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RESEARCH PAPER

Perceived educational needs in geriatric medicine of professionals: a multinational multilingual open online survey

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Abstract

Purpose To assess perceived overall knowledge in geriatric medicine and perceived educational needs in key geriatric topics and skills of health and social care professionals working within the WHO Region Europe.

Methods The sample of this cross-sectional survey was not designed to be nationally representative. We analysed the responses of 5425 professionals who completed a multilingual multinational open online survey between October 2023 and June 2024. Professionals rated their perceived knowledge, the relevance to their profession and their interest in further training in each of 33 geriatric topics or skills, from "very low" (scored as 1) to "very high" (scored as 5). We computed a global topic score as "relevance + interest – knowledge" for each topic and *Z*-scored it. Higher *Z*-scores indicated higher educational needs.

Results Professionals' mean age was 42.6 years (standard deviation 11.9); 3942 (72.7%) were women; 3273 (60.3%) worked in the EU-27. The most represented categories were medical doctors, nurses, dentists, pharmacists, and physiotherapists. Perceived overall knowledge varied by country of work and profession. The perceived educational needs *Z*-scores varied from 1.45 to −2.57, with the highest being observed for chronic pain (1.45), comprehensive geriatric assessment (1.20), management of behavioural and psychiatric symptoms of dementia (1.19), assessing capacity to consent (1.07), and resilience and diversity and depression (both 1.05).

Conclusion To our knowledge, this is the first multinational multilingual online survey on perceived educational needs in geriatric medicine of a large number of professionals from multiple disciplines. Our findings should inform harmonized curricula and continuing education programmes.

Key summary points

Aim To explore the educational needs in the care of older adults as expressed by the 5,425 professionals across Europe and beyond who completed a multilingual multinational online open survey.

Findings The perceived overall knowledge in care for older adults varied by professionals' role or profession, country of previous study and country of current work, respectively. Based on a *Z*-score combining professionals' self-rated knowledge, relevance and interest in 33 geriatric topics and skills, the highest perceived educational needs were observed for chronic

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pain, comprehensive geriatric assessment, management of behavioural and psychiatric symptoms of dementia, assessing capacity to consent, resilience and diversity, and depression.

Message We advocate for the feedback of the professionals participating in the PROGRAMMING survey to inform the content of undergraduate and postgraduate professional curricula as well as continuing education initiatives in the field of geriatric medicine, across Europe and beyond.

Keywords Online mixed-methods survey · Continuous professional development · Emerging geriatric medicine · Geriatric medicine education

Introduction

With global population ageing, geriatric medicine education is essential for all health and social care professionals [1–6]. As adults aged ≥ 65 years account for almost 10% of the global population, and about 20% of the population in Europe [7–9], all professionals will encounter older adults in their professional practice and must be adequately trained to fulfil their unique needs [4]. Geriatric care is inherently multidisciplinary and interprofessional. The Comprehensive Geriatric Assessment (CGA), which is the cornerstone of geriatric care, is defined by its multidisciplinary nature and based on the collaborative input of an interprofessional team. The CGA has been proposed as the "gold standard" for improving outcomes in older adults in hospital and community settings [10, 11]. The World Health Organization (WHO) emphasized that effective care for older people in the community—where most older adults live and age in place [12]—must be based on community-based multidisciplinary teams to ensure person-centred assessment and care pathways [13]. The complex care needs of older adults are optimally managed through a multidisciplinary and interprofessional approach [10, 14]. The management of complex geriatric conditions, such as frailty, is most effective when delivered through a multidisciplinary approach involving allied healthcare professionals [15].

Of concern, specialized workforce in geriatric medicine is largely inadequate to meet the specific and complex care needs of older people, in both countries with a long tradition of geriatric medicine and those where it is still emerging [16, 17]. Moreover, despite the growing need for geriatric expertise across Europe, structured data on perceived educational priorities among healthcare professionals remain limited.

The WHO and many others have advocated for all health and social care professionals to meet the core competencies in geriatric medicine during undergraduate and postgraduate formal education and continuous professional development [18, 19]. The engagement in continuous professional development is highly self-directed by professionals themselves. Their attitudes and beliefs are crucial in motivating them to seek further training. Therefore, it is essential to explore their perceived educational priorities, based on their perceived knowledge and competence, the relevance of specific training to their professional role and their interests.

PROGRAMMING (PROmoting GeRiAtric Medicine in countries where it is still eMergING) COST (European Cooperation in Science and Technology) Action 21122 is an international collaboration aiming to promote geriatric medicine through the education and training of health and social care professionals on basic geriatric concepts [20].

PROGRAMMING conducted an online open survey to explore the self-perceived educational interests and needs in geriatric medicine of professionals and medical students [21]. The data on medical students will be analysed and reported separately; in this paper, focus was on professionals working in the WHO Region Europe or Kosovo (* this designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence) [22]. Because geriatric care is inherently multidisciplinary, we explored the educational needs of a wide range of health and social care professionals, not only medical doctors. In this study, we reported professionals' self-perceived overall knowledge in geriatric medicine and their self-perceived educational needs across a comprehensive list of 33 key geriatric topics and skills, by combining their responses on perceived knowledge, relevance and interest in these. Finally, we ranked these topics and skills based on an ad-hoc created combined score.

Methods

The aim, development, structure, content, and dissemination of the PROGRAMMING online survey on educational needs have been previously described, in line with current guidelines for reporting online surveys [21, 23]. The survey was developed through an iterative co-creation process involving PROGRAMMING members who were experts in the care of older adults from diverse healthcare and non-healthcare professional backgrounds and multiple European and neighbouring countries. During an ad hoc meeting, the survey was presented to an external panel of 68 international stakeholders from 24 countries and revised based on their advice [21]. This co-creation

process started in October 2022 and was completed in May 2023. For transparency and for facilitating future replication or adaptation of our work, we published the original English-language version of the survey questionnaire [21].

The survey was developed in English and translated into 24 languages using a standardized process with translation and proofreading to ensure consistency with the English version [21]. The survey was directly translated only from English into each of the other languages [21]. A translation working group under a named coordinator was created for each language and comprised at least a translator and a separate proofreader [21]. Most of these were programming members with a clinical or academic research background who translated from English into their own native language or proofread in their native language; in the remaining cases, professional translators were employed. For each language, an online form was created and validation through mock responses was conducted to check its consistency and alignment with the English form. A central coordinator supervised all translation working groups through regular meetings and correspondence [21].

The survey was disseminated between October 9, 2023, and June 5, 2024 [21]. The dissemination strategy combined targeted outreach via COST Action networks, professional societies, academic institutions, and social media channels, complemented by snowball sampling through the professional contacts of the PROGRAMMING members [21, 24]. The survey especially targeted professionals and medical students across Europe, but there were no exclusion criteria for respondents across the globe [21].

The survey included multiple sections; in this study, we explored data on age, gender, role or profession (section 1, demographics), self-rated knowledge, relevance, and interest in geriatric topics and skills (section 2, topics and skills), and country of study for the main qualification or degree and country of current work (section 4, current profession). In detail, section 2 listed 33 key geriatric topics and skills and asked the participants to rate their perceived knowledge or competence, perceived relevance of the topic or skill to their current or future work or clinical practice, and perceived interest in receiving further education or training in each topic. Potential responses were very low (scored as 1), low (2), fair (3), high (4), and very high (5). The final question of section 2 asked the participants to rate their perceived overall knowledge and competence in care of older people, in relation to what was needed for their role or profession, with possible options ranging from very poor (scored as 1), poor (2), fair (3), good (4), and very good (5).

All questions of the survey were mandatory, with the exception of the open-ended questions, which will be analysed qualitatively; virtually, there were no missing data in the sections of the survey that will be analysed quantitatively, except for 5 participants who preferred not to say their age.

As previously reported, the survey received 6099 responses; after cleaning of duplicate or inconsistent answers or answers from categories not targeted by the survey, there were 5922 responses, of which 5474 were from professionals and 448 from medical students [21]. After excluding medical students ($n=448$) and professionals who reported working in countries outside the WHO Region Europe or unlisted or multiple countries ($n=49$), we included 5425 professionals working in the WHO Region Europe [22] or Kosovo* (* this designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence) in the present study.

Statistical analyses

We reported basic demographics of the study population. We calculated the mean (and standard deviation, SD) perceived overall knowledge in care for older adults by profession, by country of study for the main qualification or degree and by country of current work, respectively. Moreover, we dichotomized the professionals as those who studied for their main qualification or degree in countries of the EU-27 versus those who did not. Similarly, we dichotomized them based on whether they were working in countries of the EU-27 or not. At the time of dissemination of the survey (October 2023–June 2024), the EU-27 included the following countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden. We compared the mean perceived overall knowledge of professionals who studied in the EU-27 versus those who did not, and similarly we compared that of those professionals working in the EU-27 versus those who did not, using Student's *t*-test.

For each topic and skill, we calculated the mean (SD) knowledge score, mean relevance score and mean interest score, respectively, and then we ranked the topics and skills by descending mean scores.

To link together the three dimensions of perceived knowledge, relevance and interest, we developed a global topic score for each topic or skill by applying this formula to the responses of each individual participant:

$$Global\ topic\ score = perceived\ relevance\ score + perceived\ interest\ score - perceived\ knowledge\ score.$$

This formula prioritizes topics with high relevance, high interest and low knowledge. The global topic score incorporated all three explored dimensions (perceived knowledge, relevance and interest) at an equal weight, which reflects the way they were presented to the survey respondents. It potentially ranged from -3 to $+9$. For example, if a participant

reported very low relevance (1) and very low interest (1) but very high knowledge (5) for a specific topic, the global topic score would be 1 + 1 − 5 = − 3. In contrast, if a participant reported very high relevance (5) and very high interest (5) but very low knowledge (1) for a specific topic, the global topic score would be 5 + 5 − 1 = 9. Based on this formula, − 3 indicates the lowest educational need, while + 9 indicates the highest educational need. To standardize this global topic score and enhance the comparability of educational needs across topics, we computed standardized *Z*-scores of the global topic score. We computed a *Z*-score for each global topic score. For example, the *Z*-score for CGA was computed as:

Z-score for CGA = [(CGA global topic score) − (the mean of all 33 global topic scores)] / (SD of all 33 global topic scores).

Researchers who will analyse the survey data in the future should consider that the mean and SD of all global topic scores will be dependent on their selection of participants; therefore, they will need to adjust their calculation of *Z*-scores accordingly.

Topics were then ranked according to their *Z*-scores and categorized into quintiles ($Q_1 - Q_5$), each representing 20% of the distribution. *Z*-scores were calculated relative to the study sample and are therefore sample-dependent.

We conducted sensitivity analyses after excluding professionals working in Türkiye; we re-calculated the global topic scores and the standardised *Z*-score. Then we re-ranked the topics and skills by *Z*-scores to explore the educational needs in the sample of professionals working in the WHO Region Europe and Kosovo without Türkiye.

Statistical analyses were performed using SPSS version 29.0 [25], and R version 4.6.0 [26]. Data visualizations were generated using GraphPad Prism version 9.0 [27].

Ethical considerations

Ethics approval was obtained in the countries where local regulations necessitated review by an ethics committee, as previously detailed [21]. Informed consent was electronically obtained from each participant at the beginning of the survey. Participants were informed of the EuGMS privacy policy in compliance with the General Data Protection Regulation (GDPR; EU 2016/679) [21].

Results

Demographics and geographical distribution

Of the 5425 professionals, 1453 (26.8%) were men, 3942 (72.7%) were women, and 30 (0.5%) preferred not to disclose their gender. Mean age was 42.6 years (SD: 11.9 years; IQR 32–51 years). The web-based dissemination of the survey and open access availability on the Action's website resulted in participation of respondents beyond Europe as well.

Most professionals ($n = 5417$) studied for their main qualification or degree in 78 different individual countries across Europe and beyond; 8 professionals reported studying in an unlisted country or in more than one country. The ten most frequent countries of study for the main qualification or degree included: Türkiye ($n = 1168$, 21.5%), Greece ($n = 614$, 11.3%), Portugal ($n = 477$, 8.8%), Italy ($n = 305$, 5.6%), United Kingdom ($n = 302$, 5.6%), Poland ($n = 255$, 4.7%), Spain ($n = 244$, 4.5%), Serbia ($n = 239$, 4.4%), Albania ($n = 187$, 3.4%) and Romania ($n = 154$, 2.8%). In total, 3225 professionals studied in countries of the EU-27.

The professionals reported working in 44 different individual countries. The ten most frequent countries of current work were: Türkiye ($n = 1176$, 21.7%), Greece ($n = 705$, 13%), Portugal ($n = 490$, 9%), United Kingdom ($n = 329$, 6.1%), Italy ($n = 262$, 4.8%), Spain ($n = 254$, 4.7%), Poland ($n = 251$, 4.6%), Serbia ($n = 224$, 4.1%), Albania ($n = 182$, 3.4%) and Austria ($n = 141$, 2.6%) (Table 1).

In total, 3273 professionals worked in the countries of the EU-27. In detail, 141 worked in Austria, 100 in Belgium, 26 in Bulgaria, 127 in Croatia, 34 in Cyprus, 50 in the Czech Republic, 45 in Denmark, 5 in Estonia, 26 in Finland, 120 in France, 131 in Germany, 705 in Greece, 4 in Hungary, 26 in Ireland, 262 in Italy, 4 in Latvia, 79 in Lithuania, 13 in Luxembourg, 43 in Malta, 73 in the Netherlands, 251 in Poland, 490 in Portugal, 119 in Romania, 22 in Slovakia, 8 in Slovenia, 254 in Spain and 115 in Sweden.

Most professionals ($n = 4972$, 91.7%) worked in the same country where they had studied for their main degree or qualification, whereas 445 (8.2%) professionals worked in a country different from the one where they had studied for their main degree or qualification, and the remaining 8 (0.1%) had studied in unlisted or multiple countries.

Roles or professions

The 5425 professionals reported being: art therapists ($n = 28$, 0.5%), dental hygienists ($n = 33$, 0.6%), dental technicians ($n = 4$, 0.1%), dentists ($n = 504$, 9.3%), dieticians ($n = 178$, 3.3%), educationalists ($n = 98$, 1.8%), managers in the healthcare sector ($n = 71$, 1.3%), medical doctors in training ($n = 562$, 10.4%), medical doctors not in training ($n = 1578$, 29.1%), nurses ($n = 844$, 15.6%), nurse assistants or healthcare assistants ($n = 39$, 0.7%), occupational therapists ($n = 126$, 2.3%), pharmacists ($n = 343$, 6.3%), physiotherapists ($n = 339$, 6.2%), podiatrists or chiropodists ($n = 3$, 0.1%), policymakers or public health professionals ($n = 31$, 0.6%), professionals at the Ministry of Health or Education or other Ministry relevant to

Table 1 Demographic characteristics of professionals by country of current work (in descending order of number of responses)

Country	*N* (%) of all professionals	Women, *n* (%) within country	Mean (SD) age, years within country	Main professional category: number within country
All	5425 (100)	3942 (72.7)	42.6 (11.9)	MDs (not in training): 1578
Türkiye	1176 (21.5)	809 (68.8)	38.4 (11.1)	MDs (not in training): 401
Greece	705 (12.9)	453 (64.3)	45.9 (10.8)	MDs (not in training): 289
Portugal	490 (9.0)	395 (80.6)	42.2 (11.7)	Nurses: 176
United Kingdom	329 (6.0)	243 (73.9)	45.1 (11.3)	Physiotherapists: 101
Italy	262 (4.8)	166 (63.4)	39.7 (13.4)	MDs in training: 138
Spain	254 (4.6)	210 (82.7)	46.2 (10.5)	MDs (not in training): 70
Poland	251(4.6)	190 (75.7)	40.9 (12.4)	MDs (not in training): 45
Serbia	224 (4.1)	172 (76.8)	44.3 (11.0)	Dentists: 118
Albania	182 (3.3)	144 (79.1)	35.4 (9.0)	Pharmacists: 83
Austria	141 (2.6)	106 (75.2)	45.1 (10.4)	Nurses: 34
Germany	131 (2.4)	72 (55.0)	47.7 (13.3)	MDs (not in training): 82
Croatia	127 (2.3)	100 (78.7)	41.7 (12.1)	Pharmacists: 68
France	120 (2.2)	82 (68.3)	39.5 (11.9)	MDs (not in training): 54
Romania	119 (2.2)	96 (80.7)	45.1 (10.4)	Dentists: 71
Sweden	115 (2.1)	96 (83.5)	51.6 (11.5)	MDs (not in training): 34
Belgium	100 (1.8)	59 (59.0)	43.4 (12.7)	MDs (not in training): 43
Lithuania	79 (1.4)	74 (93.7)	48.0 (10.8)	Nurses: 19
Netherlands	73 (1.3)	52 (71.2)	45.5 (11.6)	MDs (not in training) and nurses: 19 each
Israel	72 (1.3)	64 (88.9)	46.9 (11.6)	Nurses: 31
North Macedonia	65 (1.2)	51 (78.5)	43.7 (10.9)	MDs (not in training): 29
Czech Republic	50 (0.9)	42 (84.0)	41.2 (10.4)	MDs (not in training): 22
Denmark	45 (0.8)	35 (77.8)	41.5 (9.7)	MDs in training: 11
Malta	43 (0.8)	26 (60.5)	44.6 (12.3)	MDs (not in training): 10
Cyprus	34 (0.6)	23 (67.6)	41.3 (9.3)	Dentists: 8
Montenegro	27 (0.5)	18 (66.7)	42.2 (12.1)	MDs (not in training): 21
Bulgaria	26 (0.5)	19 (73.1)	45.3 (19.0)	MDs (not in training): 10
Finland	26 (0.5)	20 (76.9)	50.3 (11.7)	MDs (not in training): 13
Ireland	26 (0.5)	22 (84.6)	43.7 (8.9)	Occupational therapists: 7
Kosovo[a]	24 (0.4)	17 (70.8)	40.5 (12.2)	MDs (not in training): 8
Slovakia	22 (0.4)	19 (86.4)	43.4 (9.7)	Nurses: 10
Switzerland	19 (0.3)	16 (84.2)	46.3 (12.1)	MDs (not in training): 6
Luxembourg	13 (0.2)	12 (92.3)	39.8 (11.6)	Occupational therapists: 4
Norway	13 (0.2)	10 (76.9)	46.5 (14.3)	Physiotherapists: 5
Countries with less than 10 professionals are listed in the footnote	42 (0.8)	NC	NC	Not reported

n number, *MD* Medical Doctor, *NC* not calculated

[a]This designation is without prejudice to positions on status, and is in line with UNSCR 1244/1999 and the ICJ Opinion on the Kosovo declaration of independence. Slovenia had 8 professionals. Armenia and Estonia had 5 professionals each. Bosnia and Herzegovina, Hungary, and Latvia had 4 professionals each. Georgia, Iceland, and Russia had 3 professionals each. Andorra had 2 professionals. Azerbaijan had 1 professional

the care of older people ($n = 25$, 0.5%), psychologists or psychotherapists ($n = 145$, 2.7%), radiographers ($n = 6$, 0.1%), researchers ($n = 125$, 2.3%), social workers ($n = 90$, 1.7%), speech and language therapists ($n = 37$, 0.7%), other healthcare professionals ($n = 149$, 2.7%), and others ($n = 67$, 1.2%) (Supplementary Table 2).

Overall knowledge and competence in care for older people

The mean score for perceived overall knowledge was 3.62 (SD 0.90) across all professionals; it varied by roles or professions, with nurse assistants and physiotherapists reporting

the highest perceived overall knowledge (4.18 and 4.02, respectively, Fig. 1 and Supplementary Table 2).

Perceived overall knowledge was 3.67 (SD 0.89) among the 3225 professionals who studied for their main degree or qualification in the EU-27, higher than that of those who did not study in the EU-27 countries (3.54, SD 0.90, p value < 0.001).

Perceived overall knowledge varied by country of current work as depicted in the map of Fig. 2, and in Supplementary Fig. 1 and Supplementary Table 3. Perceived overall knowledge was higher among the professionals working in the EU-27 versus those not working in the EU-27 (p value < 0.001). Among the 3273 professionals working in the EU-27, it was 3.67 (SD 0.89), while among the 2152 professionals not working in the countries of the EU-27 it was 3.55 (SD 0.91). Compared to the EU-27 countries, perceived overall knowledge was 3.44 (SD 0.89) in Türkiye, 3.23 (SD 0.90) in Serbia, and 3.47 (SD 0.92) in Albania (all p values < 0.001, significantly lower than the one in the EU-27 countries); conversely, it was 4.03 (SD 0.76) in the United Kingdom (p < 0.001, significantly higher than in the EU-27 countries). Supplementary Fig. 2 shows perceived overall knowledge across EU-27 countries in detail.

Topics and skills

The main findings of our paper are summarized in Fig. 3. For each topic, we report the mean perceived knowledge score, the mean perceived relevance score, and the mean perceived interest score, as expressed by the total of 5425 professionals across Europe and beyond. Notably, for each

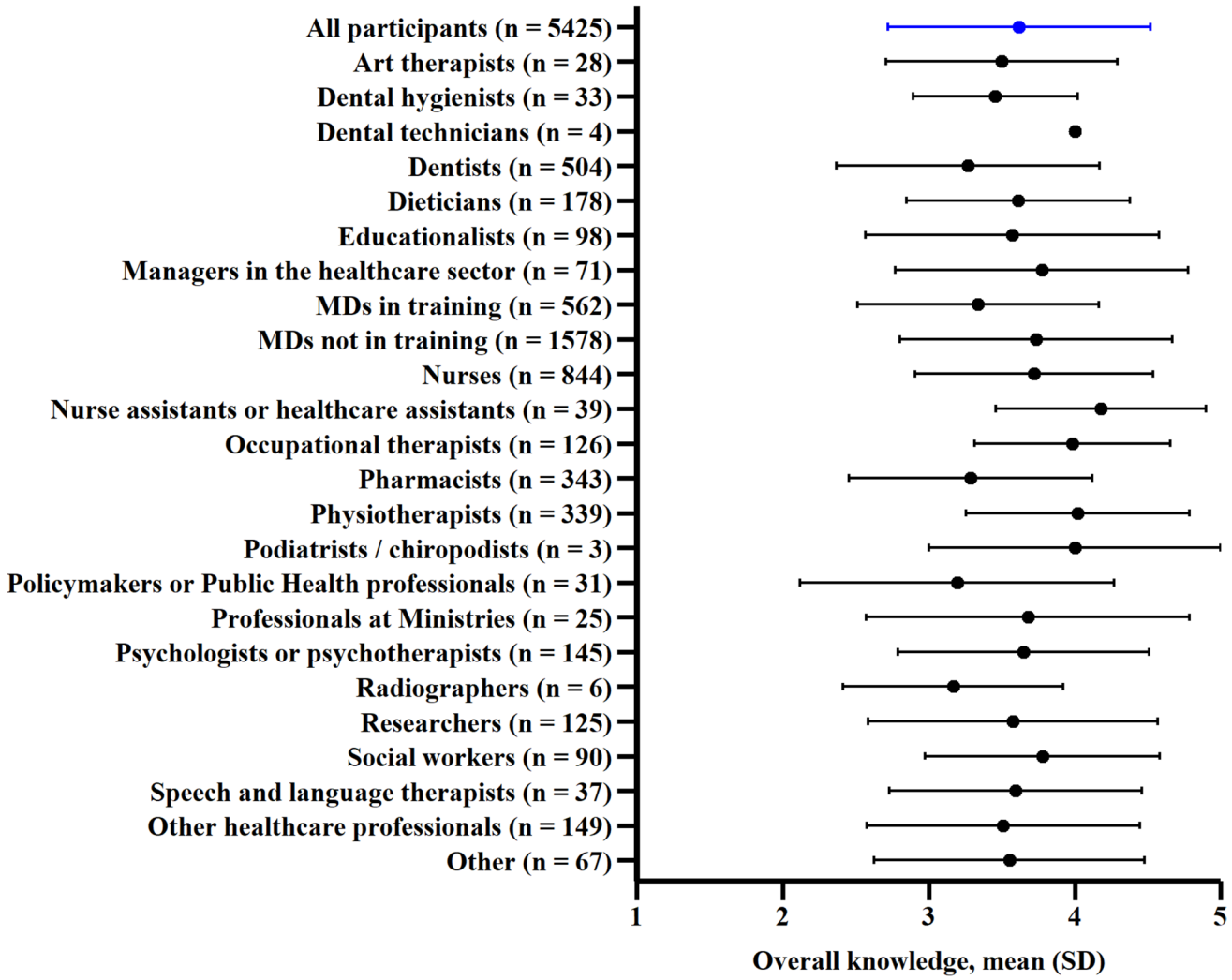

Fig. 1 Mean perceived overall knowledge score in geriatric medicine by role or profession. The dots represent the mean perceived overall knowledge score and the intervals the standard deviation. Scores: 1: very poor, 2: poor, 3: fair, 4: good, 5: very good. All the dental technicians rated their overall knowledge as 4; as a result, the standard deviation is zero and no interval was drawn

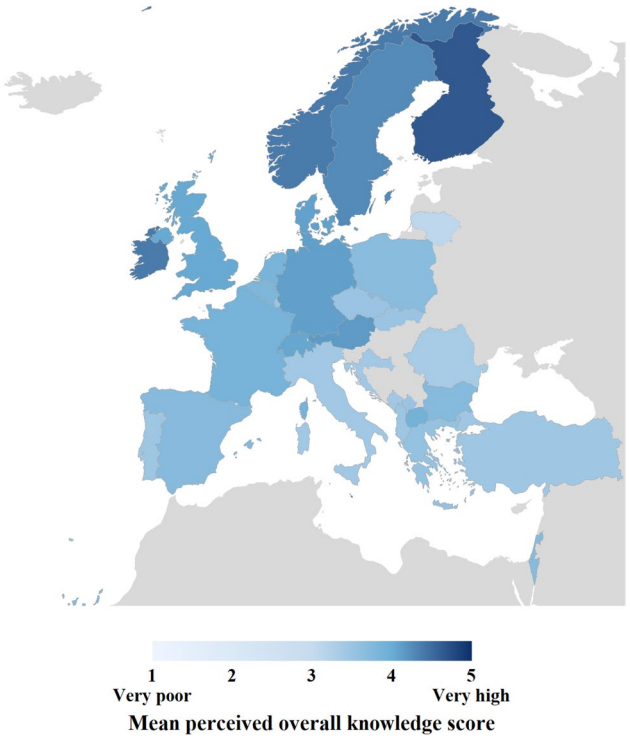

Fig. 2 Mean perceived overall knowledge score by country of current work. Choropleth map of the WHO Region Europe showing the mean perceived overall knowledge score by country of current professional activity. Darker shades of blue indicate higher mean knowledge scores (range = 1–5). Countries with fewer than ten respondents or without available data are displayed in grey

topic, mean perceived relevance and mean perceived interest scores were higher than mean perceived knowledge.

The bar charts in Supplementary Fig. 3 show the distributions of professionals' responses on their perceived knowledge, relevance, and interest, respectively, in topics and skills related to the care of older people, as based on the five options (from very low to very high).

Figure 4 depicts topics and skills ranked by mean scores for knowledge, relevance and interest, in descending order. Results are detailed in Supplementary Table 4, including mean and SD scores.

Global topic score

We applied the formula to compute the global topic score—our measure of educational needs—for each topic and skill. It ranged from 3.57 for assessing older people in the ED to 4.43 for chronic pain; the mean of all the 33 global topic scores was 4.12 (SD 0.21). Then, we computed the *Z*-score for each topic. Finally, we ranked the topics by descending *Z*-score (Fig. 5). In detail, 21 topics had a *Z*-score above 0 and 12 below 0. Based on the *Z*-score, the highest perceived educational needs *Z*-scores were observed for chronic pain (1.45), CGA (1.20), management of behavioural and psychiatric symptoms of dementia (BPSD) (1.19), assessing capacity to consent (1.07), and resilience and diversity and depression (both 1.05). The topics with the lowest *Z*-score (from the bottom) were assessing older people in the emergency department (ED) (−2.57), gerodontology (−1.83), urinary and faecal incontinence (−1.60), skin care and pressure ulcers (−1.33), and hearing and vision impairments (−1.27) (Fig. 5).

Sensitivity analyses

To explore whether the high number of professionals working in Türkiye ($n = 1176$) impacted on our findings, we re-calculated the mean scores of knowledge, relevance and interest in the sample of professionals working in the WHO Region Europe and Kosovo without Türkiye (Supplementary Table 5). Then, we re-calculated the global topic scores and the corresponding standardised *Z*-scores. The topics with the highest *Z*-score were: chronic pain (1.51), management of behavioural and psychiatric symptoms of dementia (BPSD) (1.28), CGA (1.18), assessing capacity to consent (1.18), and depression (1.07). The topics with the lowest *Z*-score (from the bottom) were: assessing older people in the emergency department (ED) (−2.62), urinary and faecal incontinence (−1.67), gerodontology (-1.62), skin care and pressure ulcers (−1.52), and ageism (−1.18) (Supplementary Fig. 4).

Discussion

In this large multinational multilingual online survey, we investigated which key geriatric topics and skills were consistently perceived as educational priorities by health and social care professionals across highly diverse contexts within the WHO Region Europe. We observed substantial variation in self-perceived competence and educational priorities across professional groups and healthcare systems. The high heterogeneity of professional backgrounds, countries of training and practice was not a limitation. Despite limited ability to draw nationally representative conclusions, this heterogeneity reflects the core objective of this initiative: mapping perceived educational needs across highly diverse educational and healthcare systems. Professionals rated their perceived knowledge, relevance to their profession and interest in further training in relation to 33 key geriatric topics; by combining these three dimensions, we estimated their perceived educational needs. The highest educational needs were found for chronic pain, comprehensive geriatric assessment, management of behavioural and psychiatric symptoms of dementia, assessing capacity to consent, resilience and diversity, and depression.

The main finding of our study is the mapping of professionals' self-perceived educational needs. This study

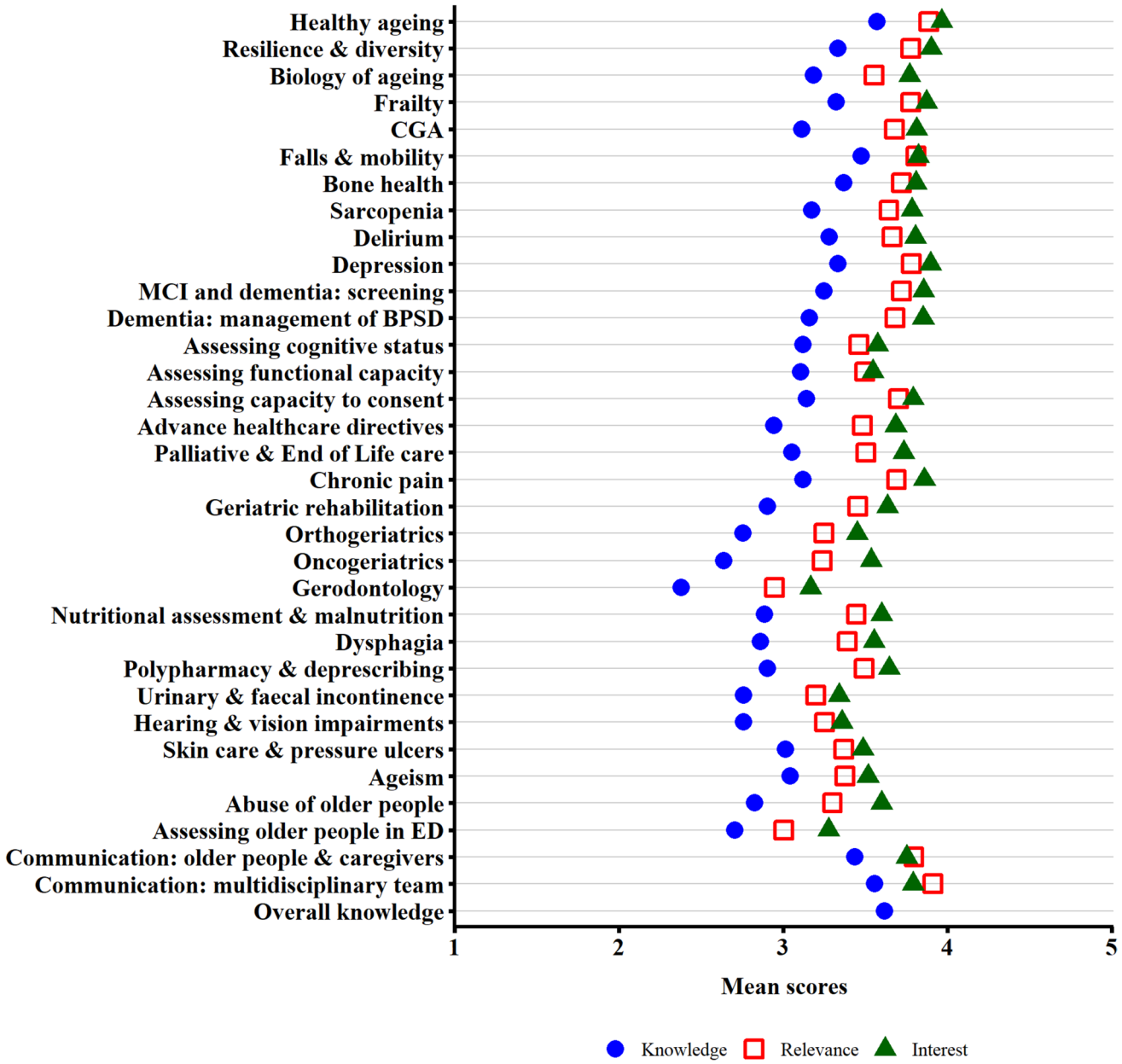

Fig. 3 Professionals' perceived knowledge, relevance and interest by topics or skills. *BPSD* behavioural and psychiatric symptoms of dementia, *CGA* Comprehensive Geriatric Assessment, *ED* Emergency Department, *MCI* mild cognitive impairment, Scores: 1: very low, 2: low, 3: fair, 4: high, 5: very high

extends previous research that focused on specific professional groups, such as pharmacists, dentists, physiotherapists or medical doctors [28–31], or on individual geriatric topics, such as polypharmacy, deprescribing, or pain management [32–34]. Previous research similarly explored self-perceived rather than objectively assessed knowledge. We acknowledge that there may be a gap between self-perceived and objective knowledge. However, self-perceived educational needs crucially drive professionals' interest in and engagement with self-directed learning [35].

Additionally, this survey highlighted heterogeneity in perceived overall knowledge in care for older people between EU-27 and non-EU-27 countries as well as among EU-27 countries. This may reflect the extreme heterogeneity in the recognition and positioning of geriatric medicine, the role of geriatricians, and their training pathways across countries [36–39]. In some countries, geriatric medicine is a recognized specialty, whereas in others it is a subspecialty of internal or family medicine, or not formally recognized at all [37, 39]. In addition, the organization of geriatric care varies substantially

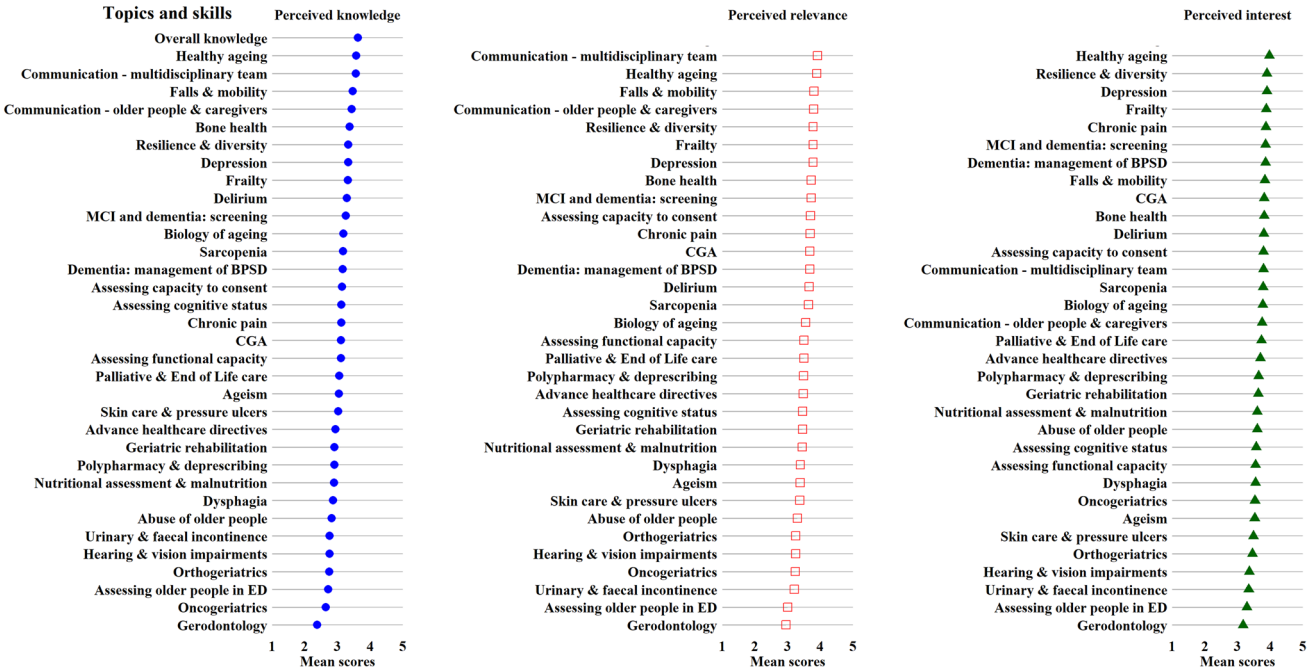

Fig. 4 Professional's topics and skills ranked by mean scores for perceived knowledge, relevance and interest, in descending order

across countries, with some systems emphasising acute hospital-based care and others focusing on community or long-term care settings [37]. Differences in training duration and curriculum content may further contribute to the variability in perceived competence [37].

Geriatricians play a key role in disseminating the principles of geriatric care to the wider health and social care workforce. Geriatricians can foster interprofessional education and training initiatives to build a competent health and social care workforce. Moreover, interprofessional education initiatives can favour the development of transversal skills such as communication and team working skills that are essential to deliver high quality and patient-centred integrated care [40]. Interprofessional educational interventions in the field of geriatric medicine have been shown to improve knowledge and skills, practices and behaviour, patient health outcomes, attitudes and perceptions to collaboration and quality of care [40]. Previous literature showed that interprofessional workshops involving undergraduate students were effective in promoting competence in specific geriatric topics such as gerodontology [41]. In addition, many experts advocated vertical integration of geriatric medicine content in the undergraduate curriculum of medical schools [42]; similar approaches may be implemented in other healthcare professional settings. Inclusion of multiple professional groups reflects the multidisciplinary nature of geriatric care, although training pathways differ substantially between professions.

This study has several strengths. To our knowledge, this is the first survey exploring perceived educational needs in a broad range of geriatric topics and skills among several professionals involved in the health and social care of older adults across Europe and beyond. Professionals participating in this survey were crucial stakeholders who strategically informed the content of educational initiatives in the field of geriatric medicine.

This survey had a broad geographic dissemination across countries with very diverse health and social care systems, including countries where geriatric medicine is a recognized medical specialty and those where it is still emerging. Moreover, it had a high professional inclusiveness, which enhances the relevance and generalizability of our findings. Of note, the translation of the original English survey into 24 languages allowed the inclusion of professionals who were not fluent in English. To our knowledge, this is the first survey on medical education that has been disseminated in 25 languages. Using an open online survey facilitated the dissemination across countries. A further strength is exploring educational needs in a comprehensive list of geriatric topics, which reflects the multidisciplinary nature of optimal geriatric care. Moreover, we intentionally administered the same set of questions on the same list of topics and skills to different health and social care professionals.

Various limitations need to be considered as well. First, participation in this open online survey was voluntary, potentially introducing self-selection bias [43]; professionals with high interest in geriatric medicine were likely more motivated to participate than those with low interest. As a result, the survey participants may not be representative of the wider population of professionals involved in the care of older people, but rather of its subset with greater interest in geriatric medicine [43]. Yet,

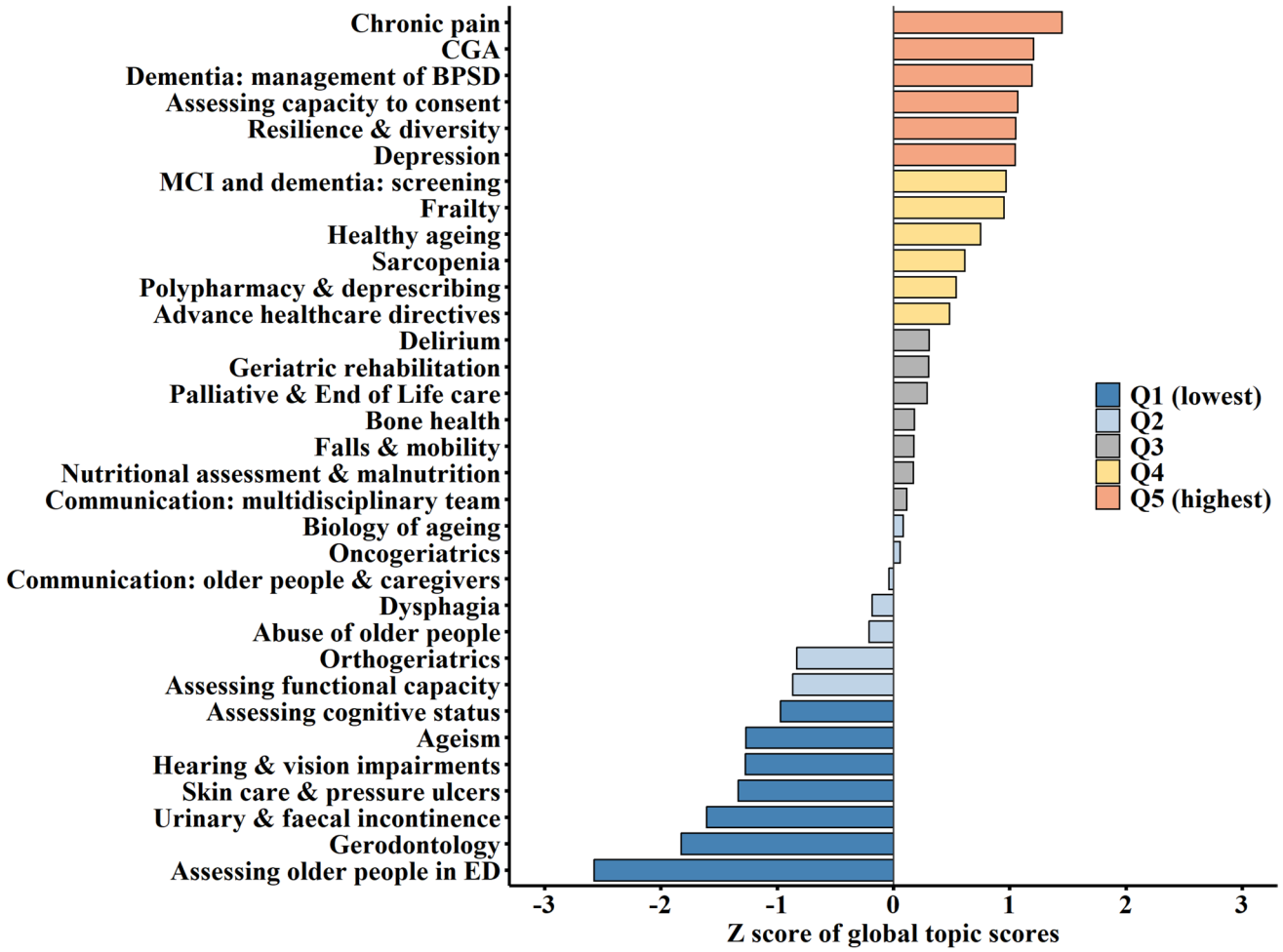

Fig. 5 Standardized *Z*-scores for global topic scores. *BPSD* behavioural and psychiatric symptoms of dementia, *CGA* Comprehensive Geriatric Assessment, *ED* Emergency Department, *MCI* mild cognitive impairment, *Q* quartile

this subset could be the target population for educational and professional institutions that plan and deliver voluntary continuous professional development courses in geriatric medicine.

Second, there was heterogeneity in the number of responses across countries; the very low number of responders in certain countries may limit the generalizability of our findings to these countries. Country-level analyses should not be conducted for those countries with a low number of responses, and no conclusions should be drawn. Third, in the present paper, we did not compare the educational needs of countries where geriatric medicine is a recognized specialty or subspecialty versus those of countries where it is not formally recognized. This was a deliberate choice that acknowledges that educational needs are present also where geriatric medicine exists, and we disseminated the survey also in countries with a long history of geriatric medicine. In the present study, we aimed to provide an overall mapping of the educational needs in geriatric medicine across diverse European healthcare systems; further planned analyses of the survey responses will focus on specific regions or countries [21].

Fourth, an uneven distribution of responses was observed among professions, with some professionals underrepresented and, in some cases, participants coming from specific countries being skewed toward one professional category. In case a similar survey is replicated in the future, we advocate for a more balanced representation across professional roles.

Fifth, our survey explored perceived knowledge, relevance and interest; there may be a discrepancy between perceived and objective knowledge, with potential cultural variation in this gap. Moreover, self-perceived competence does not necessarily reflect objective performance but provides insight into educational self-assessment and perceived training needs. Notably, the ranking remained mostly unchanged when excluding professionals working in Türkiye.

Sixth, our chosen list of 33 topics and skills reflected traditional bedside geriatric medicine, while neglecting modern, system-based, global gerontology. For instance,

emerging fields such as gerontechnology, digital health and artificial intelligence and their increasing application to support better care for older adults and ageing in place were not explored [44, 45]. Yet, the COVID-19 pandemic has accelerated the development and adoption of technological solutions supporting remote care and communication and the UK's National Healthcare System has strategically planned a shift from analogue to digital healthcare [46]. Furthermore, we did not explore topics such as cardiovascular, respiratory and neurological ageing and management—relevant to emerging medical sub-specialties—or long-term care systems or public health—relevant to policymaking.

Seventh, we applied an arbitrary formula to estimate the educational needs (we calculated a "global topic score" for each of the 33 topics). In our view, this formula equally weighted perceived knowledge, relevance and interest, as rated by our survey participants. Of note, our formula assigned a positive value to relevance and interest, while assigning a negative value to knowledge. In this way, topics where baseline knowledge is low are ranked higher than those with high baseline knowledge, given the same relevance and interest. We standardised the global topic scores by creating *Z*-scores (one for each topic). Researchers who will analyse the survey data in the future should take into account that the mean and SD of all topic global scores will be dependent on their selection of participants; therefore, they will need to adjust their calculation of *Z*-scores accordingly.

Eight, our survey assessed the professionals' perceptions. As the professionals might not be aware of the importance of certain topics, these topics may rank lower than others in terms of educational needs. This may underscore the need for appropriate campaigns to promote these educational topics. For example, gerodontology had low rankings, possibly due to the limited training of non-dental healthcare providers in oral health, despite the emphasis recently placed by WHO and scientific societies on oral health promotion in all care settings [1, 13]. Similarly, vision and hearing impairment ranked low despite the sensory domain being included in the WHO ICOPE framework [13]. In contrast, professionals perceived a high educational need in the topic of CGA. This may be reflective of an understanding that care of older adults should be holistic, in line with current guidelines from the WHO [13].

Ninth, online dissemination may have introduced a digital divide bias, potentially skewing the sample towards younger or more technologically proficient participants. However, the age range of our respondents was quite broad, indicating participation also of older professionals. In conclusion, professionals across Europe and beyond participated in our survey to express their perceived educational needs in geriatric medicine, highlighting topics related to both physical and mental health, and skills related to communication and assessment of capacity to consent. Further studies analysing in depth the responses to the survey and other initiatives within PROGRAMMING are currently ongoing and aim to inform educational initiatives and professional curricula tailored for different professional roles, work settings and countries.

The ranking of topics by professionals' self-perceived knowledge, relevance, and interest provides a data-driven foundation for curriculum development at undergraduate, postgraduate, and continuing professional education levels. Given the multidisciplinary nature of geriatric care, integrating interprofessional education principles into training programs may enhance collaboration and improve outcomes [40, 47, 48]. Harmonization of curricula and accreditation standards across countries are crucial, as well as strong advocacy towards policymakers and stakeholders' engagement. Education could be a starting point to further support national efforts to improve care for older adults at a multidomain level. This international needs assessment provides exploratory insight into perceived geriatric educational priorities across heterogeneous European contexts.

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educational needs among healthcare professionals working with older adults in acute, subacute, and long-term care settings across Europe: a COST PROGRAMMING 21122 survey analysis across Europe and beyond", in the poster "European medical students' attitudes to becoming geriatricians—data from COST PROGRAMMING action CA 21122" at the 21st Congress of the European Geriatric Medicine Society, Reykjavik, Iceland, September 24–26, 2025.

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Data availability The English-language version of the Promoting Geriatric Medicine in Countries Where It Is Still Emerging (PROGRAMMING) survey was previously made publicly available [Ogliari G, Masud T, Herghelegiu AM, et al. Educational Needs in Geriatric Medicine Among Health Care Professionals and Medical Students in COST Action 21122 PROGRAMMING: Mixed-Methods Survey Protocol. JMIR Res Protoc. 2025;14:e64985. Published 2025 Jun 3. https://doi.org/10.2196/64985]. The datasets generated by the survey may be made available upon request by following the appropriate procedure. Any member of PROGRAMMING can propose research or policy questions to be explored within the survey data following a specific set of recommendations on how to access them. A review committee will assess each proposal and decide whether access to the data should be granted. We encourage every member of PROGRAMMING to submit a specific and structured proposal form to the review committee, which will supervise and coordinate the various proposals, to promote cooperation and prevent duplication of efforts. New applications to join the European Cooperation in Science and Technology Action PROGRAMMING CA21122 are possible for the entire duration of the Action, and the process for this is outlined on the Action website ["COST. European Cooperation in Science and Technology. COST Association. URL: https://www.cost.eu/" and "PROGRAMMING - PROmoting GeRiAtric Medicine in countries where it is still eMergING homepage. PROGRAMMING. URL: https://cost-programming.eu/"].

Declarations

Conflict of interest All authors declare not to have financial or non-financial competing interests that are directly or indirectly related to the presented work. All authors are members of the COST Action PROGRAMMING and a few of them have received financial reimbursement for participation in in-person meetings related to PROGRAMMING activities.

Ethical approval The study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments. Ethics approval was obtained in the countries where local regulations necessitated review by an ethics committee, as previously detailed [Ogliari G, Masud T, Herghelegiu AM, et al. Educational Needs in Geriatric Medicine Among Health Care Professionals and Medical Students in COST Action 21122 PROGRAMMING: Mixed-Methods Survey Protocol. JMIR Res Protoc. 2025;14:e64985. Published 2025 Jun 3. https://doi.org/10.2196/64985]. Informed consent was electronically obtained by each participant at the beginning of the survey. Participants were informed of the EuGMS privacy policy in compliance with the General Data Protection Regulation (GDPR; EU 2016/679).

Informed consent All participants to the survey provided their informed consent electronically at the beginning of the survey and were informed of the EuGMS privacy policy in compliance with the General Data Protection Regulation (GDPR; EU 2016/679).

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