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Perceptions and Experiences of Geriatric Medicine Among European Medical Students: a Multinational Multilingual Open Online Survey

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Abstract

Background

Europe’s population is ageing. Therefore, all medical students should receive basic geriatric medicine education. It is essential to gain insights into their perceived educational needs and attitudes towards geriatric medicine.

Aims

To explore: medical students’ perceived knowledge, relevance, and interest across key geriatric topics and skills; their aspirations to become a geriatrician and interest in geriatric medicine.

Methods

We analysed data from the multinational multilingual open online cross-sectional survey on educational needs by COST Action PROmoting GeRiAtric Medicine in countries where it is still eMergING (PROGRAMMING) 21122. Medical students were asked to rate 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). They were also asked about their exposure to and attitudes towards geriatric medicine.

Results

448 medical students-274 (61.2%) women, 238 (53.1%) studying in EU-27 countries- completed the survey. Students’ mean (standard deviation, SD) perceived knowledge was highest in bone health (3.53, 0.86), depression (3.17, 0.93), and falls and mobility (3.16, 0.94), while lowest in gerodontology (2.14, 1.06), geriatric rehabilitation (2.45, 0.95), and orthogeriatrics (2.54, 0.99). 312 (69.7%) students reported exposure to geriatric medicine through specific courses and 257 (57.4%) through rotations in acute hospital wards. 30 (7%) students wanted to become geriatricians, while 147 (32.8%) students expressed high or very high enjoyment in engaging with older people.

Conclusion

Medical students reported limited knowledge in several key geriatric medicine topics and skills and relatively low interest in careers in geriatric medicine. In many cases learning experiences were limited to traditional lecture-based teaching and ward-based rotations. Active learning approaches such as case-based and problem-based learning were preferred.

Key Summary Points

- **Aim:** To understand European medical students' perceptions of geriatric medicine and experiences of geriatric medicine education.
- **Findings:** Low numbers of students wish to become geriatricians and knowledge of key geriatric medicine topics such as gerodontology and orthogeriatrics is especially low. Educational approaches such as case-based learning represent preferred modalities of delivering geriatric medicine education.
- **Message:** Leaders in undergraduate geriatric medicine education should adopt strategies which demonstrate the relevance of key geriatric medicine topics and seek to generate interest in entering the field of geriatric medicine.

Introduction

Europe is the continent with the highest proportion of older people globally with 22% of the European Union (EU) population aged 65 years or over and this proportion is projected to further increase [1]. These shifts in demography carry significant implications for health and social care providers in Europe. The prevalence of frailty rises from 3% in those aged 50–64 to 33% in those aged > 85 [2]; in addition, the incidence of multiple long-term conditions rises from 17% in those aged 50–59 to 54% in those aged > 80 [3]. As a result, health and social care professionals need to be trained and equipped to treat older populations with complex needs.

The United Nations (UN) has highlighted that a major factor limiting access to high-quality care for older people is the paucity of healthcare professionals trained in geriatric medicine competencies [4]. This is already seen in the European region where there is a significant shortfall of trained geriatricians in countries such as the United Kingdom [5] and Türkiye [6]. There are European countries where geriatric medicine is still not officially recognised as a distinct medical specialty and geriatricians are almost non-existent [7]. It is estimated almost 20% of European medical schools still do not cover geriatric medicine, albeit the situation is improving [8]. Based on current workforce trends, themselves a consequence of the ageing population, the situation is likely to worsen over time without intervention [9]. Additionally, all medical professionals who are working with a higher proportion of older people, not just geriatricians, will require appropriate skills in geriatric medicine [10].

"Teach all clinicians how to care for older adults" has been advocated as a central strategy for overcoming known shortages in the geriatric workforce [11]. For physicians, undergraduate medical education is a promising common pathway for teaching geriatric medicine [12]. Educators should adopt strategies to inspire medical students to acquire basic competencies in geriatric medicine [13]. Indeed, there is good evidence that educational approaches at the undergraduate level can both effectively change students' attitudes towards older people and increase the chances that they may pursue careers in geriatric medicine [14, 15].

To plan effective strategies to promote undergraduate geriatric medical education in Europe, it is essential to gain insight into medical students' perceived educational needs in geriatric medicine, aspirations and attitudes related to caring for older adults.

In this study, we aimed to explore final year medical students' perceptions towards geriatric medicine and older people including:

- Perceived knowledge, relevance, and interest across key geriatric topics and skills
- Attitudes to becoming geriatricians
- Perceptions and experiences of undergraduate geriatric medicine education.

Improved understanding of medical students' perceptions of geriatric medicine education and older people may help inform future approaches to undergraduate geriatric medicine education for leaders in medical education.

Methods

Survey Development

The COST Action PROGRAMMING 21122 developed an open online survey to explore the educational needs, interests and attitudes of health and social care professionals and medical students [16]. The PROGRAMMING group developing the survey consisted of a multi-national interdisciplinary group of healthcare professionals specialising in older people's medicine. To maximise inclusivity, the survey was translated from the original English into 24 languages including: Albanian, Bosnian, Bulgarian, Croatian, Czech, Danish, Dutch, French, German, Greek, Hebrew, Hungarian, Italian, Latvian, Lithuanian, Macedonian, Polish, Portuguese, Romanian, Serbian, Slovak, Spanish, Swedish, and Turkish. All translations were undertaken directly from English and required a translator and an independent proofreader; most of these were PROGRAMMING members with clinical and/or academic expertise while the others were professional translators. The translation process was centrally coordinated and based on translation guidelines as previously described [16].

The survey included several sections. Final year medical students were targeted in the medical students' section as this group were felt most likely to have most experience of undergraduate medical education amongst undergraduates. Medical students were required to provide the responses related to demographics (section 1), perceived knowledge, relevance, and interest across key geriatric medicine topics and skills (section 2), confirmation of being a medical student (section 3), current education in geriatric medicine (section 6), interest in care of older people/geriatric medicine and suggestions on courses in care for older people or geriatric medicine (section 8).

Dissemination

The survey was disseminated exclusively as an open online convenience sample. Several strategies were adopted to maximise reach and participation. These strategies included development of a specific webpage as part of the PROGRAMMING website (https://cost-programming.eu) [17]. Dissemination also took place through social media, EuGMS communication channels, professional contacts and other stakeholder groups, both at an international and at a national level. Stakeholders, who research has previously identified as key for promotion of geriatric medicine were consulted including educators, policy makers, scientific societies, professional societies, charities and research groups [18]. Blog posts were shared via websites of professional societies outlining the relevance and importance of the Action. Dissemination started in October 2023 and ended in June 2024.

Ethics and Consent

The study was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments [19]. Ethics approval was obtained in the countries where local regulations necessitated review by an ethics committee [16]. In countries where ethical review was not required, local regulations and institutional policies were followed. 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). No compensation was offered to respondents, and participation was solely on a voluntary basis. All data collected by the survey were stored on secure password-protected servers.

Statistical Analysis

Medical students were classified into two categories: those studying in EU-27 and those studying in non-EU-27 countries. SPSS 29 ® was used for all analyses and GraphPad Prism 10 for graph creation. Descriptive analysis included frequency and percentage (%) for categorical variables and mean (SD) for continuous variables. In the topics and skills section, students rated their self-perceived knowledge, relevance and interest in 33 key geriatric medicine topics as very low (1), low (2), fair (3), high (4), or very high (5). For each topic and skill mean (standard deviation, SD) knowledge score, mean relevance score, and mean interest score were calculated. Spearman's rank correlation coefficients were used to analyse relationships between self-perceived knowledge, skills and relevance. Pearson's Chi-square test was used to test for differences in the distributions of categorical variables (i.e. "would you like to become a geriatrician?" and obstacles to becoming a geriatrician) between EU-27 and non-EU-27 medical students.

Experiences of geriatric medicine education, attitudes to becoming a geriatrician, and attitudes towards older people were analysed by descriptive statistics. Interest in attending courses in geriatric medicine, preferred delivery of courses, and barriers to attending courses were also assessed by descriptive statistics. Medical students' perceived effectiveness of several teaching methods were analysed using Pearson's Chi-square test to test for differences between EU-27 and non-EU-27 medical students.

Results

Demographics

The survey received 6099 responses. After cleaning of duplicates, inconsistent responses, and responses by categories not targeted by the survey, the final database included 5,922 responses; of these, 448 were from medical students, while 5,474 were from professionals. Of the 448 medical students, 9 were not final year medical students (two stated they were fourth-year medical students and further seven were too young to be final year medical students in their country of study). We included all medical students – final year and non-final year – in the analyses.

Of the 448 medical students, 274 (61.2%) identified as a woman. Medical students studied in 23 different countries: among them, 238 (53.1%) studied in EU-27 countries, while 210 (46.9%) in non-EU-27 countries. The five most represented countries were Türkiye (n = 141), Romania (n = 98), Poland (n = 37), Italy (n = 36) and Serbia (n = 23) (Table 1).

Table 1
Distribution of medical students by country of study

Country of study	Total responses, n (%)	Women, n (% within country)
All countries	**448 (100)**	**274 (61.2)**
EU-27 countries	**238 (53.1)**	**163 (68.5)**
Romania	98 (21.9)	75 (76.5)
Poland	37 (8.3)	28 (75.7)
Italy	36 (8.0)	20 (55.6)
Belgium	19 (4.2)	13 (68.4)
Croatia	11 (2.5)	8 (72.7)
Portugal	11 (2.5)	8 (72.7)
Bulgaria	6 (1.3)	2 (33.3)
Greece	5 (1.1)	2 (40)
Germany	4 (0.9)	2 (50)
France	3 (0.7)	2 (66.7)
Netherlands	3 (0.7)	1 (33.3)
Austria	2 (0.4)	0 (0)
Czech Republic	1 (0.2)	1 (100)
Malta	1 (0.2)	0 (0)
Slovakia	1 (0.2)	1 (100)
Non-EU-27 countries	**210 (46.9)**	**111 (52.9)**
Türkiye	141 (31.5)	66 (46.8)
Serbia	23 (5.1)	14 (60.9)
Kosovo*	15 (3.3)	8 (53.3)
United Kingdom	15 (3.3)	14 (93.3)
North Macedonia	11 (2.5)	5 (45.5)
Albania	2 (0.5)	2 (100)
Montenegro	2 (0.5)	2 (100)
Belarus	1 (0.2)	0 (0)

* 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. Abbreviation: EU: European Union; n: number.

Perceived knowledge, relevance and interest across geriatric topics and skills

Figure 1 shows medical students' mean perceived knowledge, relevance, and interest across 33 key geriatric topics and skills. Medical students' perceived knowledge (mean, SD) was highest in bone health (3.53, 0.86), depression (3.17, 0.93), falls and mobility (3.16, 0.94), healthy ageing (3.15,0.87), and delirium (3.12, 0.96). Topics which students considered themselves to be least knowledgeable (mean, SD) were gerodontology (2.14, 1.06), geriatric rehabilitation (2.45, 0.95), orthogeriatrics (2.54, 0.99), oncogeriatrics (2.56, 0.97) and nutritional assessment and malnutrition (2.59, 0.92).

Topics which students perceived to be most relevant (mean, SD) were bone health (3.94, 0.86), communication within the multidisciplinary team (3.87, 0.86), mild cognitive impairment (MCI) and dementia screening (3.81, 0.93), chronic pain (3.80, 0.99) and falls and mobility (3.78, 0.96). Topics which students considered to be least relevant included gerodontology (2.97, 1.16), ageism (3.36, 1.07), orthogeriatrics (3.37, 1.10), geriatric rehabilitation (3.39, 1.23) and dysphagia (3.43, 1.26).

Medical students expressed the highest interest (mean, SD) for depression (3.83, 0.97), MCI and dementia screening (3.82, 0.98), management of behavioural and psychological symptoms of dementia (BPSD) (3.81, 0.99), bone health (3.81, 0.94) and delirium (3.79, 1.07). Topics which students rated as least interesting (mean, SD) were gerodontology (2.97, 1.17), orthogeriatrics (3.33, 1.23), ageism (3.36, 1.18), geriatric rehabilitation (3.38, 1.16) and dysphagia (3.38, 1.21).

Medical students' perceived knowledge of key geriatric topics was mildly correlated with relevance (Spearman's rank correlation coefficient $r = 0.24$, $p < 0.001$) and interest ($r = 0.13$, $p = 0.005$) (Fig. 2). Medical students' perceived relevance was strongly correlated with interest ($r = 0.71$, $p < 0.001$) (Fig. 2).

Undergraduate geriatric medical education

Medical students were asked about their undergraduate education in geriatric medicine. Most students (n = 312, 69.7%) attended or were going to attend specific courses or lectures in geriatric medicine; of these, 265 (59.2%) as mandatory courses, while 47 (10.5%) as elective courses. Regarding clinical rotations, 257 (57.4%) medical students had or were going to have rotations in geriatric medicine acute hospital wards, 212 (47.3%) in geriatric medicine outpatient clinics, 130 (29.0%) to rehabilitation settings, and 110 (24.5%) to care homes or nursing homes. Volunteer work with older people was done or going to be done by 140 (31.2%) medical students, while 66 (14.7%) medical students took part or were going to take part into research work involving older people, or on ageing, age-related diseases, or pathways and needs of older people in the social and healthcare system.

The proportion of medical students attending specific courses or lectures in geriatric medicine varied between EU-27 and non-EU-27 countries, with 68.5% and 10.9% EU-27 medical students attending these courses as mandatory or elective, respectively, versus 48.6% and 10.0% non-EU-27 medical students.

Attendance at lectures on geriatric medicine, rotations to acute geriatric medicine hospital wards and geriatric medicine outpatient clinics were most frequently mandatory (Table 2). However, experience of rehabilitation geriatric medicine and care home rotations were less frequently mandatory. There were no differences in clinical rotations in rehabilitation settings, or care homes or nursing homes.

Table 2
Medical students' exposure to geriatric medicine in undergraduate medical education

Specific courses or lectures in geriatric medicine, n (%):	**All medical students (n = 448)**	**EU-27 medical students (n = 238)**	**Non-EU-27 medical students (n = 210)**	**P value**
				< 0.001
Yes, mandatory	265 (59.2)	163 (68.5)	102 (48.6)	
Yes, elective	47 (10.5)	26 (10.9)	21 (10.0)	
No	84 (18.8)	30 (12.6)	54 (25.7)	
Don't know/not sure	52 (11.6)	19 (8.0)	33 (15.7)	
Clinical rotations in, n (%):				
Geriatric medicine acute hospital ward				0.008
Yes, mandatory	214 (47.8)	97 (40.8)	117 (55.7)	
Yes, elective	43 (9.6)	30 (12.6)	13 (6.2)	
No	138 (30.8)	80 (33.6)	58 (27.6)	
Don't know/not sure	53 (11.8)	31 (13.0)	22 (10.5)	
Rehabilitation setting				0.363
Yes, mandatory	77 (17.2)	37 (15.5)	40 (19.0)	
Yes, elective	53 (11.8)	31 (13.0)	22 (10.5)	
No	245 (54.7)	126 (52.9)	119 (56.7)	
Don't know/not sure	73 (16.3)	44 (18.5)	29 (13.8)	
Care homes or nursing homes				0.519
Yes, mandatory	57 (12.7)	28 (11.8)	29 (13.8)	
Yes, elective	53 (11.8)	32 (13.4)	21 (10.0)	
No	270 (60.3)	139 (58.4)	131 (62.4)	
Don't know/not sure	68 (15.2)	39 (16.4)	29 (13.8)	
Geriatric medicine outpatient clinic				< 0.001
Yes, mandatory	157 (35.0)	54 (22.7)	103 (49.0)	
Yes, elective	55 (12.3)	27 (11.3)	28 (13.3)	

Specific courses or lectures in geriatric medicine, n (%):	All medical students (n = 448)	EU-27 medical students (n = 238)	Non-EU-27 medical students (n = 210)	P value
				< 0.001
No	188 (42.0)	124 (52.1)	64 (30.5)	
Don’t know/not sure	48 (10.7)	33 (13.9)	15 (7.1)	
Volunteer work with older people, n (%)				0.121
Yes, I have done	91 (20.3)	55 (23.1)	36 (17.1)	
Yes, I am going to do	49 (10.9)	22 (9.2)	27 (12.9)	
No	194 (43.3)	108 (45.4)	86 (41.0)	
Don’t know/not sure	114 (25.4)	53 (22.3)	61 (29.0)	
Research work involving older people or on ageing, n (%)				0.008
Yes	66 (14.7)	33 (13.9)	33 (15.7)	
No	271 (60.5)	159 (66.8)	112 (53.3)	
Don’t know/not sure	111 (24.8)	46 (19.3)	65 (31.0)	

Geriatric Medicine and Barriers to Pursuing a Career in Geriatric Medicine

Students were asked if they would like to become a geriatrician (Fig. 3). Most students said ‘no’ in response to this question (n = 285, 64%). Smaller numbers said that they had ‘never thought about it, but maybe’ (n = 78, 17%), ‘don’t know’ (n = 51, 11%), ‘yes’ (n = 30, 7%) and other (n = 4, 1%) (Fig. 3). There was no difference in the distribution of responses between EU-27 and non-EU-27 medical students. In details, male medical students more frequently answer “yes” or “maybe” compared to female medical students (40% vs. 20%, $p < 0.05$).

Data was also gathered on perceived barriers to becoming a geriatrician (Supplementary Table 1). By far the largest barrier to becoming a geriatrician was that students did ‘not want to become a geriatrician’ (n = 267, 59.6%). The second and third most frequent obstacles were that being a geriatrician was considered less remunerative compared with other specialties (n = 45, 10%), followed by ‘geriatricians have a small selection of types of job opportunities in my country’ (n = 39, 8.7%). The least selected barrier was that ‘geriatricians have difficulty finding a job in my country because there are too many geriatricians’ (n = 2, 0.4%). There was no difference between EU-27 and non-EU-27 medical students regarding perceived obstacles to becoming a geriatrician (Supplementary Table 1).

Medical students reported several barriers to attending courses in geriatric medicine: time constraints (n = 285, 63.6%), low motivation (n = 152, 33.9%), doubts about the feasibility of the taught skills in the work settings (n = 102, 22.8%), financial loss (n = 99, 22.1%), paid leave issues (n = 92, 20.5%), doubts about the relevance of the taught skills to the clinical practice (n = 87, 19.4%), doubts about the necessity to improve knowledge and skills (n = 73, 16.3%), English language barrier (n = 58, 12.9%).

Attitudes and Interest in Geriatric Medicine

Medical students were asked to rate their enjoyment of engaging with older people in both professional and non-professional settings on a 5-point Likert scale from very low to very high (Supplementary Fig. 1). The most frequent response was ‘fair’ (n = 210, 46.9%), followed by ‘high’ (n = 112, 25%), ‘low’ (n = 64, 14.3%), ‘very high’ (n = 35, 7.8%), and ‘very ‘low’ (n = 27, 6%). In total, 147 (32.8%) medical students expressed high or very high enjoyment in engaging with older people. EU-27 medical students reported ‘very high’ and ‘high’ enjoyment more frequently than non-EU-27 medical students (p = 0.008, Chi-square test).

Medical students were also asked about how prestigious caring for older people was in their country. The most frequent response was ‘fair’ (n = 177, 39.5%), followed by ‘little’ (n = 109, 24.3%) and ‘very little’ (n = 49, 10.9%). The distribution of the responses varied between EU-27 and non-EU-27 medical students (p = 0.029, Chi-square test) (Supplementary Fig. 1).

Medical students were asked to rate their interest in attending courses in geriatric medicine on a 5-point Likert scale from very little to very much. The most frequent response was ‘fairly’ (n = 177, 39.5%). More students expressed ‘little’ or ‘very little’ (n = 158, 35.3%) interest in geriatric medicine courses than ‘much’ or ‘very much’ (n = 113, 25.2%) (Fig. 5). When asked about delivery of training, 173 (38.6%) medical students selected online, 171 (38.2%) hybrid and 104 (23.2%) in-person.

Perceived effectiveness of teaching methods

Teaching methods most preferred by students and rated as high/very high were case-based learning 77% (n = 343), clinical tool learning 61% (n = 271) and problem-based learning 58% (n = 259). The least preferred teaching methods with lowest high/very high scores were textbook and lecture-based learning 24% (n = 109), student short presentations 35% (n = 155) and group activities 39% (n = 175). (Supplementary Fig. 2).

Discussion

In this multilingual multinational open online survey, we aimed to better understand final year medical students’ attitudes and perspectives on geriatric medicine. Respondents perceived knowledge was highest in bone health, depression, and falls and mobility. Their perceived relevance was highest in bone health, communication within the multidisciplinary team, and MCI and dementia screening. Their perceived interest was highest in depression, MCI and dementia screening, and management of BPSD.

Respondents consistently rated their self-perceived knowledge lower than their perceptions of relevance and interest. During undergraduate medical school, about 70% of the respondents were exposed to specific courses in geriatric medicine, either mandatory or elective; about half of them had rotations in geriatric medicine acute hospital wards or outpatient clinics; less than one third in rehabilitation settings or care homes or nursing homes. Only 7% reported that they would like to become a geriatrician although a further 17% would consider it. The teaching methods rated as the most effective were case-based learning, clinical tool learning, and problem-based learning.

This study adds to previous literature on medical students' attitudes towards geriatric medicine by providing contemporary data from many EU-27 and non-EU-27 countries. Previous studies were conducted outside of Europe and in smaller samples of students [20]. Adopting an open online survey methodology allowed us to include a larger number of students than focus groups. In this survey, the proportion of medical students wishing or considering becoming a geriatrician was higher than in previous studies [21]. Additionally, this survey explored a broad range of topics ranging from medical students' perceived educational needs and perceived effectiveness of teaching methods to barriers to becoming a geriatrician or attending courses in geriatric medicine.

This survey highlighted that a considerable proportion of medical students is not exposed to geriatric medicine in various clinical settings, such as care homes; yet, care homes have been advocated as a promising setting for practising interprofessional learning and comprehensive geriatric assessment [22]. As literature points out, exposure of medical students to geriatric medicine training can positively influence their attitude towards the speciality and career interest [21, 23].

The previous European undergraduate curriculum in geriatric medicine did not recommend any teaching methods [24, 25]. There are examples of undergraduate curricula which specify pedagogical approaches, but debate exists about how to balance providing support and alignment on teaching approaches without being overly prescriptive and stifling local adaptability and innovation [24]. Insights from our survey medical students' perceived effectiveness of teaching methods may inform the choice of teaching approaches.

In this study, topics which students considered themselves to be least knowledgeable were gerodontology, geriatric rehabilitation, orthogeriatrics, oncogeriatrics, and nutritional assessment and malnutrition. The low perceived knowledge in some topics may reflect lack of geriatric medicine specific services in some countries and therefore lack of student exposure. For example, there is limited oncogeriatric services across many European countries [26].

Traditional education still appears to predominate in medical students' experiences of geriatric medicine, such as lectures and rotations to secondary care placements. Medical students were less frequently exposed to care-home and rehabilitation placements. This may explain respondents perceived low knowledge in geriatric rehabilitation and orthogeriatrics. The lack of experience outside the secondary care setting is concerning given mounting evidence that older people can be better cared for in non-hospital settings such as hospital at home, transitional care and home based CGA [27]. There is also a

wealth of evidence that exposure to community-dwelling healthy older people is critical to positive attitude and empathy formation [27–31] Community-based modules in geriatric medicine may increase medical students' interest in a career in geriatric medicine [32].

Our data showed that medical students' interest in geriatric medicine topics was closely correlated with their perceptions of the relevance. Most educational theory would support the hypothesis of a bidirectional relationship between interest and perceptions of relevance. The strong association between interest and relevance in our research suggests that strategies enhancing perceived relevance may also increase interest and vice versa [33, 34]. One strategy which is shown to improve students perceptions of both relevance and interest is adoption of competency-based curricula [35]. Competency based medical education frameworks are argued to deliver more relevant, authentic, and skill-integrated learning than traditional topic-based curricula [36, 37].

The proportion of medical students considering becoming a geriatrician was low in this cohort similar to other previous studies into students' attitudes to becoming geriatricians [32, 38, 39]. There are many factors which medical students may consider when choosing a career specialty including lifestyle, length of training, complexity, specialty content and job satisfaction [13, 21]. Previous research has found that women were more likely to pursue a career in geriatric medicine, however our data showed more men than women in our cohort would be open to choosing a career in geriatric medicine [39]. This may reflect the lower number of women studying medicine in some of the countries represented in this study. As the respondents were final year medical students, their opinions can be assumed to reflect the cumulative outcomes of current undergraduate educational approaches to geriatric medicine. When surveyed about perceptions of older people, significantly more students reported enjoying working with older people than not.

The need to foster positive attitudes towards working with older people has been highlighted as important for the future workforce in healthcare [40]. How this can be achieved is an important question for educators. Previous research has suggested simply intervening with knowledge-based interventions will not necessarily lead to a positive attitude change towards older people [15]. Systematic reviews have instead found that factors most likely to be related to positive attitudes to older people include intrinsic motivations and the quality of past relationships with older people; therefore strategies appealing to these factors, including empathy-building and relationship-based teaching, are most likely to be lead to positive attitude change [15]. There is also evidence that direct patient and carer involvement in medical education can positively influence attitudes to older people [41]. Our data showed that medical students perceived geriatric medicine to have very low, low, or fair prestige. in line with previous research. Of note, lack of prestige was not a significant deterrent to ultimately pursuing a career in geriatric medicine [42]

In our study, many medical students reported a fair interest in attending courses in geriatric medicine. A novel finding of our study is that EU-27 medical students more frequently reported high or very high interest in geriatric medicine courses than non-EU-27 medical students. Overall lack of interest in further

study and courses in geriatric medicine makes the role of undergraduate education even more imperative as many students do not intend to undertake further training in this area.

Students were unambiguous about the teaching strategies which they found to be most effective and engaging. These included case-based learning and problem-based learning. Both approaches have robust evidence bases in terms of efficacy and engagement. There has been a trend towards using strategies such as these in some regions such as the UK [43]. These approaches can be delivered in the small group setting and especially beneficial for topics such as frailty [44]. The increased adoption of case-based learning and problem-based learning across European medical schools is likely to constitute an opportunity for positive change in geriatric medicine education. Our results lend weight to the growing body of evidence that lecture-based and didactic strategies represent sub-optimal approaches compared to novel methods such as 'flipping the classroom' [45].

Strengths and limitations

The reach of the survey was wide, and students responded from 23 countries. High engagement from countries such as Türkiye, Romania, Poland, Italy and Serbia with geographical breadth represents a strength. Here we only present quantitative data, however, the overall design of the survey was mixed methods in nature and future analysis of qualitative data will allow for triangulation of results. The development of the survey was iterative and co-created with stakeholders. Centrality of stakeholder engagement should ensure outputs are those most relevant to educational leaders in undergraduate geriatric medicine. The use of translations also has ensured broad European representation which was not limited by exclusion of non-English speakers.

Some limitations should also be acknowledged. First, the sample of this cross-sectional survey was not designed to be nationally representative. The distribution of responses across Europe and across countries was uneven with Western and Northern Europe being underrepresented. This limited the ability to make comparisons between countries or make significant conclusions about individual countries. Second, our data were a cross-sectional snapshot and therefore cannot provide information about longitudinal changes in attitudes. The survey was voluntary; therefore, selection bias may be present, and medical students more interested in geriatric medicine might have been more likely to complete the survey. As this was an open online survey, it was not possible to calculate a conventional response rate which is a known limitation of this type of survey [46]. Finally, it should also be noted that that students' self-perceived knowledge and skills are subjective and do not necessarily constitute objective measures of these phenomena.

Conclusion

Our survey collected contemporary data on final year medical students' attitudes towards geriatric medicine across EU-27 and non-EU-27 countries. Only a minority of medical students in this survey expressed interest in pursuing a career in geriatric medicine, though, encouragingly, many more

expressed their enjoyment in engaging with older people and interest in courses in geriatric medicine. Respondents had high self-perceived knowledge in topics such as bone health, depression, and falls and mobility, while very low in gerodontology, geriatric rehabilitation, and orthogeriatrics. This may be linked to lack of clinical rotations in rehabilitation settings and care homes. More than half of the medical students in this survey had attended or were going to attend specific courses or lectures in geriatric medicine. This multinational multilingual survey provides exploratory insights into medical students perceived educational needs and attitudes towards geriatric medicine which may help inform leaders in undergraduate medical education. This is especially crucial as undergraduate medical education represents a vital moment to provide all medical students with basic skills to care for older people, in view of the demographic transition.

Declarations

The European Cooperation in Science and Technology (COST) Action 21122 PROmoting GeRiAtric Medicine in countries where it is still eMergING (PROGRAMMING) has received funding from COST. The grant holder of the action is the European Geriatric Medicine Society (EuGMS). The funder had no role in the study design; collection, analysis, and interpretation of the data; writing of the paper; or decision to submit it for publication.

Preliminary data on European medical students' attitudes to becoming geriatricians from COST Action PROGRAMMING CA21122" was presented at the 21st EuGMS Congress in Reykjavík, Iceland, September 24 to 26, 2025.

Compliance with Ethical Standards

Conflict of interest All authors declare not to have financial or nonfinancial competing interests that are directly or indirectly related to the presented work. All authors are members of the COST Action PROGRAMMING 21122 and a few of them have received financial reimbursement for participation to in-person meetings related to PROGRAMMING activities, according to COST Annotated rules. Luca Soraci is Associate Editor for European Geriatric Medicine. He was not involved in the review or decision-making process for this manuscript.

Compliance with ethical standards

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. doi: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).

Consent to publish

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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Author Contribution

WM - Writing - original draft, review & editing, development of table 1. GP -Writing – review & editingKP - Writing – review & editing GO -Writing – review & editing, data analysisCR -Writing – review & editingRV - Writing – review & editingVO -Writing – review & editing; data analysis; development of figure 2MK - Writing – review & editingAH - Writing – review & editingAP - Writing – review & editingLS -Writing – review & editing; data analysis; development of figures 1,3; development of supplementary figures 1,2; development of table 2; development of supplementary table 1.PR -Writing – review & editingQD -Writing – review & editingNJ -Writing – review & editingSK -Writing – review & editingZW -Writing – review & editingJG -Writing – review & editingRK -Writing – review & editingAP -Writing – review & editingSŠ - Writing – review & editingTP -Writing – review & editingMD -Writing – review & editingSS -Writing – review & editingBP -Writing – review & editingGB -Writing – review & editingMK -Writing – review & editingSS -Writing – review & editingSO -Writing – review & editingZF -Writing – review & editingMP - Writing – review & editingRR -Writing – review & editingHK -Writing – review & editingTM - Writing - original draft, review & editing; Supervision

Data Availability

The English-language version of the PROGRAMMIN 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. doi: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. The Review Committee established by the Action 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 it 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/”].

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Figures

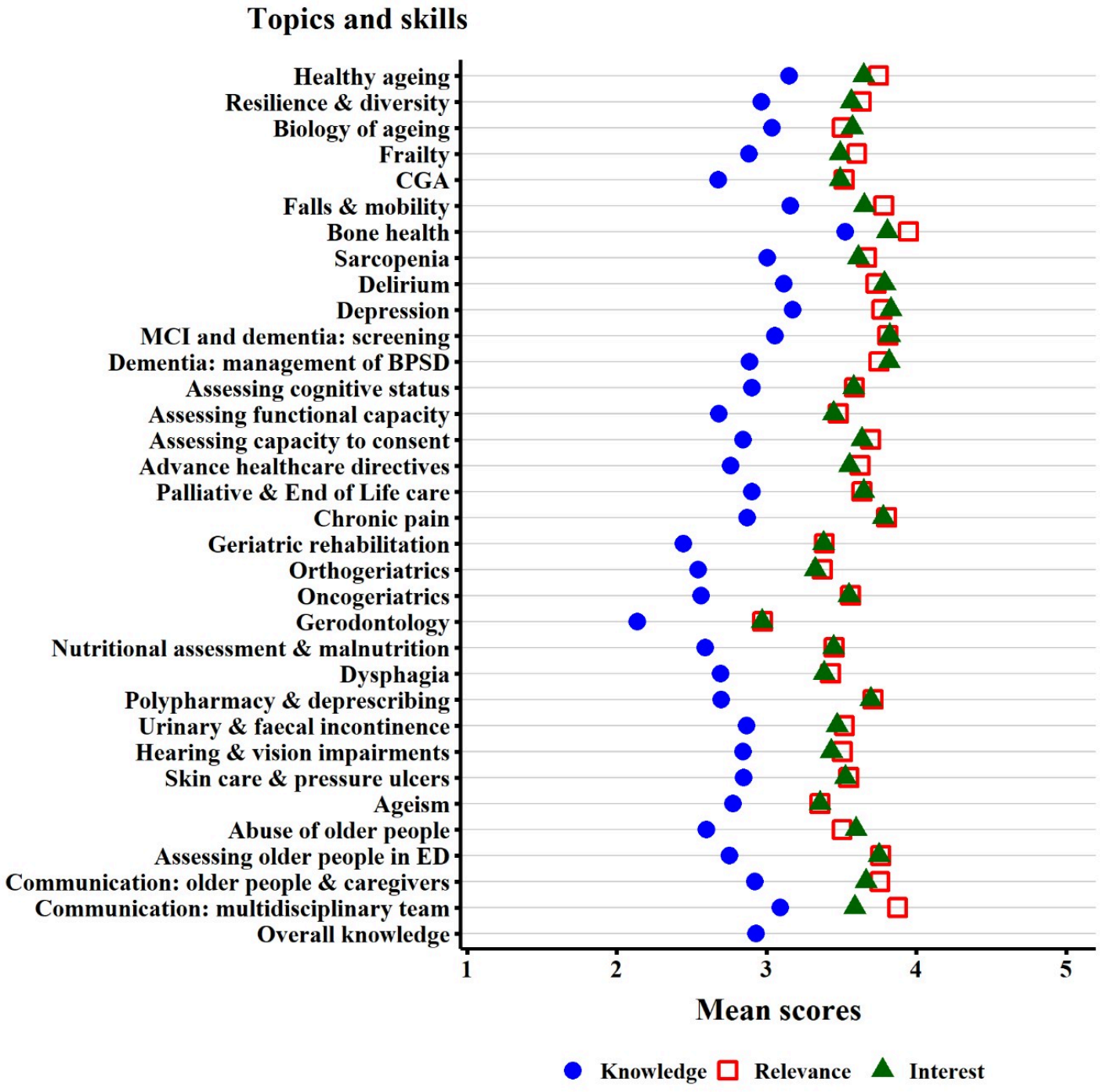

Figure 1

Medical students' mean perceived knowledge, relevance and interest across key geriatric medicine topics and skills Scores ranged from 1 = very low to 5 = very high. Abbreviations: BPSD = behavioural and psychological symptoms of dementia; CGA = comprehensive geriatric assessment; ED = emergency department; MCI = mild cognitive impairment.

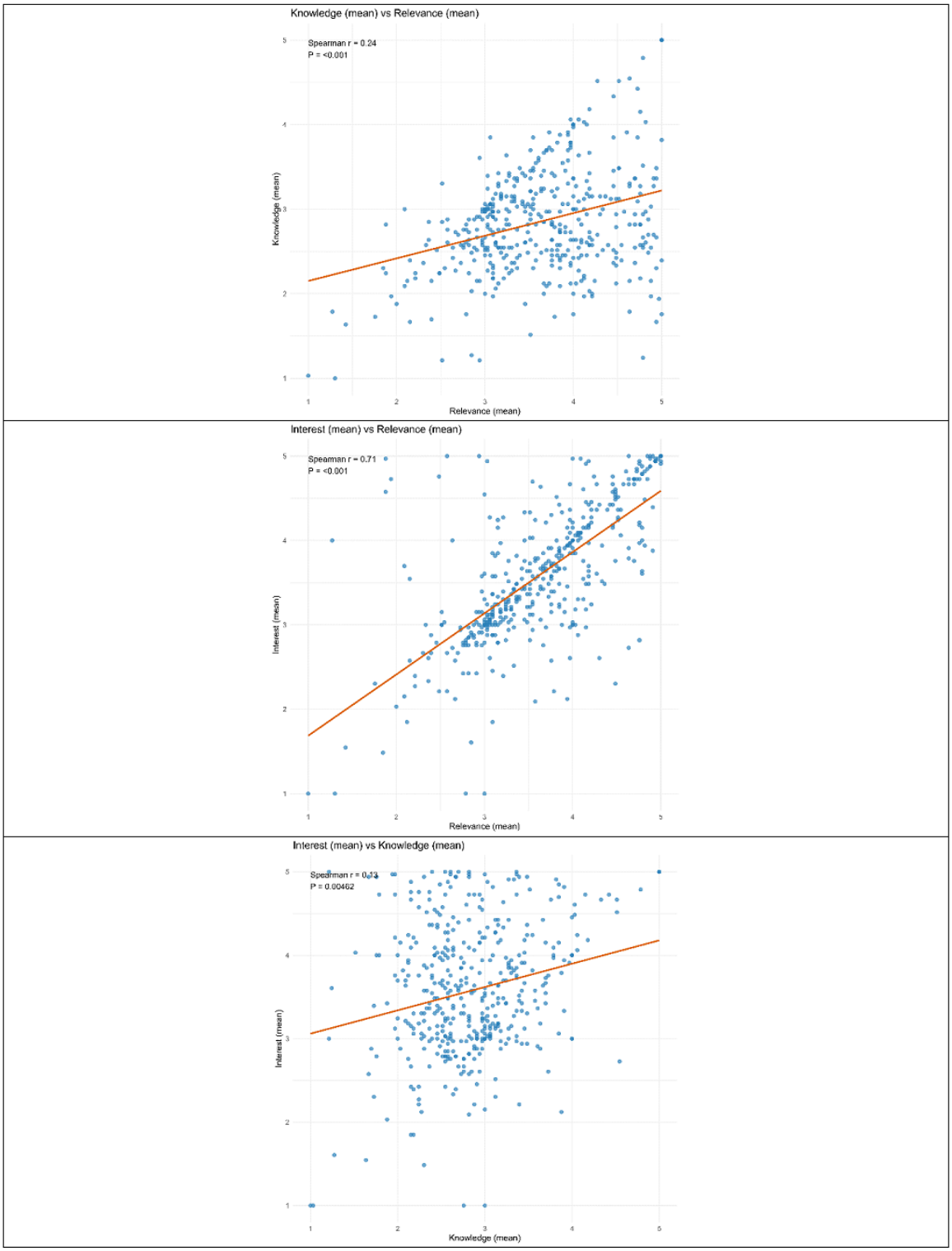

Figure 2

Scatterplots showing correlation between mean students' self-perceptions of knowledge, relevance, and interest in common geriatric medicine topics

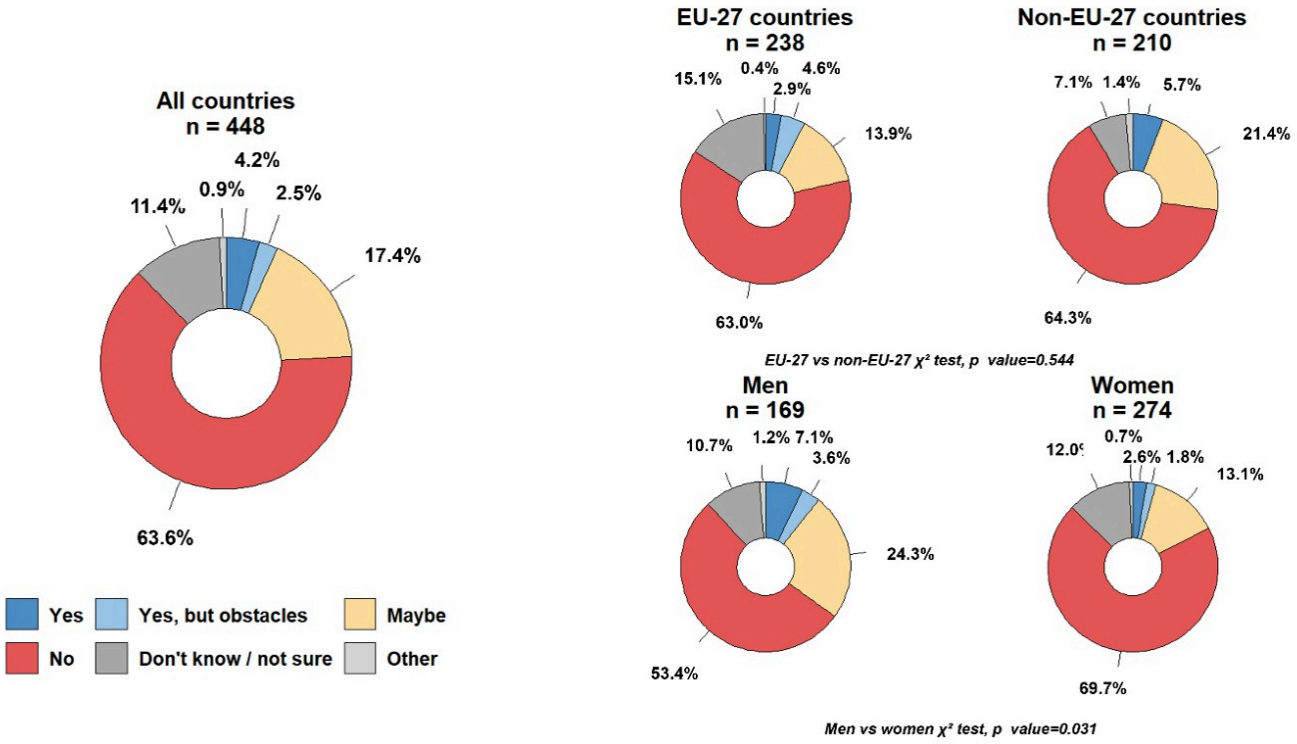

Figure 3

Responses to 'Would you like to become a geriatrician?' Figure 3 does not show data of 5 medical students who preferred not to say their gender, due to the small number size. Of these, 4 answered "no", while 1 answered "maybe".

Supplementary Files

This is a list of supplementary files associated with this preprint. Click to download.

- SupplementaryTables.docx