

A national survey identifying the factors associated with cardiovascular care nurses' perceived knowledge of international practice guidelines: the first step in the development of an implementation strategy

G. McKee, M. Hayes, N. Caples, A. Lowry, M. Shine, B. Hannon, E. Cronin, E. Lodge, L. Hill, M. Tuohy, N. Gillen, S. Teehan.

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Gabrielle McKee, PhD, Associate Professor, School of Nursing and Midwifery, Trinity College, Dublin, Ireland

Maria Hayes, MSc Clinical practice, Clinical Nurse Specialist, Cardiothoracic unit, Blackrock Clinic, Dublin, Ireland.

Norma Caples, MSc Advanced Nursing Practice, Clinical Nurse Specialist, Heart Failure Department, Waterford Regional Hospital, Waterford, Ireland.

Avril Lowry, MSN (Ed), Assistant Director of Nursing, Centre for Learning and Development, St James Hospital, Dublin, Ireland.

Maria Shine, PgDip, Clinical Nurse Manager 2, Keith Shaw Cardiothoracic ICU, St James Hospital, Dublin, Ireland.

Bernadette Hannon, MA, Clinical Nurse Specialist Vascular Disease, Vascular and Endovascular Department, St James Hospital, Dublin, Ireland

Edel Cronin, MSc, Clinical Nurse Manager 2, catheterization laboratory, Waterford Regional Hospital, Waterford, Ireland.

Emer Lodge, MSc, Advanced Nurse Practitioner , catheterization laboratory, St James Hospital, Dublin, Ireland

Loreena Hill, PhD, Lecturer, School of Nursing and Midwifery, Queen's University of Belfast, Belfast, Northern Ireland, United Kingdom

Margaret Tuohy, PGDIP, Clinical Nurse Manager 2, Coronary Care Unit, Naas General Hospital, Naas, Ireland

Nessa Gillen, PGDIP, Cardiology Clinical Nurse Specialist, O'Malley Unit, Galway Clinic, Galway, Ireland

Sinead Teehan, MSc Advanced Nursing Practice, Clinical Nurse Specialist, cardiology Department, St James Hospital, Dublin, Ireland

Corresponding Author

Dr Gabrielle McKee

School of Nursing & Midwifery

Trinity College Dublin

Institute Of Population Health,

Russell Centre, Tallaght Cross West

Tallaght, Dublin 24 DH74

Ireland

+ 353 18962779/3341

gmckee@tcd.ie

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Abstract

Background: The implementation of international guidelines within everyday practice remains problematic, which can have a detrimental impact on quality of care delivered. This study aimed to ascertain the factors associated with clinical nurses' perceived knowledge of international guidelines.

Methods: This cross-sectional survey recruited nurses from 45 hospitals, across Ireland. A previously validated anonymous questionnaire that assessed guideline knowledge, use and barriers to implementation, was utilized. Data was analyzed using SPSS 23 and logistic regression.

Results: Of the 542 responses, 54% had used international guidelines relevant to their practice and 50% had consulted within the last year. Most nurses perceived that poor patient follow up, lack of time and resources, poor clinical leadership, workload, long guidelines and not understanding guideline detail were barriers to guideline use and implementation. 45% rated their perceived knowledge of guidelines as "low". Logistic regression identified that "high" knowledge levels was significantly associated with having read guidelines in last year and their use with practice. In contrast, low knowledge of the guidelines was associated with perceptions that they were lengthy, not easy to use, lack of confidence to challenge colleagues when guidelines are not implemented or not being able to influence current practice.

Conclusions: This study identified the specific knowledge needs in this cohort of mainly basic grade registered nurses, with low perceived guideline knowledge. A whole unit or team approach led by nurse champions is needed to develop and establish practice and educational

strategies that would increase availability, application and knowledge of guidelines within everyday practice.

Keywords: practice guideline, barriers, knowledge, implementation, cardiovascular nursing

Background

Cardiovascular disease remains the leading cause of mortality in the world, in 2016 it was responsible for 44% of deaths worldwide (17.9 million people).¹ The understanding, implementation and use of clinical practice guidelines is pivotal to improving health outcomes. International cardiovascular experts develop guidelines which are scientific, evidence-based documents that help to ensure the patient receives the best proven treatment.^{2,3} Publication of guidelines is only the first step, it needs to be followed up by local implementation strategies to enhance knowledge and use of the guidelines.

The barriers to guideline knowledge, utilization and implementation are often complex and can be differentiated into professional and personal factors, guideline related factors, and external factors either organizational or environmental.⁴⁻⁹ Personal and professional factors include knowledge issues such as awareness and familiarity.⁴⁻¹⁰ They also include issues relating to professionals' attitudes, such as lack of self-efficacy, skills, communication, learning, as well as outcomes/ implementation expectancy, motivation and personal profile.^{4-8, 10, 11} Guideline related factors are varied and differ markedly depending on the guidelines in question, their usability and formats available.^{5, 9, 12} They include issues such as lack of evidence, plausibility of recommendations, complexity, access and lack of applicability or implementation strategies.^{4, 5, 10} External barriers are also many and include organizational restraints, lack of resources or facilities, lack of collaboration and lack of staff.^{4, 5, 7-10} A major consequence of these barriers is that knowledge, implementation and use of guidelines in practice is diverse and as a result often not optimal.

While the evidence above identifies many barriers, these may differ significantly across and within the different healthcare professions, across different disease entities and the loci of care including primary and secondary care. Few studies examine these concepts solely within the

nursing profession or include nurses working at the 'coalface' with cardiovascular patients^{7, 9, 10, 13, 14} In addition, there is limited evidence on the more fundamental aspect - guideline knowledge and the factors that impact this knowledge. The first step in any implementation strategy development is a needs assessment for the target group and stakeholders.¹⁵ Therefore, to develop strategies to improve the use and implementation of guidelines, an identification of deficits and barriers in guideline knowledge is required. The aim of this research is to ascertain nurses working with cardiovascular patients perceived knowledge of international guidelines and the factors that influence knowledge.

Methods

The design of this study was a cross-sectional survey design.

Site, population and sample

Participates were recruited from 45 hospitals or in a community setting across the island of Ireland. The inclusion criteria for the study was any registered nurse currently working with cardiiovascular patients in a hospital setting or as a community nurse. The study chose to sample from a large pool of potential respondents that would be nationally representative rather than a local less diverse sample. The Director of Nursing in all hospitals across the island of Ireland with a cardiovascular unit was contacted by the principal investigator, a poster put up advertising the study and a gatekeeper selected. The gatekeeper provided an estimate of the population size taking into account shift patterns, part time nursing staff and holiday rotas. This amounted to an estimate of 2015 nurses working with cardiovascular patients, in hospitals (n=1929) or in a community practice (n=86). A sample size calculation was carried out to ensure that the sample size was representative of the population. Using this sample size and a confidence level of 95% a survey sample of 179 was required to represent the population.¹⁶ A post hoc power analysis using a sample of 554 and alpha of .05 determined that the power of

the sample for logistic regression was adequate at 0.79.¹⁷ The study conformed to the principles outlined in the Declaration of Helsinki" (Br Med J 1964;ii:177). Ethics permission was obtained for all sites through regional ethics committees with completion and return of the postal questionnaire taken as consent to partake in the study.

Data collection tools

The anonymous questionnaire used in the study, with permission, was developed for a previous study focusing on implementation of guidelines by the board of the European Society of Cardiology's (ESC) Council of Cardiovascular Nurses and Allied Health Professionals.⁹ The questionnaire was adapted to focus on perceived knowledge within an Irish nursing perspective. Additional questions to examine nurses' current position, and their attendance at conferences or workshops were added. Streamlining of the questionnaire also resulted in the deletion of a large ranking question, a question on the format of the guidelines used and several perception questions relating to patient guidelines and goals. The original questionnaire's face validity and content validity was examined and reported by the original research team⁹. For content validity the questionnaire was examined by eight external experts from a variety of areas of cardiovascular expertise⁹. Clarity and relevance were assessed using a four-part Likert scale. A total of 85% of questions, instructions or statements were returned with 70% of respondents indicating that they were very clear or very relevant. The 15% that did not meet the 70% standard, and any comments that were presented, were reviewed by the research team. This resulted in 20 minor amendments, mainly clarifications and two irrelevant parts of questions been deleted. The questionnaire contained two sections. Section A consisted of nineteen questions which ascertained the profile of the participant, the guidelines they used in practice, guideline origin/source and guideline use. It contained the core 5-part Likert style question which participants used to self-rate their perceived knowledge of the ESC guidelines relevant to their practice. This section also included one question where the participants were

asked to rank their source of knowledge of risk factors. Section B of the questionnaire assessed the participants' perceptions about and barriers to the implementation and use of any ESC Guidelines. This section contained 21 statements again, utilizing a five-part Likert scale from strongly agree to strongly disagree.

Data collection

The study was promoted during the Irish Nurses Cardiac Association (INCA) Conference and on the INCA website. Following ethical approval, a gatekeeper was appointed in each of the hospitals. The role of the gatekeeper was to distribute paper copies of the questionnaire to eligible nurses. A nominated person in the research team ascertained the number of questionnaires required and mailed or delivered by hand the research packs to the local gatekeeper. The research pack contained the participant information leaflet, the anonymous questionnaire and a stamped addressed envelope for return per questionnaire. For the community nurses an electronic link to the questionnaire was sent via email by a gatekeeper to the community nurses in their area. Data was collected from August 2017 to April 2018.

Data analysis

Data were analyzed using SPSS version 23. The level of significance was set ≤ 0.05 . Descriptive statistics were used to describe the participant profile and their responses to the perceptions and barriers statements. For inferential analysis, to determine the factors associated with knowledge, data from the 5-part Likert scales were categorized into two main categories i.e. 'Low Knowledge' included poor / average and 'High Knowledge' included good / very good / excellent. The categories used in the analyses are presented in the relevant tables. For descriptive statistics and bivariate analyses missing data was not imputed and cases that did not respond to the main variable under analysis – knowledge, were therefore excluded from these analyses. As the dependent variable, perceived knowledge was categorical, logistic

regression models was used to assess 1) the profile and 2) perception factors influencing perceived knowledge collectively. The data met the assumptions required for the logistic regression models, in that the sample size was adequate for the number of independent variables examined, the data was tested for multicollinearity using multivariate regression and was screened for outliers. Initially all the factors used in the bivariate analysis as the independent variables were entered into the models. Factors were then removed from the models due to multicollinearity issues or very poor relationship with the dependent variable $p > 0.5$. In the logistic regression the SPSS listwise delete function was used to deal with missing data, as this is the recommended default function and the sample size was adequate to cope with the deletions. Secondary analysis examining the relationship between role (community nurse, staff nurse and other (clinical nurse managers, clinical nurse specialists advanced nurse practitioners and other not always identified but including tutors, research nurses) and use of any ESC guidelines, use of ESC prevention guidelines, number of different origins / sources of guidelines (local / hospital, national, international) and number of guidelines used, utilized Chi squared analysis and Kruskal Wallis tests because sources and number of guidelines were not normally distributed.

Results

A total of 554 nurses returned the questionnaire, with an estimated response rate of 28% (27% for hospital based nurses and 60% for community based nurses). Six questionnaires had only 50% or less of the questions completed and an additional six did not answer the core question on perceived knowledge, therefore these questionnaires were eliminated, leaving a core sample size of 542 for analysis. Due to anonymity the number of completed questionnaires per site could not be determined.

The majority (93%) of respondents were female, aged 45 years or older (61%), and were currently employed as “staff nurses” (i.e. clinical post, non-management, non-specialist and non-academic nurses (61%) (Table 1).

International Guideline Use

A total of 293 (55%) of participants indicated that at least one ESC guideline was used within their practice. In addition, participants were asked to state any guideline(s) that was used and specify if the source was National/local, Regional, European or International. A total of 239 sources were cited from 191 (35%) participants with International guidelines being the most commonly cited (61%; n=145), of which 111 nurses cited an ESC guideline. Some nurses (n=32) mentioned American Heart Association Guidelines. Over a third of the nurses (37%, n=89) cited national or regional guidelines, and 2% (5) cited utilized local guidelines. Of those that cited guidelines, 29% (n=55) cited that guidelines were used from two different sources (for example from local and international sources) and 6.8% (n=13) cited that guidelines from three different sources were used. A small number of nurses (9.2%, n=50) cited all the types of guidelines they used, totaling 156 citations. Of these the number of guidelines accessed per respondent ranged from one to six. Of the total guidelines accessed that were named, the most commonly used guidance was cardiovascular disease prevention (48%; n=256), followed by 21% ST Elevated Myocardial Infarction, 15% heart failure, 12% non- ST Elevated Myocardial Infarction,, 10% rhythm, 9% Acute Coronary Syndrome, 8% Advanced Cardiac Life Support/ Basic Life support/ Cardiopulmonary Resuscitation /crash and 24% cited other guidelines. Nearly half of the nurses surveyed (48%; n=256) stated they had used the ESC prevention guidelines, with most (n=262) consulting an ESC guideline in the last year.

There was a significant association between the role occupied by the nurse (community nurse, staff nurse or other) and both the use of any ESC guidelines (χ^2 (4, n=544) =54.80, p < 0.001)

and more specifically the use of the ESC prevention guidelines ($\chi^2 (4, n=544) = 17.22 p=0.001$). Utilization in both cases was lowest in community nurses. Kruskal-Wallis tests showed no significant difference across role occupied by nurse and the total number of different guidelines used ($p=0.453$). There was a significant difference found between role occupied by nurse and the number of different sources of guidelines used ($p=0.047$). Community nurses used guidelines from the lowest number of sources compared to other nurses.

Perceived Barriers to use and implementation of International Guidelines

Nurses were asked to indicate their level of agreement with 21 statements related to the international guidelines. While most (>70%) viewed the ESC guidelines positively, however 55% considered the guidelines as lengthy with 53% citing they did not understand all the detail (Figure 1). When it came to operational/ organizational point of view, a number of factors were perceived by participants as barriers to use or implementation (workload, lack of resources to follow up patients, follow up not being automatic, lack of time, lack of leadership in guideline implementation, and belief they were not in a position to influence practice, with regard to guidelines and their implementation (51%) (Figure 2).

Perceived Knowledge of International Guidelines and factors associated with it.

Participants' sources of knowledge about cardiovascular risk factors came from various modalities with workshops or continuing professional development both being ranked highest (28%) (Table 2). When asked to rate their perceived knowledge of the relevant ESC guidelines, 45% (n=244) rated their perceived knowledge as poor or average, categorized as 'low knowledge'.

Bivariate analysis (Chi-square tests for independence) indicated that 12 of the 15 personal and professional profile factors significantly impacted nurses' perceived knowledge of ESC guidelines (Table 1). There were also significant associations between perceived knowledge

of international guidelines and 16 of the 21 guideline and organizational barriers /perceptions to guideline implementation (Supplemental Table 1).

The first logistic regression analysis was performed to ascertain the effects of personal factors and perceived knowledge of ESC guidelines. In the analysis for multicollinearity, there was a strong relationship found between the use of any international guidelines and the use of the international prevention guidelines. Therefore, the prevention guidelines was removed from analysis. The initial model had five variables with very poor relationship to guideline knowledge (Education, position, gender, international conference attended or contributed to), so these was removed leaving eight variables in the final model. Logistic regression model 1 was significant (chi-square=158.79, df=8, n= 424, $p < 0.001$), explaining between 33% (Cox and Snell R squared) and 44% (Nagelkerke R squared) of the variance in knowledge, and correctly classifying 77.5% of cases. Two variables remained significant, namely, participants from practices that used international guidelines and participants who themselves had consulted these guidelines within the last year were four or five times more likely to have high perceived knowledge of guidelines respectively (Table 3). There was no association between knowledge and whether the nurses worked in hospital or community or the region they came from.

A second logistic regression analysis was performed to ascertain the association between organizational factors and perceived knowledge of ESC guidelines. All factors listed in bivariate analysis (Supplemental Table 1) were initially examined for multicollinearity using multivariate analysis and no issues arose. The initial model had four variables with very poor relationship to guideline knowledge (ECS guidelines difficult to access, not enough resources to implement follow up, I feel I have a responsibility to use the ESC guidelines, my workload prevents me from taking on the additional task of ensuring guidelines are implemented and followed up), and therefore were removed. The final logistic regression model 2 was significant (chi-square=91.72, df =15, n= 387, $p < 0.001$) explaining between 21% (Cox and

Snell R squared) and 29% (Nagelkerke R squared) of the variance in knowledge and correctly classifying 72.6% of cases. Four variables remained significant (Table 3). Those who had high perceived knowledge of international guidelines were three times more likely to agree that the guidelines were easy to use, and twice as likely to state that they were of the right length. Furthermore, nurses with high perceived knowledge were more likely to confidently challenge other members of the multidisciplinary team when ESC guidelines are not implemented. In addition, nurses with high perceived knowledge were also over two times more likely to state that they were able to influence current practice routines that would assist the implementation of ESC guidelines.

Discussion

Just over half (54%) of nurses working in clinical practice, indicated they used relevant international guidelines in their everyday practice, with 50% having consulted these guidelines during the last year. However, 45% rated their perceived knowledge of the relevant international guidelines as “Low.” Nurses who perceived their knowledge of the guidelines as ‘High’ perceived the guidelines as easy to use, of an ideal length and had referred to them during the last year. In addition, high knowledge of the guidelines was associated with guideline implementation in practice, increased confidence to challenge other members of the multidisciplinary team when guidelines were not implemented, and the perception of being in a position to influence current practice. Recognition of barriers to implementation and factors that influence guideline knowledge act as a need analysis and are an essential first step in the development of tailored strategies to enhance guideline knowledge and implementation in clinical nurses caring for cardiovascular patients.^{4, 18, 19}

The majority of participants, who were clinical nurses, cited their knowledge as low, which is contrary to other studies^{5, 9, 20} The personal use of guidelines, defined in this study as having consulted them in the last year, was only achieved by half (50%) of the nurses surveyed, again low compared to other studies 63%- 99%.^{9, 21-23} Differences in usage may in part be a reflection of methodological differences between the studies, for example different method to determine guideline use. Furthermore, a contributing factor may be the sample profile as most participants in this study were clinical nurses, younger, with less experience in cardiovascular care and a lower level of qualification, compared to other studies in the area.⁹

Similar to previous work that examined use or implementation of guidelines, personal profile factors such as education, work experience or whether the nurses were hospital or primary care/ community were not major influencing factors to guideline knowledge, when examined in a multivariate way.^{5,9,23-25} However, in contrast to previous evidence on guideline implementation, age was found to be not significantly associated with perceived knowledge.¹⁰ Knowledge could be improved by incorporating guidelines and implementation strategy education into the core curricula.²⁶ This study did not find that attendance at conferences, either national or international was associated with knowledge, nor were these seen as their principle source of risk factor knowledge, while local hospital, workshops and continuing professional development were. Therefore, these type of sessions may be better placed to address deficits in guideline knowledge.⁵

Two guideline related factors were perceived by participants as barriers to implementation and associated with guideline knowledge. Length of the guidelines and ease of their use were significant influences on perceived knowledge. This may be related to information overload, often noted as a barrier to further engagement with guidelines.^{5, 9, 27, 28} International guideline developers have worked tirelessly to develop guidelines using different formats (i.e. summary versions) and ways of presenting guidelines, so this should become less of an issue.²⁸ Future

useful strategies, utilizing local leaders, curricula and professional development have a role to play in addressing perceived information overload by increasing awareness, education, understanding and availability of these different modes.²⁷

This study supported previous findings as several organizational factors were cited as barriers to implementation and were factors associated with low knowledge. Large proportions of participants perceived that time (68%),^{5, 6, 9, 27} resources and logistics (68%),^{5, 6, 9, 22, 27} lack of leadership, encouragement or coaching (66%),^{5, 9, 10, 22} were barriers to implementation. Lack of use of international guidelines in practice was associated with poor perceived knowledge of international guidelines. In addition, 39% of participants were unaware whether the international guidelines were used in their units, reinforcing previous findings that lack of awareness of guidelines might be a barrier to implementation.²²⁻²⁴ Leadership was both cited as a barrier to guideline implementation and a factor associated with perceived guideline knowledge. Developing champions within nursing to spear head change and address knowledge deficits as well as implementation strategies from international level to local level, is required.^{5, 9, 29, 30} This would facilitate appropriate, local system adaptations that have been seen to be effective in addressing barriers such as time and resources, conflicts and changes within accepted practice.^{22,31} These alongside increased guideline education, increased accessibility of guidelines, increased use of guidelines by leaders in practice, summaries of the evidence and recommendations, alternative formats and alternate guidelines for different users including patients, would increase nurses' knowledge of guidelines and position nurses within the multidisciplinary team to better implement guidelines. It would enable them to challenge others when guidelines are not implemented, ultimately influencing current practice to improve patient outcomes.³⁰⁻³⁶ Interventions to date, to enhance guideline knowledge and implementation have also included a number of well-established sophisticated structural models of practice such as "Get with the Guidelines", nurse case management and nurse led or

coordinated care.³⁷⁻⁴⁰ Coke *et al.*, in their article – *Let's Get It Into Practice* and the recent prevention ACC/AHA primary prevention guidelines recommend a team approach including shared decision making with the patient and knowledge of the social determinants of health should inform optimal implementation of guidelines.^{41,42s}

The strength of this study design was its anonymous survey nature, its access to nurses across all hospitals in Ireland that treated cardiovascular disease, in a cohort more inexperienced in practice than previous studies. The response rate was, however, disappointing at 28%, while meeting the needs for analysis and above average for external “cold call” surveys. Missing data was not a major issue on single questions, as usually <90% answered these questions, however with the question related to ‘source of knowledge of risk factors’, only 60% answered this question. Knowledge and use of relevant guidelines were not measured objectively but was self-reported perceived knowledge. In addition, even though the sample was from many different geographical sites, the fact that it examined only personnel working on the island of Ireland could limit the results generalizability to some degree due to differing practices across different countries.

Guideline knowledge, use and implementation is a complex issue that does not have a simple solution. Most of the nurses in this study, were clinical staff nurses, non-management, non-specialist and non-academic and reported low guideline knowledge and use. Despite many strategic recent changes for guideline support at national and international level, their low perceived knowledge of guidelines was associated with the length and the ease of use of guidelines, their own lack of use, lack of use of guidelines in their practice and their poor perception in their ability to implement guidelines. This information can inform further

development and adoption of appropriate local implementation strategies to address these issues. Key to their success would be a whole unit / team approach led by nurse champions, developing and implementing local practice and education strategies that would increase availability, knowledge, application and awareness of guidelines addressing specific needs and barriers in the local context by local context resources.

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What's new

- Basic grade nurses working with cardiovascular patients, have low use and knowledge of international guidelines and significant barriers to their implementation.
- Poor perceived practice guideline knowledge was associated with lack of use by themselves or their unit, guideline length, not easy to use and poor confidence in themselves to implement guidelines or challenge others when they were not implemented
- To address these specific barriers to perceived knowledge, local champion led appropriate practice and education strategies need to be developed to increase guideline education, application and availability.

Table 1: Bivariate analysis examining association of sociodemographic and profile factors of nurses working with cardiovascular patients and perceived knowledge of European Society of Cardiology (ESC) guidelines

		<i>Knowledge poor/average n (%)</i>	<i>Knowledge good/very good/excellent n (%)</i>	χ^2	<i>p</i>
<i>Gender (526)</i>	Female (490) (93%)	222 (45)	268 (55)	2.47	0.291
	Male (36) (7%)	17 (47)	19 (53)		
<i>Age (539)</i>	Up to 45 years (330) (61%)	152 (46)	178 (54)	.234	0.628
	Over 45 years (209) (39%)	91 (44)	118 (56)		
<i>Region (538)</i>	Ireland (471) (88%)	208 (44)	263 (56)	.779	0.377
	Northern Ireland (67) (12%)	34 (51)	33 (49)		
<i>Years worked in cardiac care (476)</i>	10 years or less (222) (47%)	123(55)	99 (45)	16.84	<0.001*
	More than 10 years (254) (53%)	92(36)	162 (64)		
<i>Highest level of education (525)</i>	Higher diploma or above (211) (40%)	64 (30)	147 (70)	28.74	<0.001*
	UG/ Degree (314) (60%)	171 (54)	143 (46)		
<i>Current position/status (523)</i>	Staff Nurse (326) (62%)	178 (52)	163 (48)	46.99	<0.001*
	Community Nurse (52) (10%)	33 (63)	19 (37)		
<i>Any European Society of Cardiology Guidelines used in your practice (537)</i>	Other (CNM, CNS, ANP & others (145) (28%)	31 (21)	114 (79)	111.2	<0.001*
	Yes (293) (55%)	71 (24)	222 (76)		
	No (244) (45%)	171(70)	73(30)		

<i>European Society of Cardiology Prevention</i>	Yes (256) (48%)	65 (25)	191 (75)	74.35	<0.001*
<i>Guidelines used in practice (536)</i>	No (280) (52%)	176 (63)	104 (37)		
<i>When any guidelines last read (524)</i>	Within the last year (262) (50%)	54 (21)	208 (79)	126.2	<0.001*
	More than a year ago (262) (50%)	183 (70)	79 (30)		
<i>In the last year have you attended local or national cardiac related conference (535)</i>	Yes (211) (39%)	68 (32)	143 (68)	22.93	<0.001*
	No (324) (61%)	174 (54)	150 (46)		
<i>In the last year have you contributed to a local or national cardiac related conference (535)</i>	Yes (60) (11%)	7 (12)	53 (88)	28.91	<0.001*
	No (475) (89%)	234 (49)	241 (51)		
<i>In the last year have you attended an international cardiac related conference (534)</i>	Yes (64) (12%)	18 (28)	46 (72)	7.39	0.007*
	No (470) (88%)	221 (47)	249 (53)		
<i>In the last year have you contributed to international cardiac related conference (536)</i>	Yes (25) (5%)	3 (12)	22 (88)	10.05	.002*
	No (511) (95%)	237 (46)	274 (54)		
<i>Member of Irish National Cardiac Association (536)</i>	Yes (97) (18%)	27 (28)	70 (72)	12.92	<0.001*
	No (439) (82%)	213 (49)	226 (51)		
<i>Think membership of the national organization is important (506)</i>	Yes (309) (61%)	125 (40)	184 (60)	4.768	.023*
	No (197) (39%)	100 (51)	97 (49)		

* significant level ≥ 0.05

Fishers exact test

Table 2: Nurses working with cardiovascular patients, ranking on their most important source of information on cardiovascular risk factors (n=330)

	% (n)
<i>Workshops or continuing professional development</i>	28.2 (93)
<i>Post-registration education</i>	16.1 (53)
<i>Electronic guidelines sourced on internet</i>	14.8 (49)
<i>Paper copies of guidelines</i>	11.8 (39)
<i>Pre-registration education</i>	10.0 (33)
<i>Discussion – Multidisciplinary team</i>	8.5 (28)
<i>Discussion – Colleagues</i>	7.6 (25)
<i>Material at conferences</i>	3.0 (10)

Table 3: Logistic regression results of the sociodemographic, perception and barrier factors that significantly influence nurses working with cardiovascular patients perceived knowledge of European Society of Cardiology Guidelines (ESC).

		Odds	95% C.I.		<i>p</i>
		ratio	Lower	Upper	
Sociodemographic model					
<i>Any European guidelines used in practice</i>	No (Ref)				
	Yes	4.011	2.349	6.846	>.001
<i>Read guidelines within last year</i>	No (Ref)				
	Yes	4.867	2.883	8.216	>.001
Barriers and perceptions model					
<i>The ESC guidelines are easy to use</i>	Disagree (Ref)				
	Agree	3.316	1.596	6.892	.001
<i>I have the confidence to challenge other members of the multidisciplinary team when ESC guidelines are not implemented</i>	Disagree (Ref)				
	Agree	2.281	1.346	3.865	.002
<i>I am not in a position to influence current practices and routines that would assist the implementation of ESC guidelines</i>	Agree (Ref)				
	Disagree	.585	.349	.982	.042
<i>The ESC guidelines are not too long</i>	Disagree (Ref)				
	Agree	2.023	1.146	3.573	.015

Figure 1: Nurses working with cardiovascular patients, personal perceptions of practice guideline and their implementation

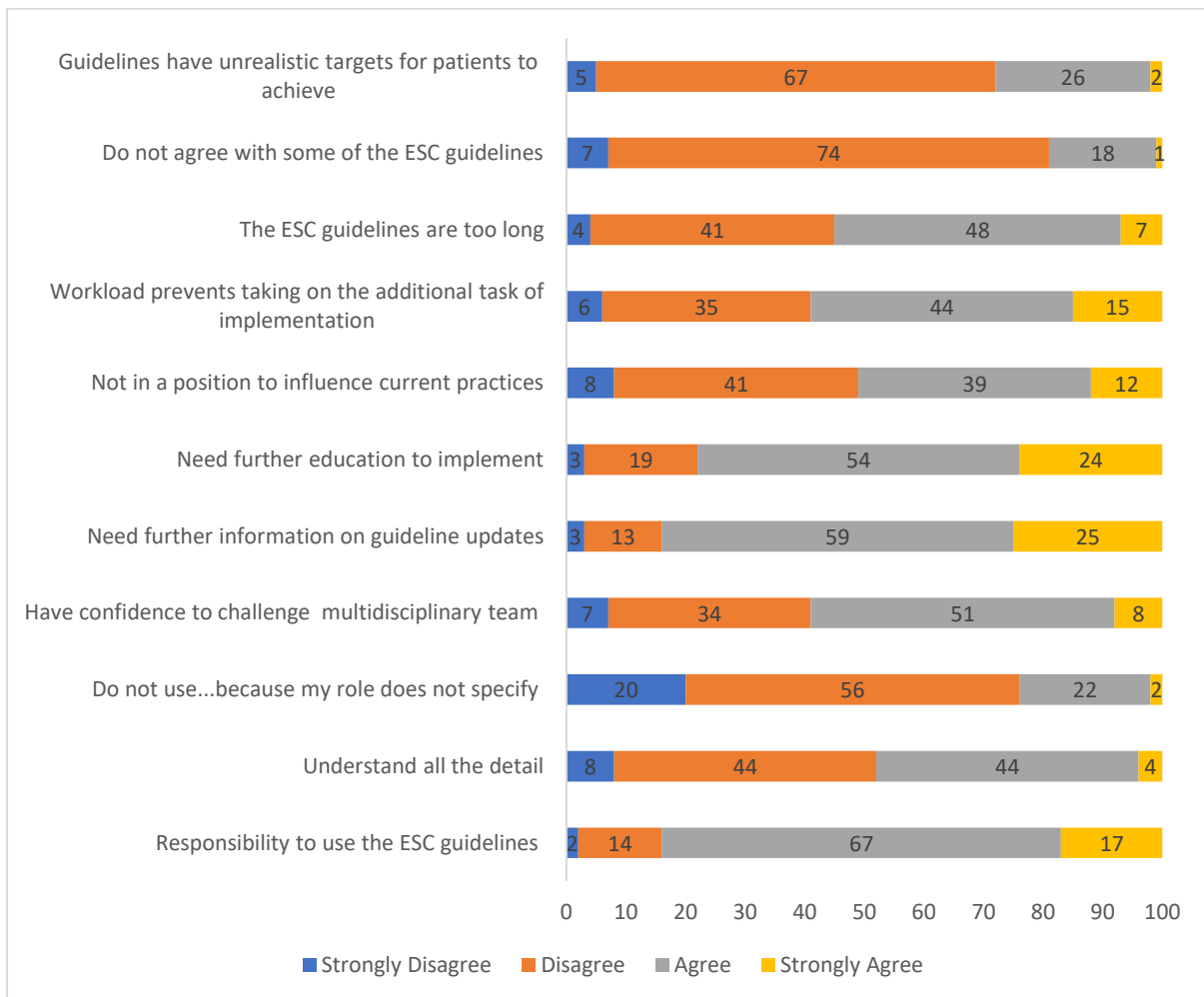


Figure 2: Nurses working with cardiovascular patients, perceptions on operational issues regarding practice guidelines and their implementation

