Atherosclerosis Supplements 42 (2020) e9–e14

Contents lists available at ScienceDirect

Atherosclerosis Supplements

journal homepage: www.elsevier.com/locate/atherosclerosis

'Diet and lifestyle' in the management of dyslipidaemia and prevention of CVD - Understanding the level of knowledge and interest of European Atherosclerosis Society members

Elke A. Trautwein [a, *], Alberico L. Catapano [b], Lale Tokgözoğlu [c]

[a] Trautwein Consulting, Hagen, Germany
[b] Department of Pharmacological and Biomolecular Sciences, University of Milan, And IRCCS Multimedia, Milan, Italy
[c] Department of Cardiology, Hacettepe University Faculty of Medicine, Ankara, Turkey

Keywords:
Cholesterol
Dyslipidaemia
Diet and lifestyle
CVD prevention
Educational needs

A B S T R A C T

To better understand the level of knowledge and interest in 'diet and lifestyle' for cholesterol management and CVD prevention, European Atherosclerosis Society (EAS) members were invited to take part in an online survey. In total, 269 EAS members participated of which 64 (24%) were students/postdocs, 102 (38%) researchers involved with CVD-related research and 103 (38%) doctors and clinicians who directly interact with patients. All (99%) of the participants either agreed or strongly agreed that 'diet and lifestyle' have a role to play in cholesterol management, with 80% indicating that 'diet and lifestyle' is very or extremely important. Of the clinicians, 75% indicated that their patients voluntarily ask for 'diet and lifestyle' advice and over 80% said they continuously provide 'diet and lifestyle advice' to their patients. Of the surveyed clinicians, 91% feel sufficiently educated and confident to provide expert advice and over 90% recommend medication, diet change, frequent exercise and smoking cessation to their patients. In view of more specific dietary advice, clinicians reportedly recommend a 'Mediterranean diet', and advise to avoid high-fat foods, and to increase intake of high-fibre foods. Interestingly, smoking cessation and alcohol avoidance were mentioned less frequently. In view of educational needs, over half of the surveyed EAS members use the internet and 'guidelines' to learn about 'diet and lifestyle' in relation to cholesterol and CVD risk management. Clinicians tend to use 'guidelines' more often, while students/postdocs tend to use the internet significantly more than clinicians and CVD researchers. Regarding unmet needs for educational tools addressing specifically 'diet and lifestyle', clinicians feel that patient-oriented leaflets and pocket guidelines would be most beneficial materials to introduce, while students/postdocs would prefer an app. In summary, the role of 'diet and lifestyle' as a cornerstone of cholesterol management and CVD risk prevention seems well recognised amongst EAS members surveyed.

1. Introduction

Cardiovascular diseases (CVD), of which atherosclerotic cardiovascular disease (ASCVD) is the major component, are the leading cause of morbidity and mortality globally. ASCVD accounts for 31% of all deaths globally and for 45% of all deaths in Europe [1,2]. ASCVD results from a lifelong process and therefore prevention strategies for risk reduction should already begin early in life. A healthy 'diet and lifestyle' play an important role in the development of ASCVD and should form the basis for dyslipidaemia treatment and CVD prevention. The role of diet and lifestyle in ASCVD prevention is undisputed, both at a population level by promoting healthy 'diet and lifestyle' behaviours as well as at an individual level by tackling unhealthy behaviours and by optimising causal cardiovascular (CV) risk factors such as LDL-cholesterol [3,4]. With adequate changes in 'diet and lifestyle', 80% of (premature) CVD mortality could be prevented [5]. Furthermore, major modifiable CVD risk factors, including obesity, type 2 diabetes, poor dietary habits, physical inactivity, smoking as well as dyslipidaemia can be targeted by approaches that improve lifestyle and dietary behaviour.

The European guidelines for the management of dyslipidaemias released by the European Society of Cardiology (ESC) and the

* Corresponding author.
E-mail address: et@trautwein-consulting.com (E.A. Trautwein).

https://doi.org/10.1016/j.atherosclerosissup.2021.01.003

European Atherosclerosis Society (EAS) as well as the American College of Cardiology (ACC)/American Heart Association (AHA) guidelines on lifestyle management to reduce cardiovascular risk emphasise the importance of 'diet and lifestyle' for the prevention and treatment of CVD. These guidelines provide recommendations for a heart healthy 'diet and lifestyle' and give practical advice, for instance on food choices, to manage dyslipidaemia by lowering total and LDL-cholesterol levels [3,6].

The EAS initiated and commissioned a member survey to find out how 'diet and lifestyle' guidelines are implemented, for instance by clinicians in their daily practice when seeing patients, and what the level of the self-perceived knowledge and interest of clinicians, CVD-oriented researchers and students/postdocs is with respect to 'diet and lifestyle' aspects in the management of dyslipidaemia and the prevention of CVD. The objectives of the survey were to.

- gain a better understanding of the EAS members' knowledge and interest in 'diet and lifestyle'
- understand the needs for and assess the usefulness of currently available educational materials that address 'diet and lifestyle' in the prevention of CVD.

This report summarises the findings from the survey and addresses their implications for promoting 'diet and lifestyle' recommendations.

1.1. Survey methodology

An online survey was conducted between the 4 and 24 December 2018. The survey was initiated jointly by the EAS and its corporate members BASF, Raisio and Upfield, and was carried out by Pegasus, Brighton, UK. The 15-min online questionnaire contained 24 questions, of which 14 were related to 'diet and lifestyle' knowledge and 10 were about the needs for educational materials, i.e. what type of educational assets (tools) do EAS members already use, and/or find useful to have that are currently missing.

In total, 269 EAS members from 42 countries participated in the survey. Amongst participants from the represented countries, 10% were from Italy, 8% from Spain and 6% from Greece, while other countries contributed with 1–4% each. The participants' age ranged from 20 to 81 years with 28% being 55 years and older, 17% between 45 and 54 years, 25% between 35 and 44 years, 26% between 25 and 34 years and just 4% younger than 24 years. Regarding gender, 57% of the participants were males and 43% females. Of all participants, 64 (24%) were students/postdocs, 102 (38%) researchers mainly involved with CVD-related research and 103 (38%) were doctors and clinicians who directly interact with patients.

2. Results and discussion

2.1. Attitudes towards the role of 'diet and lifestyle' in dyslipidaemia and CVD prevention

Almost all (99%) of the participants recognised that 'diet and lifestyle' has a role to play in cholesterol management with a statistically significantly higher proportion (66%) of students/post docs strongly agreeing with this sentiment. 94% of participants, amongst them 92% of the surveyed clinicians, agreed or strongly agreed that it is possible to change blood cholesterol through 'diet and lifestyle'. 'Diet and lifestyle' are perceived as essential in cholesterol management, as 80% indicated that 'diet and lifestyle' is either very or extremely important. This number was lower amongst clinicians (75%) as compared to students/post docs (86%, significantly higher) and CVD researchers (80%). Of the surveyed clinicians, 75% indicated that their patients take a relatively proactive attitude towards cholesterol management by voluntarily asking for 'diet and lifestyle' advice (Fig. 1).

2.2. Feeling educated about the role of 'diet and lifestyle' in CVD prevention

Reassuringly, 91% of the surveyed clinicians stated that they feel educated, to some degree, about 'diet and lifestyle' and hence feel confident to provide expert advice to their patients. While 44% consider themselves sufficiently educated, 35% feel very educated and 13% even extremely educated.

Almost all the surveyed EAS members (97%) perceive medication, e.g. statin use, as the most effective intervention for managing cholesterol followed by physical activity (82%), while reducing stress is considered more difficult with just 47% of all respondents regarding it as effective (Table 1).

Considering dietary changes, reducing intake of saturated fat, trans fats and replacing saturated fat by unsaturated fat (mono- and polyunsaturated fatty acids) was considered as an effective way of lowering cholesterol by the large majority of participating EAS members (82–85%). Around three quarters of all responders considered increasing dietary fibre intake (78%) and consuming foods with added plant sterols/stanols (72%) as effective. Interestingly, 33% of the EAS members surveyed also considered drinking more water as an effective way to reduce cholesterol.

Regarding easiness of adherence, 76% of the participating EAS members believe that adhering to medication is easy or extremely easy, whereas reducing stress levels is considered not easy by 95% of all responders. Changes related to dietary fat, such as reducing total fat, saturated and trans fat intake and replacing saturated fat with unsaturated fats are considered quite or extremely easy by 38, 43, 45 and 36% of the responders respectively. Reducing intake of sugar-sweetened beverages is considered easy by 57% and increasing dietary fibre intake by 58% of all responders. Consuming foods with added plant sterols/stanols was considered externally easy and quite easy by 43%.

While 77% of the surveyed clinicians considered foods with added plant sterols/stanols as very effective of extremely effective, only 36% believe that it will be easy for their patients to adhere to such advice. For comparison, 64% of the responding clinicians consider medication use the easiest for their patients to lower their LDL-cholesterol.

The most recognised foods or food supplements in dyslipidaemia management were omega-3 fatty acids from fish (78% aware), dietary fibres (77% aware) and plant sterols/stanols (76% aware).

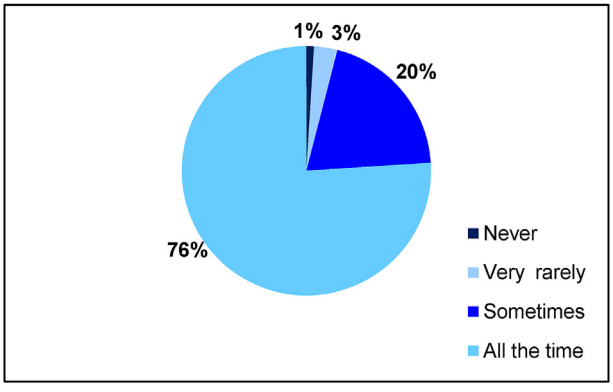

Fig. 1. Response of surveyed clinicians to the question "When you see patients, do they ask you about 'diet and lifestyle' advice?"

Table 1
Response to the question "Thinking about the most effective ways to lower cholesterol, please rank the extent to which you believe each intervention is effective."

	Ranking of the degree of effectiveness in %				
Effective ways to lower cholesterol	Extremely effective	Very effective	Effective	Somewhat effective	Not at all effective
Taking medication (e.g. statins)	**56**	**31**	10	2	-
Increase physical activity	**23**	**32**	27	14	5
Reduce stress levels	7	16	24	**29**	**24**
Reduce total fat intake	14	26	**31**	22	7
Reduce saturated fat intake	16	**36**	**33**	14	2
Replace saturated fat by unsaturated fat (mono-and polyunsaturated fat)	13	**34**	**38**	15	1
Reduce trans fat intake	21	**32**	29	14	3
Drink more water	5	13	15	22	**46**
Reduce intake of sugar sweetened beverages	18	19	**30**	22	12
Increase dietary fibre intake	11	28	**39**	19	3
Consume foods with added plant sterols or stanols	6	25	**41**	24	4

Based on n = 269 responders.

Furthermore, clinicians were also more aware of red yeast rice and berberine supplements than students/post docs and CVD researchers (Fig. 2).

2.3. Preferred resources to get information

To obtain information, over half of the surveyed EAS members mentioned that they use the internet and 'guidelines' to learn about 'diet and lifestyle' in relation to cholesterol and CVD risk management. Especially the surveyed clinicians tend to use 'guidelines' more often, while students/postdocs preferably use more often the internet as a 'learning tool' compared to clinicians and CVD researchers. Textbooks and other information sources seem to play only a minor role. These observations underline the importance of expert guidelines such as the joint ESC/EAS Guidelines for the management of dyslipidaemias [3] and the European Guidelines on cardiovascular disease prevention in clinical practice.

[5] in providing evidence-based knowledge about the benefits of 'diet and lifestyle' as the foundation for cholesterol management and CVD prevention. These guidelines can further support healthcare professionals, like doctors and clinicians, in their continued communication with patients about early cardiovascular risk management and the benefits of adopting and maintaining a healthy diet and lifestyle [5].

2.4. Advising patients about 'diet and lifestyle'

Reassuringly, 82% of the surveyed clinicians said that they continuously provide 'diet and lifestyle' advice to their patients, while 8% stated that they only occasionally give such advice and just 1% said they do not usually give specific advice for lowering cholesterol through 'diet and lifestyle' changes. Additionally, the participating clinicians stated that they provide specific dietary advice to patients, mainly centred around a 'Mediterranean diet', encouraging patients to avoid high-fat foods, and to increase intake of dietary fibre as well as being more physically active. The 'Mediterranean diet' recommendation seems to relate to the popularity of this dietary pattern and the proven evidence for effectively lowering CVD risk factors and reducing the incidence of cardiovascular events as demonstrated in the PREDIMED trial [3].

Astonishingly, smoking cessation and alcohol avoidance were mentioned less often by the clinicians. This finding could perhaps

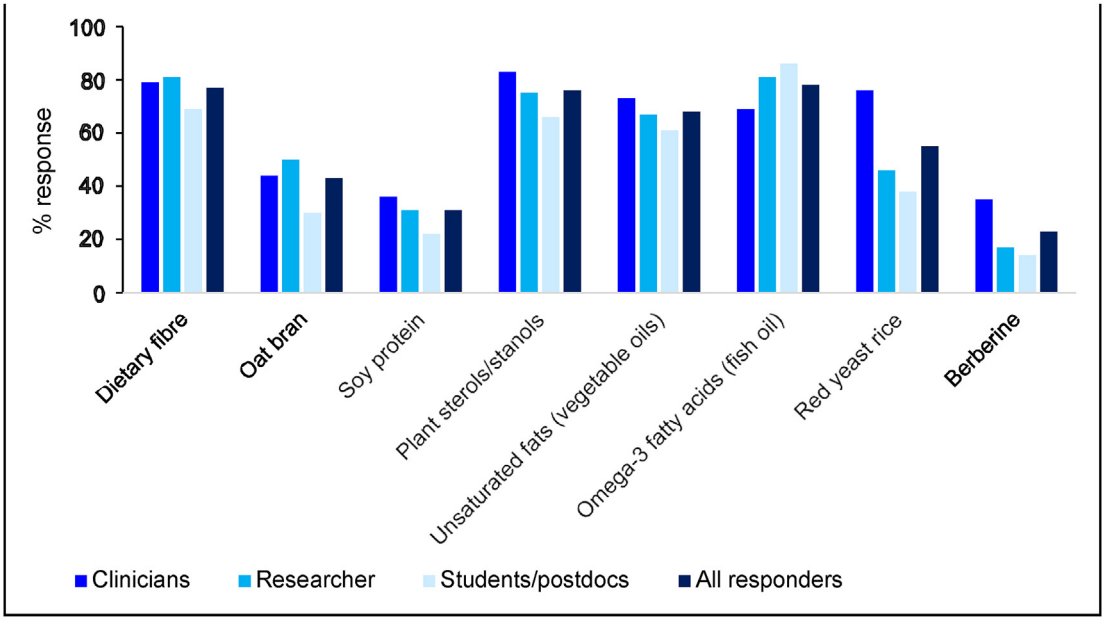

Fig. 2. Response to the question "Thinking about specific foods/supplements with a proven cholesterol lowering benefit, which you are aware of?" Based on n= 269 responders, 103 clinicians, 102 researchers and 64 students/postdocs.

be related to the fact that the smoking rates have declined over years in Europe [2] with smoking being less prevalent. Nevertheless, smoking remains a key public health concern and is still common, particularly among women [5]. Hence, advice to stop smoking is still important since smoking cessation has a clear benefit on the overall CVD risk [3,5].

While over 90% of the surveyed clinicians stated that they recommend medication, dietary change, exercise and smoking cessation to their patients, less than half (46%) indicated that they also recommend specific foods and only 4% said to recommend vitamin supplements (Fig. 3). Considering specific foods for dyslipidaemia management, 64% of the surveyed clinicians stated that they would recommend dietary fibres, 59% plant sterols/stanols and 59% would recommend omega-3 fatty acids from fish to their patients.

Considering personal consumption, about 50% of the surveyed EAS members indicated that they sometimes or always take specific foods or food supplements for cholesterol lowering. Of the clinicians, 60% said they would always or sometimes take specific foods or food supplements compared to 50% of the researchers and 30% of the surveyed students/postdocs. Amongst those who indicated to consume specific foods or food supplements, 70% use dietary fibres, 66% omega-3 fatty acids and 35% foods with added plant sterols/stanols.

2.5. Awareness of current and wishes for new educational materials

Just 43% of the surveyed EAS members said that they were unaware of the educational materials that the EAS offers on 'diet and lifestyle' related topics. Nonetheless, 47% of all surveyed EAS members and amongst them 53% of the clinicians said that they are aware of the two-pager leaflet that summarises the role of 'diet and lifestyle' in prevention of CVD as described in the ESC/EAS Guidelines for the Management of Dyslipidaemias. In contrast, only 16% of all survey EAS members (19% of the clinicians, 18% of the researchers and 6% of the students/postdocs) are aware of the educational e-learning tool called 'Diet at the heart', which is hosted at the EAS website (http://www.dietattheheart.com/). Amongst those who are aware of this educational tool, just 41% stated to personally use it. The number of users was higher for the students/postdocs (50%) and lowest for the clinicians (35%). This finding seems supported by the observation that students/postdocs prefer to use the internet more often to find relevant information such as on 'diet and lifestyle' and are therefore perhaps more interested in this type of online learning tools.

Under half (47%) of the surveyed EAS members regularly attend the EAS annual meetings and 64% said that they do not listen to specific recorded sessions from the EAS congresses on 'diet and lifestyle' related topics, mainly because of unawareness and/or lack of time. This finding would imply that either efforts to raise the awareness of such educational materials should be increased or alternatively, shorter more snapshot-like tailored messages on diet and lifestyle themes should be communicated via different channels including social media.

In view of unmet needs for educational materials on 'diet and lifestyle', about 60% of the surveyed clinicians feel that specific patient-oriented leaflets and pocket-style guidelines would be most beneficial materials, 39% of the CVD researchers would like to see a website and 50% of the students/postdocs would prefer an app (Fig. 4). Regarding future formats for educational sessions at the annual EAS congresses, 61% of the surveyed EAS members would prefer educational seminars and about half indicated that they would also like to see workshops (57%), 'meet the expert' sessions (54%), debates (38%) or case reports (28%) that address 'diet and lifestyle' topics. Clearly, 'diet and lifestyle' related topics have a role to play at the annual EAS congresses and the congress organising committees are encouraged to consider this in the future congress program.

2.6. Limitations of the survey

This survey was performed on a random sample of EAS members who willingly participated online. Therefore, the observed findings may not be fully representative for all EAS members even so EAS members from 42 countries participated in the survey and the distribution between clinicians and researchers involved in CVD related research was equally 38% with the remaining 24% being students/postdocs. Nonetheless, the findings provide a general impression of clinicians, researchers and students/postdocs about their perceived knowledge and interest in 'diet and lifestyle' matters. It further provides useful insights into educational material needs to support the important role of 'diet and lifestyle'

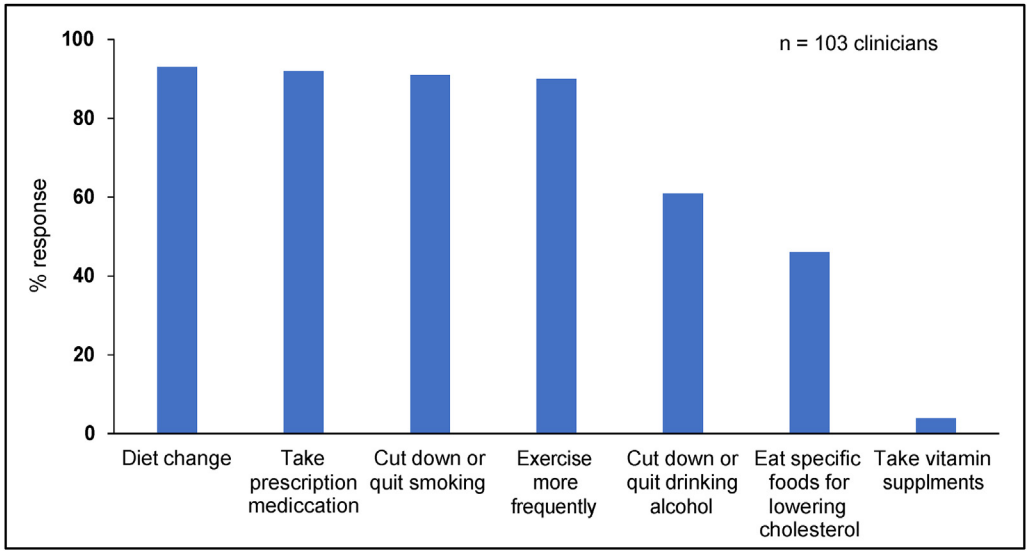

Fig. 3. Response to the question "What kind of advice and recommendations do you give your patients with dyslipidaemia who are in need for lowering their cholesterol levels?"

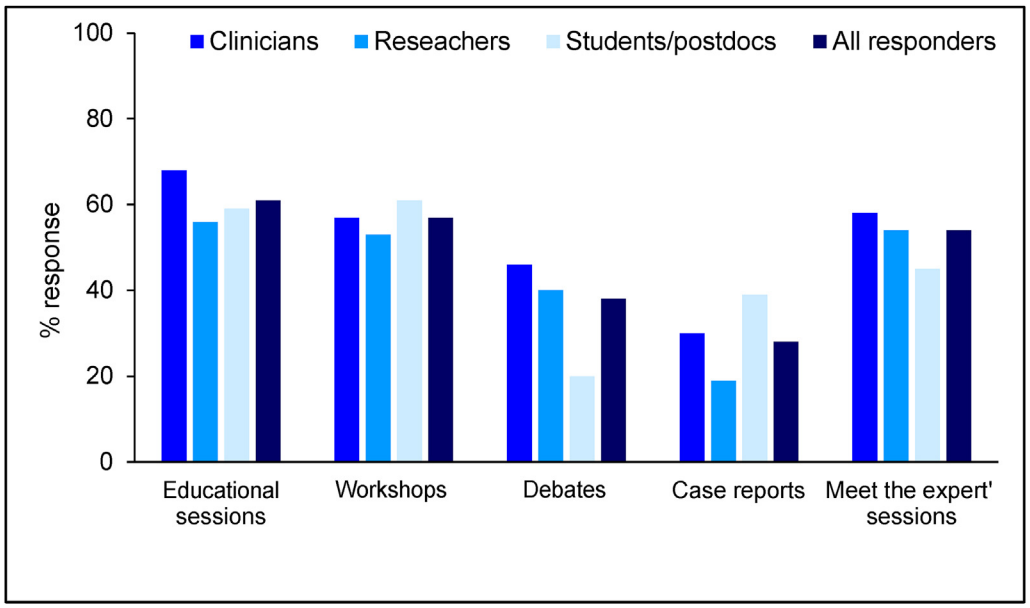

Fig. 4. Response to the question "Which educational formats addressing 'diet and lifestyle' topics would you like to see featured in upcoming EAS annual meetings?" Based on n= 269 responders, 103 clinicians, 102 researchers and 64 students/postdocs.

recommendations in the management of dyslipidaemia and prevention of CVD.

3. Conclusions and implications

Encouragingly, the EAS members who participated in the survey clearly recognise the role of 'diet and lifestyle' in the management of dyslipidaemia and the prevention of CVD. This is especially evident amongst the younger generation since especially students/postdocs recognise the benefit of 'diet and lifestyle' changes. The survey participants expressed to a high degree the feeling of being educated about the role of 'diet and lifestyle', and especially clinicians reported feeling sufficiently educated and hence confident of talking about 'diet and lifestyle' related aspects and providing advice to their patients. However, conclusions cannot be drawn regarding the quantity and quality of any given advice as this was not assessed in the current survey.

The successful implementation of 'diet and lifestyle' advice relies not only on the clinician's perceived knowledge but also on their efforts to provide such advice and to educate their patients about healthy behaviour changes. Guideline implementation in daily practice is, however, far from optimal as has been found in several cross-sectional surveys as part of the European Action on Secondary and Primary Prevention by Intervention to Reduce Events (EUROASPIRE). For instance, the EUROASPIRE IV survey (primary care arm) revealed that a large proportion of the interviewed patients who were free of established CVD but were at a high risk of developing CVD, had unhealthy lifestyle habits such as being persistent smokers and being overweight or obese next to having uncontrolled blood pressure, blood lipids and diabetes [7]. Nevertheless, 65% of the obese patients had received a personal dietary recommendation by a health professional and 59% were advised to participate in regular physical activity, while less than 14% had been advised to attend some form of CVD prevention programme. Also, the most recent EUROASPIRE V survey found that most coronary patients still have an unhealthy lifestyle with respect to smoking, diet and sedentary behaviour, adversely impacting the management of CVD risk factors like elevated LDL-cholesterol and blood pressure and diabetes [8]. Furthermore, EUROASPIRE V also studied whether and what type of dietary advice was provided by a physician or another health care professional to CVD patients next to asking for implemented changes made by the patients. Dietary advice was not systematically provided to CVD patients with the percentage of patients receiving dietary advice and the type of advice varying widely between the studied 27 countries [9]. Dietary advice was provided to two-thirds of CVD patients including advice to reduce (in descending order) fat, salt, sugar and calories and to increase (in descending order) fruits and vegetables, fish, esp. oily fish, and foods with added plant sterols/stanols. However, it was also shown that the more frequent patients receive dietary advice, the more patients reported changes made in their dietary habits [9]. It should, however, be noted that the quality of the provided dietary advice was not assessed and remains hence unknown. Clearly, there is a need to further improve the implementation of the diet and lifestyle guidelines in everyday clinical practice both for patients with CHD as well as individuals at risk of developing CVD.

Regarding effectiveness and easiness, medication, i.e. statin use, was perceived by the participating EAS members as the most effective and easiest intervention while dietary changes are considered as more difficult to adhere to. This certainly reflects the fact that providing dietary advice, e.g. for adopting and maintaining a heart healthy diet is more complex than prescribing drug treatment because it also requires guidance on behavioural change strategies. While more insights into behaviour change practices, e.g. what advice patients receive by clinicians and other health care professionals, are required, cognitive behavioural methods such as motivational interviewing have been shown to be effective [5]. Moreover, individual aspects such as personal and cultural food preferences and the capability to afford and prepare foods should be considered. Furthermore, the involvement of a team of interdisciplinary health care professionals including physicians, clinicians, dietitians and nurses is desirable to address all aspects of 'diet and lifestyle' for optimal CVD risk factor management and CVD risk prevention.

CRediT authorship contribution statement

Elke A. Trautwein: Conceptualization, Writing - original draft, Writing - review & editing, Supervision. **Alberico L. Catapano:** Conceptualization, Supervision. **Lale Tokgözoğlu:** Conceptualization, Supervision.

Declaration of competing interest

None relevant to the work described in this manuscript.

Acknowledgments

The execution of the survey was supported by the EAS via an educational grant from joint corporate partners BASF, Germany; Raisio, Finland and Upfield, Netherlands. The work of ALC has been supported by Ministry of Health IRCCS MultiMedica, PRIN 2017H5F943 and ERANET ER-2017-2364981. We thank Pegasus for carrying out the survey and especially Grace Sear and Vanessa Slade from Pegasus for quantifying the findings. This article is part of a Supplement entitled “Plasma lipids and cardiovascular risk: Nutritional and therapeutic approaches” published with support from Società Italiana di Terapia Clinica e Sperimentale (SITeCS).

References

[1] WHO factsheet No. 317. 2017. https://www.who.int/news-room/fact-sheets/detail/cardiovascular- diseases-(cvds.

[2] Wilkins E, Wilson L, Wickramasinghe K, Bhatnagar P, Leal J, Luengo-Fernandez R, Burns R, Rayner M, Townsend N. European cardiovascular disease statistics 2017. Brussels: European Heart Network; 2017.

[3] Mach F, Baigent C, Catapano AL, Koskinas KC, Casula M, Badimon L, Chapman MJ, De Backer GG, Delgado V, Ference BA, Graham IM, Halliday A, Landmesser U, Mihaylova B, Pedersen TR, Riccardi G, Richter DJ, Sabatine MS, Taskinen MR, Tokgozoglu L, Wiklund O. ESC Scientific Document Group .2019 ESC/EAS Guidelines for the management of dyslipidaemias: lipid modification to reduce cardiovascular risk. Eur Heart J 2019. Aug 31. pii: ehz455. doi: 10.1093/eurheartj/ehz455 and Atherosclerosis. 2019 Nov; 290: 140-205. doi: 10.1016/j.atherosclerosis.2019.08.014. Epub 2019 Aug 31.

[4] Ference BA, Ginsberg HN, Graham I, Ray KK, Packard CJ, Bruckert E, Hegele RA, Krauss RM, Raal FJ, Schunkert H, Watts GF, Boren J, Fazio S, Horton JD, Masana L, Nicholls SJ, Nordestgaard BG, van de Sluis B, Taskinen MR, Tokgozoglu L, Landmesser U, Laufs U, Wiklund O, Stock JK, Chapman MJ, Catapano AL. Low density lipoproteins cause atherosclerotic cardiovascular disease. 1. Evidence from genetic, epidemiologic, and clinical studies. A consensus statement from the European Atherosclerosis Society Consensus Panel. Eur Heart J 2017;38: 2459–72.

[5] Piepoli MF, Hoes AW, Agewall S, Albus C, Brotons C, Catapano AL, Cooney MT, Corra U, Cosyns B, Deaton C, Graham I, Hall MS, Hobbs FD, Lochen ML, Lollgen H, Marques-Vidal P, Perk J, Prescott E, Redon J, Richter DJ, Sattar N, Smulders Y, Tiberi M, van der Worp HB, van Dis I, Verschuren WM, Authors/Task Force M. European guidelines on cardiovascular disease prevention in clinical practice: the sixth joint task force of the European society of Cardiology and other societies on cardiovascular disease prevention in clinical practice (constituted by representatives of 10 societies and by invited experts) developed with the special contribution of the European association for cardiovascular prevention & rehabilitation (EACPR). Eur Heart J 2016;37:2315–81. 2016.

[6] Eckel RH, Jakicic JM, Ard JD, de Jesus JM, Houston Miller N, Hubbard VS, Lee IM, Lichtenstein AH, Loria CM, Millen BE, Nonas CA, Sacks FM, Smith Jr SC, Svetkey LP, Wadden TA, Yanovski SZ, Kendall KA, Morgan LC, Trisolini MG, Velasco G, Wnek J, Anderson JL, Halperin JL, Albert NM, Bozkurt B, Brindis RG, Curtis LH, DeMets D, Hochman JS, Kovacs RJ, Ohman EM, Pressler SJ, Sellke FW, Shen WK, Smith Jr SC, Tomaselli GF. American College of Cardiology/American heart association task force on practice guidelines. 2013 AHA/ACC guideline on lifestyle management to reduce cardiovascular risk: a report of the American College of Cardiology/American heart association task force on practice guidelines. Circulation 2014;129:S76–99.

[7] Kotseva K, De Bacquer D, De Backer G, Rydén L, Jennings C, Gyberg V, Abreu A, Aguiar C, Conde AC, Davletov K, Dilic M, M1 Dolzhenko, Gaita D, Georgiev B, Gotcheva N, Lalic N, Laucevicius A, Lovic D, Mancas S, Miličić D, Oganov R, Pajak A, Pogosova N, Reiner Ž, Vulic D, Wood D. On behalf of the Euroaspire Investigators. Lifestyle and risk factor management in people at high risk of cardiovascular disease. A report from the European Society of Cardiology European Action on Secondary and Primary Prevention by Intervention to Reduce Events(EUROASPIRE) IV cross-sectional survey in 14 European regions. European Journal of Preventive Cardiology 2016;23(18):2007–18.

[8] Kotseva K, De Backer G, De Bacquer D, Rydén L, Hoes Grobbee D, A1 Maggioni, et al. on behalf of the EUROASPIRE Investigators. Lifestyle and impact on cardiovascular risk factor control in coronary patients across 27 countries: Results from the European Society of Cardiology ESC-EORP EUROASPIRE V registry. Eur J Prev Cardiol 2019;26(8):824–35. May.

[9] Marques-Vidal P, Jankowski P, De Bacquer D, Kotesva K, on behalf of the EUROASPIRE V collaborators. Dietary measures among patients with coronary heart disease in Europe. ESC EORP Euroaspire V. Intern J Cardiol 2020;302: 5–14. https://doi.org/10.1016/j.ijcard.2019.12.064.