77 (9.6%)	28 (10.9%)
Missing data	7	5	2
Membership			
ESH and/ or ESC	494 (60.4%)	494 (87.9%)	NA

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Membership in the DHL	24 (2.9%)	NA	24 (9.4%)
No ESH/ ESC or DHL membership	300 (36.7%)	68 (12.1%)	232 (90.6%)
Membership total	518 (63.3%)	NA	NA
Missing data	246	NA	2

Numbers and percentages refer to total responses available for each item; relative frequencies are reported as adjusted percentages excluding missing values.

ESC, European Society of Cardiology; ESH, European Society of Hypertension; DGIM, German Society of Internal Medicine; DGK, German Society of Cardiology; DHL, German Society of Hypertension; NA, not applicable

Estimation of hypertensive patients with additional alcohol problems

Participating physicians (n=946) estimated that 18.0%±15.9% (range: 0–95%) of their patients with hypertension have additional alcohol problems. Higher percentages were estimated by physicians attending the German meetings compared to their colleagues attending the European meetings (22.3% vs. 16.8%; $p<0.001$). By their own estimates, physicians working in a practice managed significantly higher rates of hypertensive patients with additional alcohol problems than their hospital-based colleagues (estimated 21.4% patients visiting a practice have additional alcohol problems vs. estimated 17.2% in hospital; $p<0.05$). Concerning different medical specializations, GPs estimated a significantly higher percentage of their hypertensive patients (27%, $p<0.001$) suffered from additional alcohol problems compared to cardiologists (16.7%), internists (18.4%), or physicians from other specializations (16.9%).

Quantification of alcohol consumption

Overall, 81.9% of participating physicians (n=1,028) responded “yes” to the question “Do you quantify alcohol consumption in your patients with hypertension?” (Q11, table 1). Physicians attending the German meetings quantified the alcohol consumption of their hypertensive patients significantly less often than their peers attending the European meetings

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(74.5% vs. 84.3%; p<0.001). The frequencies for quantification of alcohol consumption did not show any statistically significant association according to place of work or specialization of physicians (data not shown).

Screening of alcohol consumption in different clinical settings

To the question "When do you ask for alcohol consumption in patients with hypertension?" 986 physicians responded (figure 1A). The medical history of alcohol consumption was taken primarily in the context of newly detected hypertension (28.6%) rather than in patients with hypertension and very high BP (17.5%) or in patients with treatment-resistant hypertension (14.5%). Free-text answers were additionally sorted by meaning and classified into "regularly/always" and "never/rarely". Overall, 55.2% of the respondent physicians reported quantifying alcohol consumption in their hypertensive patients regularly. When responses of the attendees at the European and German meetings were compared, significantly more physicians attending the European meetings reported taking the history of alcohol in their hypertensive patients regularly (68.8% vs. 10.8%; p<0.001; figure 1A).

GPs asked significantly more often (42.5%) than internists (28.2%), cardiologists (26.8%), or physicians from other medical specializations (25.8%; all p<0.05) about alcohol consumption in patients with newly detected hypertension. Similar differences between GPs and physicians from other specialties were observed concerning taking the medical history of alcohol consumption in patients with very high BP as well as in patients with treatment-resistant hypertension (figure 1B).

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Referring hypertensive patients to other specialist to address alcohol problems

In patients with both hypertension and moderate to high alcohol consumption, 52% of the responding physicians (n=1,021) would treat and manage both conditions by themselves and 10.3% would manage only hypertension without taking further action. In case of alcohol dependence, 13.8% would treat both hypertension and alcohol addiction, while 3.7% would treat only hypertension without taking further action, and 64.1% would only treat hypertension and refer the patient to specialist care for alcohol dependence ($p<0.001$). These differences are shown in figure 2.

In patients with moderate or high alcohol consumption but without alcohol dependence, 58.9% of the internists reported managing both hypertension and alcohol problems significantly more as compared to cardiologists (49.2%) and other specialists (44%; $p<0.001$). Differences between internists and GPs were not statistically significant (58.9% vs. 52.8%; $p>0.05$). In addition, physicians working in a practice were significantly more likely to manage both hypertension and the alcohol problems themselves than their colleagues working in a hospital (59.1% vs. 50.3%; $p<0.05$). Physicians attending the German meetings reported managing both alcohol dependence and hypertension significantly more often by themselves than their colleagues attending the European meetings (14.7% vs. 10.9%; $p<0.001$).

Amount of alcohol recommended

Physicians reported to recommend a maximum alcohol intake of 13.1±11.7 g/day for women (n=901 reporting physicians; 95% CI 12.3 to 13.8; range: 0–150) and 19.9±15.6 g/day for men (n=884 reporting physicians; 95% CI 18.8 to 20.9; range: 0–150). Physicians attending the German meetings were significantly more tolerant in their recommendations of the maximum amount of alcohol per day for women and men than their colleagues attending the European meetings (15.8±9.4 g/day vs. 12.1±12.2 g/day for women and 28.3±17.5 g/day vs. 16.9±13.7 g/day for men; $p<0.001$). Physicians working in a practice were consistently more

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tolerant than hospital-based physicians in their recommended maximum alcohol intake for men (23.5±20.8 g/day vs. 18.8±13.6 g/day; $p<0.05$), but not for women (14.7±15.0 g/day vs. 12.6±10.5g/day; $p>0.05$). Significant differences were not observed for the intake of men or women between physicians belonging to different medical specializations (table 3).

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Table 3 Recommendation for Alcohol intake of participating physicians

	N participating physicians	Mean±SD	95% CI	Range	p value
	Recommendation for alcohol intake of women (g/day) from participants of the different congresses				
German meetings	231	15.8±9.4	14.6–17.0	0–50	
European meetings	669	12.1±12.2	11.2–13.0	0–150	p<0.001
	Recommendation for alcohol intake of men (g/day) from participants of the different congresses				
German meetings	227	28.3±17.5	26.0–30.6	0–100	
European meetings	662	16.9±13.7	15.9–18.0	0–150	p<0.001
	Recommendation for alcohol intake of women (g/day) for the participants according to their place of work				
Hospital	697	12.6±10.5	11.8–13.4	0–150	
Practice	197	14.7±15.0	12.5–16.8	0–100	p=0.07
	Recommendation for alcohol intake of men (g/day) for the participants according to their place of work				
Hospital	689	18.8±13.6	17.8–19.8	0–125	
Practice	194	23.5±20.8	20.5–26.4	0–150	p=0.04
	Recommendation for alcohol intake of women (g/day) for the participants according to their medical specialization				
Cardiologist	471	12.8±11.3	11.8–13.9	0–100	
Internist	271	14.0±13.7	12.3–15.6	0–150	p=0.35
GP	70	11.9±8.9	9.8–14.0	0–50	
Other	84	11.9±8.2	10.2–13.7	0–50	
	Recommendation for alcohol intake of men (g/day) for the participants according to their medical specialization				
Cardiologist	467	19.6±16.2	18.1–21.1	0–150	
Internist	266	21.1±15.5	19.2–22.9	0–125	p=0.38
GP	72	18.5±13.3	15.3–21.7	0–60	
Other	80	18.0±14.0	14.9–21.2	0–60	

SD, standard deviation; CI, confidence Interval; GP, general practitioner

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DISCUSSION

The relationship between elevated BP and alcohol consumption is well established,[7 8] and the importance of their burden of diseases[1-6] prove them as global public health priorities. Nevertheless, until the last fifteen years, alcohol policies were largely not supported by sufficient research findings.[26 27] Recently, globally important public health organizations such as GAPA (Global Alcohol Policy Alliance)[28] supported the generation of evidence-based recommendations on alcohol policies.[28] In Europe, AMPHORA (Alcohol Measures for Public Health Research Alliance)[29] was the first research project on alcohol from a public health perspective that had been co-financed by the European Commission through the Seventh Framework Program of Research.[30] AMPHORA's affiliated organizations from all 27 member states aimed to generate scientific evidence about alcohol consumption and alcohol-related harm to help cover the European policy gap.[29] In its final report updated in August 2013, AMPHORA reported that there is still a lot to be done and emphasized the need to identify more clearly which factors at an European level are limiting the effectivity and implementation of alcohol policies.[31] Therefore, our efforts assessing the awareness, screening, and current interventions in alcohol consumption in hypertensive patients among European physicians are very well justified.

Our analysis showed that European physicians also recognize a high prevalence of high BP and comorbid alcoholism. About 27% of the patients with hypertension have additional alcohol problems, as estimated by their treating physicians. Similarly, in the general population aged 15–64 years, 300 of 1,000 men consume 40 g of alcohol or more per day in Europe.[32] Some aspects and practices on the management of alcohol in patients with hypertension observed in the current survey appear acceptable or positive. These include the amount of alcohol recommended by the participating physicians for both genders, which was below the thresholds recommended in the European guidelines.[9] In addition, more than 80%

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of the physicians reported to generally quantify the alcohol consumption of their hypertensive patients. The screening of alcohol consumption was, however, very poor in some important clinical settings: less than a third of the European physicians asked about alcohol consumption in cases of newly detected hypertension and less than a fifth asked in patients with very high BP. Moreover, even fewer (14.5% of the participating physicians) asked about alcohol consumption in patients with treatment-resistant hypertension. This is of major clinical interest, because 10–30% of patients with hypertension are considered to be resistant to treatment,[33 34] and patients with treatment-resistant hypertension have a considerably higher risk for stroke, cardiovascular and kidney disease than patients with controlled hypertension, as shown in multiple studies.[35-38] Furthermore, there is good evidence that treatment-resistant hypertension can also be linked to non-adherence to moderation of alcohol consumption.[39-41] Regarding the low frequency of physicians asking about alcohol consumption in newly detected hypertension, in patients with very high BP, and in patients with treatment resistance observed in our current study, we cannot exclude the possibility that some physicians assumed that answering "regularly" in our survey did include all of the situations mentioned above, although this question was read in the interview as a multiple choice question with possibility of more than one answer (Q12 in figure 1). Even when considering this possibility, only half of the interviewed physicians, and also half of the GPs, answered "regularly" to the question: "When do you ask about alcohol consumption in patients with hypertension?" These percentages of history-taking of alcohol are still unsatisfactory.

In comparison to a similar study conducted exclusively in GPs in Europe, *Rehm* et al.[13] noted that 34% of interviewed GPs reported sufficient screening of alcohol in patients with hypertension. However, the study design and questions are not fully comparable with the present report: The study by Rehm et al.,[13] was based on online interviews, and the interviewers did not ask if GPs quantified alcohol consumption in their hypertensive patients

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(yes/no). Instead, sufficient screening was assumed if GPs screened at least 7 out of 10 hypertensive patients for alcohol consumption.[13] In another study in GPs by *Kraus* et al.,[42] also conducted through an online survey, less than half of the German and European patients with hypertension in primary care were screened for alcohol use.[42] Collectively, the findings by *Rehm et al.*[13] and *Kraus et al.*[42] are in agreement with our analysis in showing that screening for alcohol consumption in hypertensive patients is poor among German and European GPs and should be improved.

In the current survey, a significantly greater fraction of physicians participating at the German meetings estimated that patients exhibit both hypertension and alcohol problems as compared to the participants at the European meetings. Nevertheless, a significantly greater fraction of physicians attending the German meetings (25.5%) did not quantify alcohol consumption in their hypertensive patients as compared to their European colleagues (15.7%). Accordingly, physicians attending the German meetings had a lower level of awareness about the class I level of evidence A recommendation on the moderation of alcohol consumption contained in the ESH/ESC Guidelines[9] than their European peers.[25] Similarly, *Kraus et al.*[42] reported in their survey analysis, that German GPs do not consider alcohol intake as a major risk for hypertension.[42] It is arguable that these differences between German and European physicians are due to a stronger cultural bond with alcohol than other European countries,[43 44] which might obscure the perception of alcohol-related harm among German physicians.

Among the limitations of this study, there might have been a bias towards inclusion of physicians who have a particular interest in the management of hypertension. In addition, the majority of physicians participating in the survey were hospital-based (78.5 %), although long-term management of hypertension is predominantly carried out in an ambulatory setting. Moreover, because some questions were formulated as closed questions (i.e. questions that

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can be answered with yes/no) and answers were self-reported, social pressure might have shifted some results upwards and led to an overestimation in our analysis.

In summary, European physicians recognize the high prevalence of comorbid hypertension and alcohol problems and some aspects of their management strategies in hypertensive patients regarding alcohol consumption appear adequate. In contrast, the frequency of alcohol history taking in cases of newly detected hypertension, in patients with very high BP, and in treatment-resistant hypertension is very poor. Given the clinical importance of the latter conditions, the current report further supports the notion that improvements of awareness among European physicians on moderation of alcohol intake as an important modifiable lifestyle factor in hypertension management are necessary.

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Contributors

LTZ performed the statistical analyses, interpreted the data and wrote the manuscript. JB supervised the statistical analyses and revised the manuscript. TGR helped perform the statistical analyses with constructive discussion and revised the manuscript. RK conceived and designed the study, revised the manuscript for important intellectual content, and provided supervision.

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Competing interests

None declared.

Patient consent

Not required.

Data sharing statement

No additional data are available.

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References

1. Forouzanfar MH, Alexander L, Anderson HR, et al. Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks in 188 countries, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. *The Lancet* 2015;386(10010):2287-323. doi: 10.1016/S0140-6736(15)00128-2
2. NCD-Risc Factor Collaboration. Worldwide trends in blood pressure from 1975 to 2015: a pooled analysis of 1479 population-based measurement studies with 19,1 million participants. *The Lancet* 2017;389(10064):37-55. doi: 10.1016/S0140-6736(16)31919-5
3. Ettehad D, Emdin CA, Kiran A, et al. Blood pressure lowering for prevention of cardiovascular disease and death: a systematic review and meta-analysis. *Lancet* 2016;387(10022):957-67. doi: 10.1016/s0140-6736(15)01225-8
4. Rehm J, Imtiaz S. A narrative review of alcohol consumption as a risk factor for global burden of disease. *Subst Abuse Treat Prev Policy* 2016;11(1):37. doi: 10.1186/s13011-016-0081-2
5. Word Health Organization. Alcohol-Fact sheet from the World Health Organization's Media Centre 2015. http://www.who.int/mediacentre/factsheets/fs349/en/ (accessed 24 February 2017) Archived by WebCite ® http://www.webcitation.org/6v7UXNd10.
6. World Health Organization. Global status report on alcohol and health, 2014.
7. Taylor B, Irving HM, Baliunas D, et al. Alcohol and hypertension: gender differences in dose-response relationships determined through systematic review and meta-analysis. *Addiction* 2009;104(12):1981-90. doi: 10.1111/j.1360-0443.2009.02694.x
8. Roerecke M, Kaczorowski J, Tobe SW, et al. The effect of a reduction in alcohol consumption on blood pressure: a systematic review and meta-analysis. *The Lancet Public Health*;2(2):e108-e20. doi: 10.1016/S2468-2667(17)30003-8
9. Mancia G, Fagard R, Narkiewicz K, et al. 2013 ESH/ESC Guidelines for the management of arterial hypertension: the Task Force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC). *Journal of hypertension* 2013;31(7):1281-357. doi: 10.1097/01.hjh.0000431740.32696.cc
10. Redon J, Mourad JJ, Schmieder RE, et al. Why in 2016 are patients with hypertension not 100% controlled? A call to action. *Journal of hypertension* 2016;34(8):1480-8. doi: 10.1097/hjh.0000000000000988
11. Borghi C, Tubach F, De Backer G, et al. Lack of control of hypertension in primary cardiovascular disease prevention in Europe: Results from the EURIKA study. *Int J Cardiol* 2016;218:83-8. doi: 10.1016/j.ijcard.2016.05.044
12. Wang YR, Alexander GC, Stafford RS. Outpatient hypertension treatment, treatment intensification, and control in Western Europe and the United States. *Arch Intern Med* 2007;167(2):141-7. doi: 10.1001/archinte.167.2.141
13. Rehm J, Prieto JA, Beier M, et al. The role of alcohol in the management of hypertension in patients in European primary health care practices - a survey in the largest European Union countries. *BMC family practice* 2016;17(1):130. doi: 10.1186/s12875-016-0529-5
14. Rehm J, Gmel G, Serra C, et al. Reducing non-communicable disease via better detection of hypertension and alcohol problems in primary health care in Spain. *Adicciones* 2016;0(0):726-26.
15. Collart F, de Timary P, Dom G, et al. Alcohol-induced hypertension: an important healthcare target in Belgium. *Acta Clin Belg* 2015;70(6):389-95. doi: 10.1179/2295333715y.0000000039

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16. Kaner EF, Beyer F, Dickinson HO, et al. Effectiveness of brief alcohol interventions in primary care populations. *Cochrane Database Syst Rev* 2007(2):Cd004148. doi: 10.1002/14651858.CD004148.pub3
17. Rehm J, Anderson P, Prieto JAA, et al. Towards new recommendations to reduce the burden of alcohol-induced hypertension in the European Union. *BMC medicine* 2017;15(1):173. doi: 10.1186/s12916-017-0934-1
18. PHEPA Network - Primary Health Care European Project on Alcohol http://www.phepa.net/units/phepa/html/en/Du9/index.html (accessed 10 March 2016) Archived by Webcite ® at: http://www.webcitation.org/6v7Uvwrtc.
19. The ODHIN project (Optimizing delivery of health care interventions) 2011-2014. http://www.odhinproject.eu/ (accessed 24 February 2017) Archived by Webcite ® at: http://www.webcitation.org/6v7V52XGF.
20. Anderson P, Kaner E, Keurhorst M, et al. Attitudes and Learning through Practice Are Key to Delivering Brief Interventions for Heavy Drinking in Primary Health Care: Analyses from the ODHIN Five Country Cluster Randomized Factorial Trial. *International Journal of Environmental Research and Public Health* 2017;14(2):121.
21. German Society of Cardiology, DGK Düsseldorf. https://dgk.org/ (accessed 10 March 2016) Archived by Webcite ® at: http://www.webcitation.org/6v8VsEMT1.
22. German Society of Internal Medicine, DGIM Wiesbaden. http://www.dgim.de/ (accessed 10 March 2016) Archived by Webcite ® at: http://www.webcitation.org/6v8wocemO.
23. European Society of Hypertension, ESH Europe. http://www.eshonline.org/ (accessed 10 March 2016) Archived by Webcite ® at: http://www.webcitation.org/6v8wyBSdH.
24. European Society of Cardiology, ESC Europe. https://www.escardio.org/ (accessed 10 March 2016) Archived by Webcite ® at: http://www.webcitation.org/6v8x6BPT3.
25. Bolbrinker J, Zaidi Touis L, Gohlke H, et al. European guidelines on lifestyle changes for management of hypertension : Awareness and implementation of recommendations among German and European physicians. *Herz* 2017 doi: 10.1007/s00059-017-4575-0
26. Allamani A, Voller F, Decarli A, et al. Contextual determinants of alcohol consumption changes and preventive alcohol policies: a 12-country European study in progress. *Subst Use Misuse* 2011;46(10):1288-303. doi: 10.3109/10826084.2011.572942
27. Norström T, Simpura J, Hemström Ö, et al. Conclusions : Alcohol in postwar Europe: consumption, drinking patterns, consequences and policy responses in 15 European countries. Alcohol in postwar Europe: consumption, drinking patterns, consequences and policy responses in 15 European countries: Almqvist&Wiksell 2002:185-94.
28. GAPA (Global Alcohol Policy Alliance). he Global Alcohol Policy Alliance is a network of non-governmental organisations and people working in public health agencies who share information on alcohol issues and advocate evidence-based alcohol policies, "free from commercial interests." Resource centres affiliated to GAPA operate in Africa, European Union, South America, South East Asia, USA and Western Pacific regions. http://globalgapa.org/index.php/about-us/ (accessed 24 february 2017) Archived by Webcite ® at: http://www.webcitation.org/6v8wbf9GA.
29. AMPHORA. Project description-The European Alcohol Policy Research Alliance 2010. http://www.amphoraproject.net/view.php?id_cont=46&PHPSESSID=ecp57e414c2gc4c7bhaflt3i62 (accessed 24 April 2017) Archived by Webcite ® at: http://www.webcitation.org/6v7VN9xDY.
30. European Commission. Alcohol Measures for Public Health Research Alliance (AMPHORA): EU Publications Office,; 2009. http://cordis.europa.eu/project/rcn/92876_en.htmlArchived by Webcite ® at: http://www.webcitation.org/6v8wDS9Zt.

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31. AMPHORA. Final Report Summary - AMPHORA (Alcohol Measures for Public Health Research Alliance): European Commission, 2013.
32. Rehm J, Shield K, Rehm M, et al. Alcohol consumption, alcohol dependence, and attributable burden of disease in Europe: Potential gains from effective interventions for alcohol dependence2012.
33. Cai A, Calhoun DA. Resistant Hypertension: An Update of Experimental and Clinical Findings. *Hypertension (Dallas, Tex : 1979)* 2017;70(1):5-9. doi: 10.1161/hypertensionaha.117.08929
34. Sim JJ, Bhandari SK, Shi J, et al. Characteristics of resistant hypertension in a large, ethnically diverse hypertension population of an integrated health system. *Mayo Clinic proceedings* 2013;88(10):1099-107. doi: 10.1016/j.mayocp.2013.06.017
35. Sim JJ, Bhandari SK, Shi J, et al. Comparative risk of renal, cardiovascular, and mortality outcomes in controlled, uncontrolled resistant, and nonresistant hypertension. *Kidney international* 2015;88(3):622-32. doi: 10.1038/ki.2015.142
36. Muntner P, Davis BR, Cushman WC, et al. Treatment-resistant hypertension and the incidence of cardiovascular disease and end-stage renal disease: results From the Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT). *Hypertension (Dallas, Tex : 1979)* 2014;64(5):1012-21. doi: 10.1161/hypertensionaha.114.03850
37. Daugherty SL, Powers JD, Magid DJ, et al. Incidence and prognosis of resistant hypertension in hypertensive patients. *Circulation* 2012;125(13):1635-42. doi: 10.1161/circulationaha.111.068064
38. de Beus E, Bots ML, van Zuilen AD, et al. Prevalence of Apparent Therapy-Resistant Hypertension and Its Effect on Outcome in Patients With Chronic Kidney Disease. *Hypertension (Dallas, Tex : 1979)* 2015;66(5):998-1005. doi: 10.1161/hypertensionaha.115.05694
39. Diaz KM, Booth JN, Calhoun DA, et al. Healthy Lifestyle Factors and Risk of Cardiovascular Events and Mortality in Treatment-Resistant Hypertension: The Regards Study. *Hypertension (Dallas, Tex : 1979)* 2014;64(3):465-71. doi: 10.1161/hypertensionaha.114.03565
40. Shimbo D, Levitan EB, Booth JN, et al. The Contributions of Unhealthy Lifestyle Factors to Apparent Resistant Hypertension: Findings from the REasons for Geographic And Racial Differences in Stroke (REGARDS) Study. *Journal of hypertension* 2013;31(2) doi: 10.1097/HJH.0b013e32835b6be7
41. Sarafidis PA, Georgianos P, Bakris GL. Resistant hypertension--its identification and epidemiology. *Nat Rev Nephrol* 2013;9(1):51-8. doi: 10.1038/nrneph.2012.260
42. Kraus L, Schulte B, Manthey J, et al. Alcohol screening and alcohol interventions among patients with hypertension in primary health care: an empirical survey of German general practitioners. *Addiction Research & Theory* 2017;25(4):285-92. doi: 10.1080/16066359.2016.1263728
43. P. Anderson LMaGG. Alcohol in the European Union. Consumption, harm and policy approaches: World Health Organization 2012, 2012.
44. Karlsson T, Simpura J. Changes in living conditions and their links to alcohol consumption and drinking patterns in 16 European countries, 1950 to 2000. *Nordic Studies on Alcohol and Drugs* 2001;18(1_suppl):82-99. doi: 10.1177/145507250101801S03

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Figure captions

Figure 1. Proportion of physicians (%) answering the multiple choice question: "When do you ask for alcohol consumption in patients with hypertension?"

A. Proportion of physicians (n=986) attending the European meetings compared to the physicians attending the German meetings. Differences are significant *p value<0.05

BP, blood pressure; ESC, European Society of Cardiology; ESH, European Society of Hypertension; DGIM, German Society of Internal Medicine; DGK, German Society of Cardiology

B. Proportion of physicians from different medical specialities (n= 981); *Difference is significant p value <0.05 for GP compared to each one of the other specializations.

BP, blood pressure; GP, general practitioner

Figure 2 Proportion of physicians (%) answering the multiple choice question: "What actions will you take when you diagnose someone with hypertension and alcohol consumption?"

Differences are significant *p value ≤0.001 in case of *moderate and high consumption alcohol consumption* (n=1021 physicians) vs. *alcohol dependence* (n=1025 physicians);

GP, general practitioner

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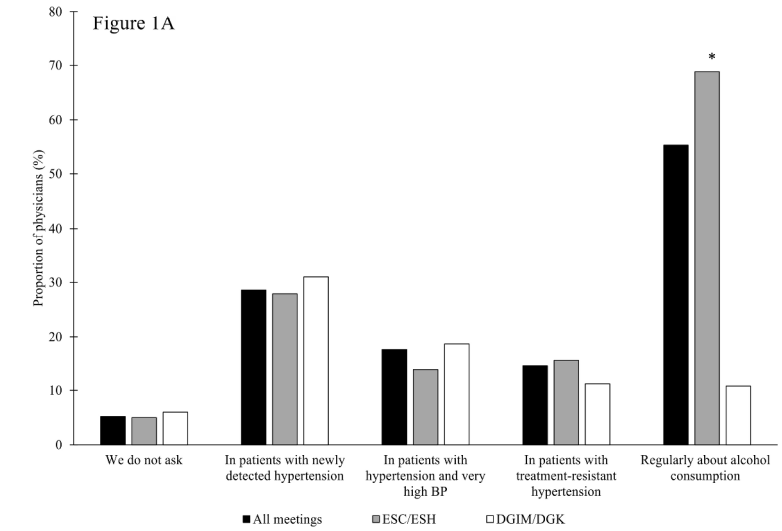

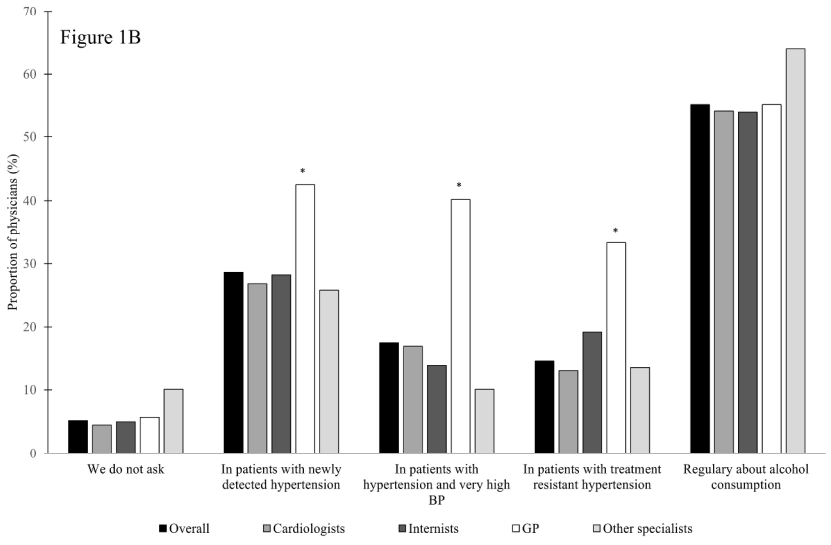

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270x341mm (300 x 300 DPI)

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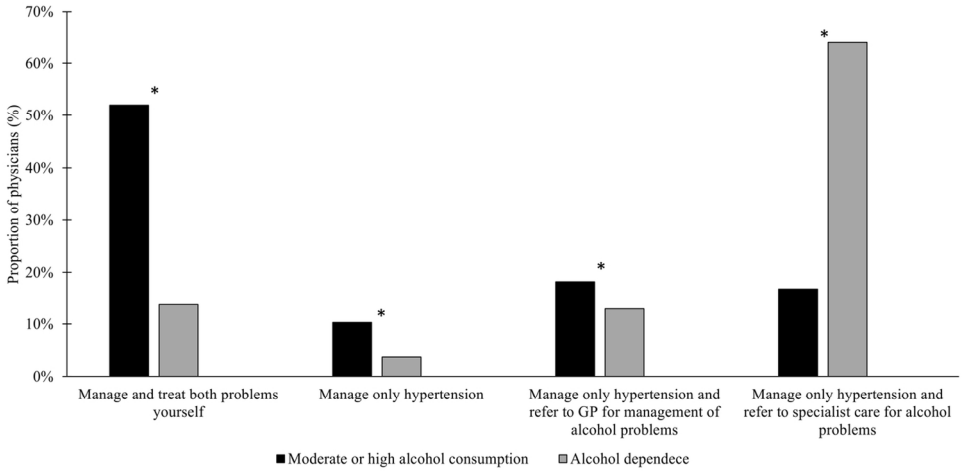

Figure 2 Proportion of physicians (%) answering the multiple choice question: "What actions will you take when you diagnose someone with hypertension and alcohol consumption?" Differences are significant *p value ≤0.001 in case of moderate and high consumption alcohol consumption (n=1021 physicians) vs. alcohol dependence (n=1025 physicians). GP, general practitioner

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Moderation of alcohol intake as a recommendation in European hypertension management guidelines: survey on awareness, screening, and clinical practice among European physicians

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Supplementary Table 1 Recommended lifestyle changes with class I evidence level A according to the 2013 ESH/ESC guidelines for the management of arterial hypertension [1].

Salt restriction to 5–6 g per day
Moderation of alcohol consumption to no more than 20–30 g of ethanol per day in men and 10–20 g of ethanol per day in women
Increased consumption of vegetables, fruits, and low-fat dairy products
Reduction of weight to BMI of 25 kg/m^2 and of waist circumference to <102 cm in men and <88 cm in women
Regular exercise, i.e. at least 30 min of moderate dynamic exercise on 5 to 7 days per week
Advise all smokers to **quit smoking** and offer assistance

ESH, European Society of Hypertension; ESC, European Society of Cardiology; BMI, body mass index

1. Mancia, G., et al., *2013 ESH/ESC Guidelines for the management of arterial hypertension: the Task Force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC).* J Hypertens, 2013. **31**(7): p. 1281-357.

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Supplementary Table 2 Questionnaire items included in part one of the survey.

Items	Topic	Answers
Q1	Attended congress	ESC: London, August/ September 2015 ESH: Milan, June 2015 DGK: Berlin, October 2015 DGIM: Mannheim, April 2015
Q2	Gender	Pre-specified: female/ male
Q3	Age category	Pre-specified: 20-29 years/ 30-39/ 40-49/ 50-59/ 60 or older
Q4	Nationality (only European meetings)	Pre-specified: European citizen/ other
Q5	Place of work	Pre-specified: hospital/ practice
Q6	Specialization	Pre-specified: GP/ internist/ cardiologist/ other
Q7	Membership	European meetings Pre-specified: ESH/ ESC/ National Hypertension Society German meetings Pre-specified: DHL yes/ no
Q8	How many patients have you seen with hypertension in the last four weeks?	Insert number
Q9	Which lifestyle changes are recommended by the ESH/ESC hypertension guidelines?	Spontaneously answered
Q10	Which lifestyle changes do you recommend your patients with hypertension?	Spontaneously answered

BP, blood pressure; ESC, European Society of Cardiology; ESH, European Society of Hypertension; DGIM, German Society of Internal Medicine; DGK, German Society of Cardiology; DHL, German Society of Hypertension; GP, general practitioner

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1, 2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	5
Methods			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5, 6, supplementary page 2
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	5
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5, 6, supplementary page 2
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5, 6 , supplementary page 2
Bias	9	Describe any efforts to address potential sources of bias	Not applicable
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7
		(*b*) Describe any methods used to examine subgroups and interactions	7
		(*c*) Explain how missing data were addressed	7
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	Not applicable

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		(*e*) Describe any sensitivity analyses	Not applicable
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	8–13
		(b) Give reasons for non-participation at each stage	Not applicable: voluntary survey.
		(c) Consider use of a flow diagram	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8, 9
		(b) Indicate number of participants with missing data for each variable of interest	8, 9
Outcome data	15*	Report numbers of outcome events or summary measures	9–13
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9–13
		(*b*) Report category boundaries when continuous variables were categorized	11–13
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not applicable
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	9–13
Discussion			
Key results	18	Summarise key results with reference to study objectives	17
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	16, 17
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	14–17
Generalisability	21	Discuss the generalisability (external validity) of the study results	14–16
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	18

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

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Moderation of alcohol consumption as a recommendation in European hypertension management guidelines: a survey on awareness, screening, and implementation among European physicians

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Secondary Subject Heading:	Public health
Keywords:	alcohol management, survey, alcohol screening, guidelines implementation, lifestyle changes, Hypertension < CARDIOLOGY

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Moderation of alcohol consumption as a recommendation in European hypertension management guidelines: a survey on awareness, screening, and implementation among European physicians

Laila Zaidi Touis[1], Juliane Bolbrinker[1], Thomas G. Riemer[1], Reinhold Kreutz[1]

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ABSTRACT

Objectives: Moderation of alcohol consumption is included as a class I, level of evidence A recommendation in the current European guidelines for the management of hypertension. We investigated its awareness, and self-reported implementation among European physicians across different specialties and workplaces.

Design and Setting: A cross-sectional survey study conducted in two annual German meetings (German Society of Cardiology and the German Society of Internal Medicine) and two annual European meetings (European Society of Hypertension and European Society Cardiology) in 2015.

Participants: 1,064 physicians attending the European meetings were interviewed including 52.1% cardiologists, 29.2% internists, and 8.8% general practitioners.

Main outcome measures: Physician screening of alcohol consumption, awareness, and self-implementation of the recommendation of the current European guidelines about moderation of alcohol consumption for the management of hypertension.

Results: Overall, 81.9% of physicians reported to generally quantify alcohol consumption in patients with hypertension. However, only 28.6% and 14.5% of participants reported screening alcohol consumption in their patients with newly detected or treatment-resistant hypertension. Physicians recommended a maximum alcohol intake of 13.1±11.7 g/day for women (95% CI 12.3 to 13.8) and 19.9±15.6 g/day for men (95% CI 18.8 to 20.9). In case of moderate to high alcohol consumption 10.3% would manage only hypertension without addressing alcohol consumption, while 3.7% of the physicians would do so in case of alcohol dependence ($p<0.001$).

Conclusions: The average amount of alcohol intake per day recommended by European physicians in this survey was in agreement with the guidelines. The low number of physicians that screen for alcohol consumption in patients with newly detected and with treatment-resistant hypertension indicates an important deficit in the management of hypertension.

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ARTICLE SUMMARY "STRENGTHS AND LIMITATIONS OF THIS STUDY"

- Identifying deficits in the management of alcohol consumption among European physicians attending annual scientific meetings in the field of cardiovascular or internal medicine indicates a need to develop better future alcohol interventions.
- The majority of physicians participating in this survey were hospital-based (78.5%), although out-patient care in the ambulatory setting plays a predominate role in the long-term management of hypertension.
- Answers were self-reported in a face to face interview, which might have shifted some results upwards and led to an overestimation in our analysis.

KEY WORDS

Hypertension, alcohol management, alcohol screening, survey, guidelines, guidelines implementation.

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INTRODUCTION

High blood pressure (BP) or hypertension represents a main non-communicable risk factor for global burden of disease.[1] In 2015 the global age-standardized prevalence of raised BP was 24.1% in men and 20.1% in women,[2] affecting more than one billion subjects worldwide[3] and thus constituting a primary health concern.[3]The harmful use of alcohol accounts for 5.1% of the global burden of disease and injury, measured in disability-adjusted life years (DALYs),[4 5] and for 3.3 million deaths every year, representing 5.9% of all deaths worldwide.[5] Among the more than 200 diseases and injuries for which alcohol causality is well established[6] we also find a linear relationship between elevated BP and alcohol consumption.[7 8] The exact mechanism of alcohol induced hypertension is complex [9] and on a molecular level still largely unknown.[9] On one hand, alcohol seems to increases the tendency to vasoconstriction due to an impairment of the baroreceptors[10 11] and imbalance of the central nervous system regulation, resulting in enhanced sympathetic activity.[12] In addition, alcohol consumption increases also cortisol levels and stimulates the renin-angiotensin-aldosterone system[13]. The chronic alcohol induced elevation of angiotensin II has been shown in rodents to directly cause inflammation and endothelial injury through increase of oxidative stress.[14 15] This, on the other hand, leads to inhibition of endothelium-dependent nitric oxide production and thus to endothelial dysfunction with impaired vasodilation.[16 17]

Accordingly, moderation of alcohol consumption to no more than 20–30 g of alcohol per day in men and 10–20 g of alcohol per day in women was one of the six recommended lifestyle changes in the current European Society of Hypertension (ESH) and European Society of Cardiology (ESC) guidelines for the management of arterial hypertension[18] (supplementary table 1). While not done in the previous edition in 2007 and its reappraisal in 2009, the last available guidelines (2013) graded the strength of this six recommended lifestyle changes for the first time with a class I evidence level A.

Currently, BP control rates in treated hypertensive patients across Europe are insufficient, with less than 50% of the patients achieving BP goals,[19-21] and alcohol seems to be the least intervened factor in the management of hypertension.[22-24] According to the latest World Health Organization status report on alcohol and health,[6] the amount of alcohol consumed in the European Region is almost twice the worlds average.[6] Thus, efforts aiming to improve BP control, specifically through interventions in the management of alcohol consumption, are justified. Furthermore, the impact of screening and brief interventions for alcohol use in primary care have been proven positive in many European projects,[25 26] such as the PHEPA

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(Primary Health Care European Project on Alcohol)[27] and the ODHIN (Optimizing Delivery of Health Care).[28 29]

Against this background, we conducted a survey to investigate, by European physicians across different specialties and workplaces, screening of alcohol consumption, awareness, and self- implementation of the recommendation to moderate alcohol consumption in their hypertensive patients.

METHODS

The survey collected data during four annual congresses between April and October of 2015. Two of the meetings were German (meeting of the German Society of Cardiology [DGK][30] and the German Society of Internal Medicine [DGIM][31]), and two were European (ESH[32] and ESC[33]). Attending physicians willing to participate were interviewed in German in the two German meetings and in English at the two European meetings. The complete questionnaire consisted of two parts; the first containing ten (supplementary table 2), and the second six questions (table 1), respectively. Basic demographic data of the participants as well as awareness and implementation of the six recommended life style changes in the 2013 ESH/ESC guidelines[18] into clinical practice were assessed through part one (supplementary table 2); the results are reported elsewhere.[34] Part two of the survey included six questions (table 1), which focused exclusively on the awareness and implementation of the European physicians regarding the role of moderation of alcohol intake in the management of their hypertensive patients.

Throughout the manuscript we expressed all measures using consistently grams of alcohol to report amounts of ethyl alcohol (ethanol). According to the UK Chief Medical Officers[35], a unit of alcohol contains eight grams of pure alcohol.[35]

Patient and Public Involvement

No patients were involved in this study.

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Table 1 Questionnaire items included in this study (corresponding to part two of the original survey).

Items	Topic	Answers
Q11	**Do you quantify alcohol consumption in your patients with hypertension?**	Yes/No
Q12	**When do you ask for alcohol consumption in patients with hypertension? *(multiple answers possible)***	-In patients with newly detected hypertension -In patients with hypertension and very high pressure -In patients with treatment resistant hypertension -Other: Please specify (free text answers were sorted among others in categories like "Rarely-never"/ "Always-regularly" for further analysis)
Q13	**What actions will you take when you diagnose someone with hypertension and moderate or high alcohol consumption? (*no alcohol dependence: asked in the next question)***	-Manage and treat both problems yourself -Manage only hypertension -Manage only hypertension and refer to a general practitioner for the management of alcohol problems -Manage only hypertension and refer to specialist care for alcohol problems -Other (specify)
Q14	**What actions will you take when you diagnose someone with both alcohol dependence and hypertension?**	-Manage and treat both problems yourself -Manage only hypertension-Manage only hypertension and refer to a general practitioner for management alcohol problems -Manage only hypertension and refer to specialist care for alcohol problems -Other (specify)
Q15	**Which maximum amount of alcohol in g/day do you advise your female/ male patients with hypertension?**	Insert number, spontaneously answered
Q16	**How many of your hypertension patients have additional alcohol problems [in %]?**	Insert number, spontaneously answered

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Statistical analysis

Data were analysed with SPSS software (IBM SPSS Statistics 24). The number of responses available for each questionnaire item is reported, and relative frequencies are given as adjusted percentages excluding missing values. For each variable of interest comparisons within the following subgroup categories were performed: meeting (European: ESH/ESC vs. German: DGK/DGIM), place of work (hospital vs. practice), medical specialization (GP vs. cardiologists vs. internists vs. other specializations). For comparison between categorical variables chi-square test analyses were performed. For continuous variables, t-test or one-way ANOVA with Bonferroni post-hoc correction for multiple comparisons were applied. A two-sided p value <0.05 was considered statistically significant.

RESULTS

The characteristics of the participating physicians are given in table 2. Overall, 1,064 physicians (37.4% female) took part in the survey (806 at the European and 258 at the German meetings, respectively). About 20% of the asked physicians, were not willing to participate in the survey. The participants were predominantly cardiologists (52.1%) and internists (29.2%), while 8.8% were general practitioners (GPs); and 78.5% of all physicians were hospital-based.

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Table 2 Characteristics of participating physicians

	All meetings n=1,064	European meetings ESC/ESH 2015 n=806 (75.8%)	German meetings DGIM/DGK 2015 n=258 (24.2%)
Sex			
Women	396 (37.4%)	281 (35.0%)	115 (44.6%)
Men	664 (62.6%)	521 (65.0%)	143 (55.4%)
Missing data	4	4	0
Age category			
20-29 years	89 (8.4%)	76 (9.5%)	13 (5%)
30-39	261 (24.6%)	205 (25.6%)	56 (21.7%)
40-49	310 (29.3%)	235 (29.3%)	75 (29.1%)
50-59	274 (25.9%)	196 (24.5%)	78 (30.2%)
60 years or older	125 (11.8%)	89 (11.1%)	36 (13.9%)
Missing data	5	5	0
Nationality			
European countries	1004 (94.8%)	746 (93.1%)	258 (100%)
Non-European countries	55 (5.2%)	55 (6.9%)	0
Missing data	5	5	0
Place of work			
Practice	226 (21.5%)	130 (16.4%)	96 (37.4%)
Hospital	824 (78.5%)	663 (83.6%)	161 (62.6%)
Missing data	14	13	1
Specialization			
General practitioner	93 (8.8%)	81 (10.1%)	12 (4.7%)
Cardiologist	551 (52.1%)	443 (55.3%)	108 (42.2%)

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Internist	308 (29.1%)	200 (25.0%)	108(42.2%)
Other specialization	105 (9.9%)	77 (9.6%)	28 (10.9%)
Missing data	7	5	2
Membership			
ESH and/ or ESC	494 (60.4%)	494 (87.9%)	NA
Membership in the DHL	24 (2.9%)	NA	24 (9.4%)
No ESH/ ESC or DHL membership	300 (36.7%)	68 (12.1%)	232 (90.6%)
Membership total	518 (63.3%)	NA	NA
Missing data	246	NA	2

Numbers and percentages refer to total responses available for each item; relative frequencies are reported as adjusted percentages excluding missing values.

ESC, European Society of Cardiology; ESH, European Society of Hypertension; DGIM, German Society of Internal Medicine; DGK, German Society of Cardiology; DHL, German Society of Hypertension; NA, not applicable

Estimating proportion of hypertensive patients with additional alcohol problems

Participating physicians (n=946) estimated that 18.0%±15.9% (range: 0–95%) of their patients with hypertension have additional alcohol problems. Higher percentages were estimated by physicians attending the German meetings compared to their colleagues attending the European meetings (22.3% vs. 16.8%; $p<0.001$). By their own estimates, physicians working in a practice reported that significantly higher rates of hypertensive patients have additional alcohol problems compared to their hospital-based colleagues (estimated 21.4% patients visiting a practice have additional alcohol problems vs. estimated 17.2% in hospital; $p<0.05$). Concerning different medical specializations, GPs estimated that a significantly higher percentage of their hypertensive patients (27%, $p<0.001$) are affected by additional alcohol problems compared to cardiologists (16.7%), internists (18.4%), or physicians from other specializations (16.9%).

Quantification of alcohol consumption

Overall, 81.9% of participating physicians (n=1,028) responded "yes" to the question "Do you quantify alcohol consumption in your patients with hypertension?" (Q11, table 1).

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Physicians attending the German meetings quantified the alcohol consumption of their hypertensive patients significantly less often than the attendees of the European meetings (74.5% vs. 84.3%; p<0.001). The frequencies for quantification of alcohol consumption did not show any statistically significant association according to place of work or specialization of physicians (data not shown).

Screening of alcohol consumption in different clinical settings

In the Survey, 986 physicians responded to the question "When do you ask for alcohol consumption in patients with hypertension?" (figure 1A). Screening of alcohol consumption took place primarily in the context of newly detected hypertension (28.6%) rather than in patients with hypertension and very high BP (17.5%) or in patients with treatment-resistant hypertension (14.5%). Free-text answers were additionally sorted and classified into "Rarely-never" and "Always-regularly". Overall, 55.2% of the respondent physicians reported quantifying regularly alcohol consumption in their hypertensive patients. When responses of the attendees at the European and German meetings were compared, significantly more physicians attending the European meetings reported asking about alcohol consumption their hypertensive patients regularly (68.8% vs. 10.8%; p<0.001; figure 1A).

GPs asked significantly more often (42.5%) than internists (28.2%), cardiologists (26.8%), or physicians from other medical specializations (25.8%; all p<0.05) about alcohol consumption in patients with newly detected hypertension. Similar differences between GPs and physicians from other specialties were observed regarding screening of alcohol consumption in patients with very high BP as well as in patients with treatment-resistant hypertension (figure 1B).

Self-reported management or referral of hypertensive patients for the treatment of hypertension and/or alcohol problems

In patients with both hypertension and moderate to high alcohol consumption, 52% of the responding physicians (n=1,021) would treat and manage both conditions by themselves and 10.3% would manage only hypertension without taking further action. In case of alcohol dependence, 13.8% would treat both hypertension and alcohol dependence, while 3.7% would treat only hypertension without taking further action, and 64.1% would only treat hypertension and refer the patient to a specialist for the management of alcohol dependence (p<0.001). These differences are shown in figure 2.

In patients with moderate or high alcohol consumption but without alcohol dependence, 58.9% of the internists reported managing both hypertension and alcohol problems

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significantly more as compared to cardiologists (49.2%) and other specialists (44%; p<0.001). Differences between internists and GPs were not statistically significant (58.9% vs. 52.8%; p>0.05). In addition, physicians working in a practice were significantly more likely to manage both hypertension and the alcohol problems themselves, than their colleagues working in a hospital (59.1% vs. 50.3%; p<0.05). Physicians attending the German meetings reported managing both alcohol dependence and hypertension significantly more than their colleagues attending the European meetings (14.7% vs. 10.9%; p<0.001).

Maximum amount of alcohol per day recommended

Physicians reported to recommend a maximum alcohol intake of 13.1±11.7 g/day for women (n=901 reporting physicians; 95% CI 12.3 to 13.8; range: 0–150) and 19.9±15.6 g/day for men (n=884 reporting physicians; 95% CI 18.8 to 20.9; range: 0–150).

For men, overall, 43% of physicians recommended less than 20g alcohol intake/day, 44% recommended between 20 and 30g/day, and 13% recommended more than 30g/day. In their recommendations for women, 21% recommended less than 10g/day, 71% recommended 10-20g/day women, and 8% recommended more than 20g/per day women

Physicians attending the German meetings were significantly more tolerant with their recommendations of the maximum amount of alcohol per day for women and men than their colleagues attending the European meetings (15.8±9.4 g/day vs. 12.1±12.2 g/day for women and 28.3±17.5 g/day vs. 16.9±13.7 g/day for men; p<0.001). Physicians working in a practice were consistently more tolerant than hospital-based physicians in their recommended maximum alcohol intake for men (23.5±20.8 g/day vs. 18.8±13.6 g/day; p<0.05), but not for women (14.7±15.0 g/day vs. 12.6±10.5g/day; p>0.05). Significant differences were not observed for the alcohol intake of men or women between physicians belonging to different medical specializations (table 3).

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Table 3 Recommendation for Alcohol intake of participating physicians

	N participating physicians	Mean±SD	95% CI	Range	p value
	Recommendation for alcohol intake of women (g/day) from participants of the different congresses				
German meetings	231	15.8±9.4	14.6–17.0	0–50	
European meetings	669	12.1±12.2	11.2–13.0	0–150	p<0.001
	Recommendation for alcohol intake of men (g/day) from participants of the different congresses				
German meetings	227	28.3±17.5	26.0–30.6	0–100	
European meetings	662	16.9±13.7	15.9–18.0	0–150	p<0.001
	Recommendation for alcohol intake of women (g/day) for the participants according to their place of work				
Hospital	697	12.6±10.5	11.8–13.4	0–150	
Practice	197	14.7±15.0	12.5–16.8	0–100	p=0.07
	Recommendation for alcohol intake of men (g/day) for the participants according to their place of work				
Hospital	689	18.8±13.6	17.8–19.8	0–125	
Practice	194	23.5±20.8	20.5–26.4	0–150	p=0.04
	Recommendation for alcohol intake of women (g/day) for the participants according to their medical specialization				
Cardiologist	471	12.8±11.3	11.8–13.9	0–100	

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Internist	271	14.0±13.7	12.3–15.6	0–150	p=0.35
GP	70	11.9±8.9	9.8–14.0	0–50	
Other	84	11.9±8.2	10.2–13.7	0–50	
	Recommendation for alcohol intake of men (g/day) for the participants according to their medical specialization				
Cardiologist	467	19.6±16.2	18.1–21.1	0–150	
Internist	266	21.1±15.5	19.2–22.9	0–125	p=0.38
GP	72	18.5±13.3	15.3–21.7	0–60	
Other	80	18.0±14.0	14.9–21.2	0–60	

SD, standard deviation; CI, confidence Interval; GP, general practitioner

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DISCUSSION

The relationship between elevated BP and alcohol consumption is well established,[7 8] and the importance of their burden of diseases[1-6 36], prove them as global public health priorities. Consequently, alcohol consumption and raised blood pressure are key parts of the WHO goals to reduce NCD global non-communicable diseases (NCD) mortality by 25% by 2025.[6]

According to a review and meta-analysis by Roerecke et.al,[8] moderation of alcohol consumption can reduce blood pressure in a dose-dependent manner in people drinking more than 24 grams of pure alcohol per day. [8] Furthermore, this reduction was shown to be similar to that of other lifestyle changes,[8] such as regular exercise[37] or reduction of weight.[38] Lifestyle changes can reduce or eliminate the need for antihypertensive medication in hypertensive patients [39-41], as and their BP lowering effects can be comparable to those effects achieved by drug monotherapy [39 40]. Nevertheless, even if elevated BP and harmful alcohol consumption are preventable public health priorities, until the last fifteen years, alcohol policies were largely not supported by sufficient research findings.[42 43] Recently, globally important public health organizations such as GAPA (Global Alcohol Policy Alliance)[44] supported the generation of evidence-based recommendations on alcohol policies.[44] In Europe, AMPHORA (Alcohol Measures for Public Health Research Alliance)[45] was the first research project on alcohol from a public health perspective that had been co-financed by the European Commission through the Seventh Framework Program of Research.[46] AMPHORA's affiliated organizations from all 27 member states aimed to generate scientific evidence about alcohol consumption and alcohol-related harm to help cover the European policy gap.[45] In its final report updated in August 2013, AMPHORA reported that there is still a lot to be done and emphasized the need to identify more clearly which factors on a European level are limiting the effectiveness and implementation of alcohol policies.[47] Therefore, our efforts assessing the awareness, screening, and current interventions in alcohol consumption in hypertensive patients among European physicians are very well justified.

Our analysis showed that European physicians also recognized a high prevalence of high BP and comorbid alcoholism. About 27% of the patients with hypertension have additional alcohol problems, as estimated by their treating physicians. Similarly, in the general population aged 15–64 years, 300 of 1,000 men consume 40 g of alcohol or more per day in Europe.[48] Some aspects and practices on the management of alcohol in patients with hypertension observed in the current survey appear acceptable or positive. These include the amount of alcohol recommended by the participating physicians for both genders, which was below the thresholds recommended in the European guidelines.[18] In addition, more than 80%

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of the physicians reported to generally quantify the alcohol consumption of their hypertensive patients. The screening of alcohol consumption was, however, very poor in some important clinical settings. less than a third of the European physicians asked about alcohol consumption in cases of newly detected hypertension and less than a fifth asked in patients with very high BP. Moreover, even fewer (14.5% of the participating physicians) asked patients with treatment-resistant hypertension about alcohol consumption. This result is of major clinical interest, because 10–30% of patients with hypertension are considered to be resistant to treatment,[49 50] and patients with treatment-resistant hypertension have a considerably higher risk for stroke, cardiovascular and kidney disease than patients with controlled hypertension, as shown in multiple studies.[51-54] Furthermore, there is good evidence that treatment-resistant hypertension can also be linked to non-adherence to moderation of alcohol consumption.[55-57] Regarding the low number of physicians asking about alcohol consumption in newly detected hypertension, in patients with very high BP, and in patients with treatment resistance observed in our current study, we cannot exclude the possibility that some physicians assumed that answering "regularly" in our survey did include all of the situations mentioned above, although this question was read in the interview as a multiple choice question with the possibility of more than one answer (Q12 in figure 1). Moreover, even considering this possibility, only half of the interviewed physicians, and also half of the GPs, answered "regularly" to the question: "When do you ask about alcohol consumption in patients with hypertension?" These percentages of alcohol screening are still unsatisfactory.

In comparison to a similar study conducted exclusively in GPs in Europe, *Rehm* et al.[22] noted that 34% of interviewed GPs reported sufficient screening of alcohol in patients with hypertension. However, the study design and questions are not fully comparable with the present report: The study by Rehm et al.,[22] was based on online questionnaires, and the interviewers did not ask if GPs quantified alcohol consumption in their hypertensive patients (yes/no). Instead, sufficient screening was assumed if GPs screened at least 7 out of 10 hypertensive patients for alcohol consumption.[22] In another part of the same study, published separately by *Kraus* et al.,[58] less than half of the German and European patients with hypertension in primary care were screened for alcohol use.[58] Collectively, the findings by *Rehm et al.*[22] and *Kraus et al.*[58] are in agreement with our analysis concluding that screening for alcohol consumption in hypertensive patients is poor among German and European GPs and should be improved.

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In the current survey, a significantly greater fraction of physicians participating in the German meetings estimated that their patients exhibit both hypertension and alcohol problems compared to the participants at the European meetings. Nevertheless, a significantly greater fraction of physicians attending the German meetings (25.5%) did not quantify alcohol consumption in their hypertensive patients as compared to their colleagues attending the European meetings (15.7%). Accordingly, physicians attending the German meetings had lower awareness of the class I level of evidence A recommendation on the moderation of alcohol consumption contained in the ESH/ESC Guidelines[18] than their peers attending the European meetings.[34] Similarly, *Kraus et al.*[58] reported in their survey analysis, that German GPs do not consider alcohol intake as a major risk for hypertension[58] and their screening rates were slightly lower than the European average.[58] It is arguable that these differences between German and European physicians are due to a stronger cultural bond with alcohol than other European countries,[59 60] which might obscure the perception of alcohol-related harm among German physicians.

The deficits identified in this study, are worth overcoming, as alcohol screening and brief intervention have showed positive results in many European projects.[25 27 28] Lack of resources, training, and support from management, as well as workload[26], have been described as barriers to the adoption of screening and brief intervention.[26] We believe in the importance of finding economically sustainable ways of working against these barriers with the objective of systematizing alcohol interventions. Future research should serve as a valuable feedback measuring the effects and extend of such implementation.

Among the limitations of this study, there might have been a bias towards inclusion of physicians who have a particular interest in the management of hypertension. In addition, reasons for non-participation were not recorded in our study. Also, while we recorded the nationality of the participating physicians, country of practice was not assessed in our survey. During the conduction of the survey, participants who volunteered to participate in the survey were informed by the interviewers before the start of the interview that only one participation was allowed. As participation in the survey was voluntary with anonymized data collection, we cannot exclude the possibility, although deemed very unlikely, of intentional or unintentional multiple participations. The implementation of standardized assessment of alcohol intake, like AUDIT-C (Alcohol Use Disorders Identification Test),[61] or SADQ (Severity of Alcohol Dependence Questionnaire),[62] or other available screening instruments, as well as how physicians assess and diagnose alcohol dependence, were not recorded in our

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study. Furthermore, the majority of physicians participating in the survey were hospital-based (78.5 %), although long-term management of hypertension is predominantly carried out in an ambulatory setting. Moreover, because some questions were formulated as closed questions (i.e. questions that can be answered with yes/no) and answers were self-reported, social pressure might have shifted some results upwards and led to an overestimation in our analysis.

In summary, European physicians recognize the high prevalence of comorbid hypertension and harmful alcohol consumption. In addition, some aspects of their management strategies in hypertensive patients regarding alcohol consumption appear adequate. In contrast, alcohol consumption screening in cases of newly detected hypertension, in patients with very high BP, and in treatment-resistant hypertension is very poor. Given the clinical importance of the latter conditions, the current report further supports the notion that improvements of awareness among European physicians on moderation of alcohol intake as an important modifiable lifestyle factor in hypertension management are necessary.

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Contributors

LTZ performed the statistical analyses, interpreted the data and wrote the manuscript. JB supervised the statistical analyses and revised the manuscript. TGR helped perform the statistical analyses with constructive discussion and revised the manuscript. RK conceived and designed the study, revised the manuscript for important intellectual content, and provided supervision.

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Competing interests

None declared.

Patient consent

Not required.

Data sharing statement

No additional data are available.

References

1. Global, regional, and national comparative risk assessment of 84 behavioural, environmental and occupational, and metabolic risks or clusters of risks, 1990-2016: a systematic analysis for the Global Burden of Disease Study 2016. *Lancet* 2017;390(10100):1345-422. doi: 10.1016/s0140-6736(17)32366-8
2. NCD-Risc Factor Collaboration. Worldwide trends in blood pressure from 1975 to 2015: a pooled analysis of 1479 population-based measurement studies with 19,1 million participants. *The Lancet* 2017;389(10064):37-55. doi: 10.1016/S0140-6736(16)31919-5
3. Ettehad D, Emdin CA, Kiran A, et al. Blood pressure lowering for prevention of cardiovascular disease and death: a systematic review and meta-analysis. *Lancet* 2016;387(10022):957-67. doi: 10.1016/s0140-6736(15)01225-8

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BMJ Open: first published as 10.1136/bmjopen-2018-022026 on 21 October 2018. Downloaded from http://bmjopen.bmj.com/ on April 24, 2024 by guest. Protected by copyright.

4. Rehm J, Imtiaz S. A narrative review of alcohol consumption as a risk factor for global burden of disease. *Subst Abuse Treat Prev Policy* 2016;11(1):37. doi: 10.1186/s13011-016-0081-2
5. Word Health Organization. Alcohol-Fact sheet from the World Health Organization's Media Centre 2015 [Available from: http://www.who.int/mediacentre/factsheets/fs349/en/ accessed 24 February 2017).Archived by WebCite ® http://www.webcitation.org/6v7UXNd10.
6. World Health Organization. Global status report on alcohol and health, 2014.
7. Taylor B, Irving HM, Baliunas D, et al. Alcohol and hypertension: gender differences in dose-response relationships determined through systematic review and meta-analysis. *Addiction* 2009;104(12):1981-90. doi: 10.1111/j.1360-0443.2009.02694.x
8. Roerecke M, Kaczorowski J, Tobe SW, et al. The effect of a reduction in alcohol consumption on blood pressure: a systematic review and meta-analysis. *The Lancet Public Health* 2017;2(2):e108-e20. doi: 10.1016/S2468-2667(17)30003-8
9. Husain K, Ansari RA, Ferder L. Alcohol-induced hypertension: Mechanism and prevention. *World Journal of Cardiology* 2014;6(5):245-52. doi: 10.4330/wjc.v6.i5.245
10. Zhang X, Abdel-Rahman AA, Wooles WR. Impairment of baroreceptor reflex control of heart rate but not sympathetic efferent discharge by central neuroadministration of ethanol. *Hypertension (Dallas, Tex : 1979)* 1989;14(3):282-92.
11. Abdel-Rahman AA, Wooles WR. Ethanol-induced hypertension involves impairment of baroreceptors. *Hypertension (Dallas, Tex : 1979)* 1987;10(1):67-73.
12. Russ R, Abdel-Rahman AR, Wooles WR. Role of the sympathetic nervous system in ethanol-induced hypertension in rats. *Alcohol* 1991;8(4):301-7.
13. Potter JF, Watson RD, Skan W, et al. The pressor and metabolic effects of alcohol in normotensive subjects. *Hypertension (Dallas, Tex : 1979)* 1986;8(7):625-31.
14. Husain K, Vazquez M, Ansari RA, et al. Chronic alcohol-induced oxidative endothelial injury relates to angiotensin II levels in the rat. *Mol Cell Biochem* 2008;307(1-2):51-8. doi: 10.1007/s11010-007-9583-6
15. Wright JW, Morseth SL, Abhold RH, et al. Elevations in plasma angiotensin II with prolonged ethanol treatment in rats. *Pharmacol Biochem Behav* 1986;24(4):813-8.
16. Griendling KK, Sorescu D, Ushio-Fukai M. NAD(P)H Oxidase. *Role in Cardiovascular Biology and Disease* 2000;86(5):494-501. doi: 10.1161/01.Res.86.5.494
17. Alexander RW. Hypertension and the Pathogenesis of Atherosclerosis. *Hypertension (Dallas, Tex : 1979)* 1995;25(2):155. doi: 10.1161/01.HYP.25.2.155
18. Mancia G, Fagard R, Narkiewicz K, et al. 2013 ESH/ESC Guidelines for the management of arterial hypertension: the Task Force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC). *J Hypertens* 2013;31(7):1281-357. doi: 10.1097/01.hjh.0000431740.32696.cc
19. Redon J, Mourad JJ, Schmieder RE, et al. Why in 2016 are patients with hypertension not 100% controlled? A call to action. *J Hypertens* 2016;34(8):1480-8. doi: 10.1097/hjh.0000000000000988
20. Borghi C, Tubach F, De Backer G, et al. Lack of control of hypertension in primary cardiovascular disease prevention in Europe: Results from the EURIKA study. *Int J Cardiol* 2016;218:83-8. doi: 10.1016/j.ijcard.2016.05.044
21. Wang YR, Alexander GC, Stafford RS. Outpatient hypertension treatment, treatment intensification, and control in Western Europe and the United States. *Arch Intern Med* 2007;167(2):141-7. doi: 10.1001/archinte.167.2.141
22. Rehm J, Prieto JA, Beier M, et al. The role of alcohol in the management of hypertension in patients in European primary health care practices - a survey in the largest European Union countries. *BMC Fam Pract* 2016;17(1):130. doi: 10.1186/s12875-016-0529-5

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23. Rehm J, Gmel G, Serra C, et al. Reducing non-communicable disease via better detection of hypertension and alcohol problems in primary health care in Spain. *Adicciones* 2016;0(0):726-26.
24. Collart F, de Timary P, Dom G, et al. Alcohol-induced hypertension: an important healthcare target in Belgium. *Acta Clin Belg* 2015;70(6):389-95. doi: 10.1179/2295333715y.0000000039
25. Kaner EF, Beyer F, Dickinson HO, et al. Effectiveness of brief alcohol interventions in primary care populations. *The Cochrane database of systematic reviews* 2007(2):Cd004148. doi: 10.1002/14651858.CD004148.pub3
26. Rehm J, Anderson P, Prieto JAA, et al. Towards new recommendations to reduce the burden of alcohol-induced hypertension in the European Union. *BMC Med* 2017;15(1):173. doi: 10.1186/s12916-017-0934-1
27. PHEPA Network - Primary Health Care European Project on Alcohol [Available from: http://www.phepa.net/units/phepa/html/en/Du9/index.html accessed 10 March 2016).Archived by Webcite ® at: http://www.webcitation.org/6v7Uvwrtc.
28. The ODHIN project (Optimizing delivery of health care interventions) 2011-2014 [Available from: http://www.odhinproject.eu/ accessed 24 February 2017.Archived by Webcite ® at: http://www.webcitation.org/6v7V52XGF.
29. Anderson P, Kaner E, Keurhorst M, et al. Attitudes and Learning through Practice Are Key to Delivering Brief Interventions for Heavy Drinking in Primary Health Care: Analyses from the ODHIN Five Country Cluster Randomized Factorial Trial. *International Journal of Environmental Research and Public Health* 2017;14(2):121.
30. German Society of Cardiology, DGK Düsseldorf [Available from: https://dgk.org/ accessed 10 March 2016).Archived by Webcite ® at: http://www.webcitation.org/6v8VsEMT1.
31. German Society of Internal Medicine, DGIM Wiesbaden [Available from: http://www.dgim.de/ accessed 10 March 2016).Archived by Webcite ® at: http://www.webcitation.org/6v8wocemO.
32. European Society of Hypertension, ESH Europe [Available from: http://www.eshonline.org/ accessed 10 March 2016).Archived by Webcite ® at: http://www.webcitation.org/6v8wyBSdH.
33. European Society of Cardiology, ESC Europe [Available from: https://www.escardio.org/ accessed 10 March 2016).Archived by Webcite ® at: http://www.webcitation.org/6v8x6BPT3.
34. Bolbrinker J, Zaidi Touis L, Gohlke H, et al. European guidelines on lifestyle changes for management of hypertension : Awareness and implementation of recommendations among German and European physicians. *Herz* 2017 doi: 10.1007/s00059-017-4575-0
35. Alcohol Guidelines Review – Report from the Guidelines development group to the UK Chief Medical Officers. 2016:44.
36. Forouzanfar MH, Alexander L, Anderson HR, et al. Global, regional, and national comparative risk assessment of 79 behavioural, environmental and occupational, and metabolic risks or clusters of risks in 188 countries, 1990-2013: a systematic analysis for the Global Burden of Disease Study 2013. *The Lancet* 2015;386(10010):2287-323. doi: 10.1016/S0140-6736(15)00128-2
37. Williamson W, Foster C, Reid H, et al. Will Exercise Advice Be Sufficient for Treatment of Young Adults With Prehypertension and Hypertension? A Systematic Review and Meta-Analysis. *Hypertension (Dallas, Tex : 1979)* 2016;68(1):78-87. doi: 10.1161/hypertensionaha.116.07431

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38. Siebenhofer A, Jeitler K, Horvath K, et al. Long-term effects of weight-reducing drugs in people with hypertension. *The Cochrane database of systematic reviews* 2016;3:Cd007654. doi: 10.1002/14651858.CD007654.pub4
39. Elmer PJ, Obarzanek E, Vollmer WM, et al. Effects of comprehensive lifestyle modification on diet, weight, physical fitness, and blood pressure control: 18-month results of a randomized trial. *Ann Intern Med* 2006;144(7):485-95. doi: 10.7326/0003-4819-144-7-200604040-00007
40. [No authors listed]The treatment of mild hypertension study. A randomized, placebo-controlled trial of a nutritional-hygienic regimen along with various drug monotherapies. The Treatment of Mild Hypertension Research Group. *Arch Intern Med* 1991;151(7):1413-23.
41. Frisoli TM, Schmieder RE, Grodzicki T, et al. Beyond salt: lifestyle modifications and blood pressure. *Eur Heart J* 2011;32(24):3081-7. doi: 10.1093/eurheartj/ehr379
42. Allamani A, Voller F, Decarli A, et al. Contextual determinants of alcohol consumption changes and preventive alcohol policies: a 12-country European study in progress. *Subst Use Misuse* 2011;46(10):1288-303. doi: 10.3109/10826084.2011.572942
43. Norström T, Simpura J, Hemström Ö, et al. Conclusions : Alcohol in postwar Europe: consumption, drinking patterns, consequences and policy responses in 15 European countries. Alcohol in postwar Europe: consumption, drinking patterns, consequences and policy responses in 15 European countries: Almqvist&Wiksell 2002:185-94.
44. GAPA (Global Alcohol Policy Alliance) [Available from: http://globalgapa.org/index.php/about-us/ accessed 24 february 2017.Archived by Webcite ® at: http://www.webcitation.org/6v8wbf9GA.
45. AMPHORA. Project description-The European Alcohol Policy Research Alliance 2010 [Available from: http://www.amphoraproject.net/view.php?id_cont=46&PHPSESSID=ecp57e414c2gc4c7bhaflt3i62 accessed 24 April 2017.Archived by Webcite ® at: http://www.webcitation.org/6v7VN9xDY.
46. European Commission. Alcohol Measures for Public Health Research Alliance (AMPHORA): EU Publications Office,; 2009 [Available from: http://cordis.europa.eu/project/rcn/92876_en.html accessed 24 April 2017.Archived by Webcite ® at: http://www.webcitation.org/6v8wDS9Zt.
47. AMPHORA. Final Report Summary - AMPHORA (Alcohol Measures for Public Health Research Alliance): European Commission, 2013.
48. Rehm J, Shield K, Rehm M, et al. Alcohol consumption, alcohol dependence, and attributable burden of disease in Europe: Potential gains from effective interventions for alcohol dependence2012.
49. Cai A, Calhoun DA. Resistant Hypertension: An Update of Experimental and Clinical Findings. *Hypertension (Dallas, Tex : 1979)* 2017;70(1):5-9. doi: 10.1161/hypertensionaha.117.08929
50. Sim JJ, Bhandari SK, Shi J, et al. Characteristics of resistant hypertension in a large, ethnically diverse hypertension population of an integrated health system. *Mayo Clin Proc* 2013;88(10):1099-107. doi: 10.1016/j.mayocp.2013.06.017
51. Sim JJ, Bhandari SK, Shi J, et al. Comparative risk of renal, cardiovascular, and mortality outcomes in controlled, uncontrolled resistant, and nonresistant hypertension. *Kidney Int* 2015;88(3):622-32. doi: 10.1038/ki.2015.142
52. Muntner P, Davis BR, Cushman WC, et al. Treatment-resistant hypertension and the incidence of cardiovascular disease and end-stage renal disease: results From the Antihypertensive and Lipid-Lowering Treatment to Prevent Heart Attack Trial (ALLHAT). *Hypertension (Dallas, Tex : 1979)* 2014;64(5):1012-21. doi: 10.1161/hypertensionaha.114.03850

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53. Daugherty SL, Powers JD, Magid DJ, et al. Incidence and prognosis of resistant hypertension in hypertensive patients. *Circulation* 2012;125(13):1635-42. doi: 10.1161/circulationaha.111.068064
54. de Beus E, Bots ML, van Zuilen AD, et al. Prevalence of Apparent Therapy-Resistant Hypertension and Its Effect on Outcome in Patients With Chronic Kidney Disease. *Hypertension (Dallas, Tex : 1979)* 2015;66(5):998-1005. doi: 10.1161/hypertensionaha.115.05694
55. Diaz KM, Booth JN, Calhoun DA, et al. Healthy Lifestyle Factors and Risk of Cardiovascular Events and Mortality in Treatment-Resistant Hypertension: The Regards Study. *Hypertension (Dallas, Tex : 1979)* 2014;64(3):465-71. doi: 10.1161/hypertensionaha.114.03565
56. Shimbo D, Levitan EB, Booth JN, et al. The Contributions of Unhealthy Lifestyle Factors to Apparent Resistant Hypertension: Findings from the REasons for Geographic And Racial Differences in Stroke (REGARDS) Study. *J Hypertens* 2013;31(2) doi: 10.1097/HJH.0b013e32835b6be7
57. Sarafidis PA, Georgianos P, Bakris GL. Resistant hypertension--its identification and epidemiology. *Nat Rev Nephrol* 2013;9(1):51-8. doi: 10.1038/nrneph.2012.260
58. Kraus L, Schulte B, Manthey J, et al. Alcohol screening and alcohol interventions among patients with hypertension in primary health care: an empirical survey of German general practitioners. *Addiction Research & Theory* 2017;25(4):285-92. doi: 10.1080/16066359.2016.1263728
59. P. Anderson LMaGG. Alcohol in the European Union. Consumption, harm and policy approaches: World Health Organization 2012, 2012.
60. Karlsson T, Simpura J. Changes in living conditions and their links to alcohol consumption and drinking patterns in 16 European countries, 1950 to 2000. *Nordic Studies on Alcohol and Drugs* 2001;18(1_suppl):82-99. doi: 10.1177/14550725010180 1S03
61. WHO | AUDIT: The Alcohol Use Disorders Identification Test. *WHO*
62. Edwards G, Gross, Milton M, Keller, Mark, Moser, Joy, Room, Robin. et al. . Alcohol related disabilities *WHO (Offset Publication No 32)* 1977

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Figure captions

Figure 1. Proportion of physicians (%) answering the multiple choice question: "When do you ask for alcohol consumption in patients with hypertension?"

A. Proportion of physicians (n=986) attending the European meetings compared to the physicians attending the German meetings. Differences are significant *p value<0.05

BP, blood pressure; ESC, European Society of Cardiology; ESH, European Society of Hypertension; DGIM, German Society of Internal Medicine; DGK, German Society of Cardiology

B. Proportion of physicians from different medical specialities (n= 981); *Difference is significant p value <0.05 for GP compared to each one of the other specializations.

BP, blood pressure; GP, general practitioner

Figure 2 Proportion of physicians (%) answering the multiple choice question: "What actions will you take when you diagnose someone with hypertension and alcohol consumption?"

Differences are significant *p value ≤0.001 in case of *moderate and high consumption alcohol consumption* (n=1021 physicians) vs. *alcohol dependence* (n=1025 physicians);

GP, general practitioner

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Figure 1A

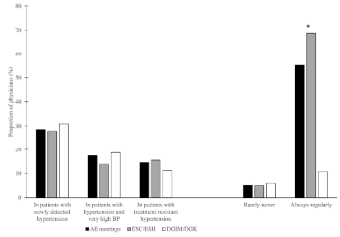

Figure 1B

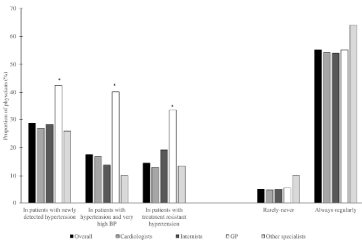

Figure 1. Proportion of physicians (%) answering the multiple choice question: "When do you ask for alcohol consumption in patients with hypertension?" A. Proportion of physicians (n=986) attending the European meetings compared to the physicians attending the German meetings. Differences are significant *p value<0.05. BP, blood pressure; ESC, European Society of Cardiology; ESH, European Society of Hypertension; DGIM, German Society of Internal Medicine; DGK, German Society of Cardiology. B. Proportion of physicians from different medical specialities (n= 981); *Difference is significant p value <0.05 for GP compared to each one of the other specializations. BP, blood pressure; GP, general practitioner

474x266mm (300 x 300 DPI)

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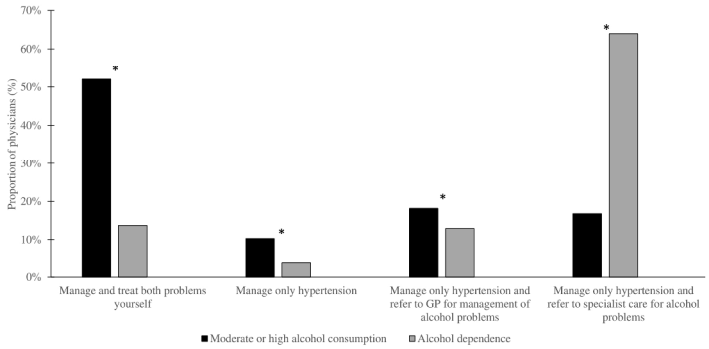

Figure 2 Proportion of physicians (%) answering the multiple choice question: "What actions will you take when you diagnose someone with hypertension and alcohol consumption?" Differences are significant *p value ≤0.001 in case of moderate and high consumption alcohol consumption (n=1021 physicians) vs. alcohol dependence (n=1025 physicians). GP, general practitioner

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Moderation of alcohol intake as a recommendation in European hypertension management guidelines: survey on awareness, screening, and clinical practice among European physicians

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Supplementary Table 1 Recommended lifestyle changes with class I evidence level A according to the 2013 ESH/ESC guidelines for the management of arterial hypertension [1].

Salt restriction to 5–6 g per day
Moderation of alcohol consumption to no more than 20–30 g of ethanol per day in men and 10–20 g of ethanol per day in women
Increased consumption of vegetables, fruits, and low-fat dairy products
Reduction of weight to BMI of 25 kg/m^2 and of waist circumference to <102 cm in men and <88 cm in women
Regular exercise, i.e. at least 30 min of moderate dynamic exercise on 5 to 7 days per week
Advise all smokers to **quit smoking** and offer assistance

ESH, European Society of Hypertension; ESC, European Society of Cardiology; BMI, body mass index

1. Mancia, G., et al., *2013 ESH/ESC Guidelines for the management of arterial hypertension: the Task Force for the management of arterial hypertension of the European Society of Hypertension (ESH) and of the European Society of Cardiology (ESC).* J Hypertens, 2013. **31**(7): p. 1281-357.

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Supplementary Table 2 Questionnaire items included in part one of the survey.

Items	Topic	Answers
Q1	Attended congress	ESC: London, August/ September 2015 ESH: Milan, June 2015 DGK: Berlin, October 2015 DGIM: Mannheim, April 2015
Q2	Gender	Pre-specified: female/ male
Q3	Age category	Pre-specified: 20-29 years/ 30-39/ 40-49/ 50-59/ 60 or older
Q4	Nationality (only European meetings)	Pre-specified: European citizen/ other
Q5	Place of work	Pre-specified: hospital/ practice
Q6	Specialization	Pre-specified: GP/ internist/ cardiologist/ other
Q7	Membership	European meetings Pre-specified: ESH/ ESC/ National Hypertension Society German meetings Pre-specified: DHL yes/ no
Q8	How many patients have you seen with hypertension in the last four weeks?	Insert number
Q9	Which lifestyle changes are recommended by the ESH/ESC hypertension guidelines?	Spontaneously answered
Q10	Which lifestyle changes do you recommend your patients with hypertension?	Spontaneously answered

BP, blood pressure; ESC, European Society of Cardiology; ESH, European Society of Hypertension; DGIM, German Society of Internal Medicine; DGK, German Society of Cardiology; DHL, German Society of Hypertension; GP, general practitioner

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of *cross-sectional studies*

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(*a*) Indicate the study's design with a commonly used term in the title or the abstract	1, 2
		(*b*) Provide in the abstract an informative and balanced summary of what was done and what was found	2
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	4
Objectives	3	State specific objectives, including any prespecified hypotheses	5
Methods			
Study design	4	Present key elements of study design early in the paper	5
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	5, 6, supplementary page 2
Participants	6	(*a*) Give the eligibility criteria, and the sources and methods of selection of participants	5
Variables	7	Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	5, 6, supplementary page 2
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	5, 6 , supplementary page 2
Bias	9	Describe any efforts to address potential sources of bias	Not applicable
Study size	10	Explain how the study size was arrived at	5
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	7
Statistical methods	12	(*a*) Describe all statistical methods, including those used to control for confounding	7
		(*b*) Describe any methods used to examine subgroups and interactions	7
		(*c*) Explain how missing data were addressed	7
		(*d*) If applicable, describe analytical methods taking account of sampling strategy	Not applicable

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		(*e*) Describe any sensitivity analyses	Not applicable
Results			
Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed	8–13
		(b) Give reasons for non-participation at each stage	Not applicable: voluntary survey.
		(c) Consider use of a flow diagram	
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders	8, 9
		(b) Indicate number of participants with missing data for each variable of interest	8, 9
Outcome data	15*	Report numbers of outcome events or summary measures	9–13
Main results	16	(*a*) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included	9–13
		(*b*) Report category boundaries when continuous variables were categorized	11–13
		(*c*) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	Not applicable
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	9–13
Discussion			
Key results	18	Summarise key results with reference to study objectives	17
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	16, 17
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	14–17
Generalisability	21	Discuss the generalisability (external validity) of the study results	14–16
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	18

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

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Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLoS Medicine at http://www.plosmedicine.org/, Annals of Internal Medicine at http://www.annals.org/, and Epidemiology at http://www.epidem.com/). Information on the STROBE Initiative is available at www.strobe-statement.org.

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