HEALTH PROMOTION

Italian Hygiene and Preventive Medicine Medical Doctor Residents' interest in a Preventive Medicine Physician: a national survey

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Keywords

Preventive medicine • Lifestyle medicine • Public health • Prevention • Prevention physician

Summary

Introduction. *The growing importance of Preventive Medicine is creating a need for specialised professional figures, that are often missing in the actual national and international contexts. This study aimed to assess attitudes, knowledge, and compliance with preventive measures of the Italian physicians specializing in this field, addressing the unrecognized significance of the figure of a prevention expert in Italy and the inadequate training in this Public Health branch.*
Methods. *Between May 1 and May 31, 2023, an online survey was administered to approximately 200 Hygiene and Preventive Medicine Residents (HPMMDR), covering demographic data, health behaviours, training and interests in Preventive Medicine and in undergoing a visit of a "preventive doctor". The collected data were cross-referenced to understand which variables were most related to knowledge and interests in this field. Statistical analyses included parametric tests, hierarchical cluster analysis, and ordered logit regression.*
Results. *Demographically, 57.0% were female, median age 31, with central Italy having the highest representation (52.3%). Analyses revealed associations between demographics, health behaviors, and attitudes. Ordered logit regression showed a significant correlation (OR = 11.3, p = 0.03) between a healthier lifestyle and belief in specialists' usefulness.*
Conclusion. *Despite the lack of recognition and insufficient education, the study unveiled substantial interest and willingness to learn among HPMMDRs in Italy. Findings emphasize the need for recognizing shared priorities and implementing actions for effective Preventive Medicine interventions, guiding future research and policy decisions.*

Introduction

Preventive Medicine, as defined by the American College of Preventive Medicine, is the practice of promoting preventive health care to improve patient well-being, with the ultimate goal of preventing disease, disability, and death [1]. It encompasses a broad range of strategies to reduce the burden of disease by addressing its root causes and risk factors before full-blown illnesses. It shifts the focus from reactive measures to proactive ones, prioritizing prevention over treatment [2].
Examples of Preventive Medicine interventions addressed to small communities or single individuals allowed the collection of evidence of their effectiveness, either for mental health, [3] cardio-vascular diseases [4], diabetes or cancer [5]. Clinical and community-based prevention also has the potential to significantly reduce the economic impact of chronic diseases such as heart disease, cancer, depression, hypertension and type II diabetes [6, 7], and of epidemics, as demonstrated by the recent interventions implemented worldwide to control SARS-CoV-2 spread [7].
The growing importance of Preventive Medicine created a need for specialised professionals. In the field of health and its various determinants, Public Health experts possess the knowledge and insights to formulate policies and programs [8], analysing data, identifying trends, and assessing the potential impact of interventions. Public Health physicians address Public Health crises and promote well-being [9], improving health of communities and environments, striving to diminish diseases and disparities in health [10].
The relationship between individual and population health is often oversimplified, framing them as distinct concepts [11]. However, they are interconnected, and an individual's health is shaped by their life course and environmental factors within the context of a larger society [12]. Unhealthy lifestyle behaviours contribute significantly to the global burden of chronic diseases, resulting in a substantial number of deaths [13]. In recent

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years, there has been a growing interest in examining the advantages of adhering to a "low-risk lifestyle" and ideal "cardiovascular health metrics" [14] but the adoption of such practices remains limited in the population [15].
Moreover, many healthcare workers engage in prevention without clear regulations [16]. Despite the effectiveness of population-level interventions conducted by Prevention Departments of various Italian Local Health Authorities (Azienda Sanitaria Locale, ASL), [17], Public Health education is typically underrepresented in clinical curricula and tends to remain separate from mainstream clinical instruction [18]. Also, many clinicians do not perceive their roles as advocates for Public Health, lacking the required skills [19].
Given the often overlooked role of Preventive Medicine physicians and uncertainty regarding the community's recognition and the areas of maximum benefit [16], we explored the significance of their contributions in prevention at an individual level, fulfilling a role traditionally exclusive to doctors during direct involvement in clinical activities (Riordino Della Disciplina in Materia Sanitaria, a Norma Dell'articolo 1 Della Legge 23 Ottobre 1992, n. 421, 1992). In Italy, resident medical doctors specialising in the Public Health branch are called Hygiene and Preventive Medicine Medical Doctor Residents (HPMMDRs).
This study explores HPMMDRs interest, knowledge, and adherence to preventive measures, as well as the prevalence of prevention-focused activities in their Public Health schools. The findings aim to guide the development of healthcare policies and inform future research in the field.

Methods

Data collection

The study was conducted using a web-based survey on a Google Form and was available for responses from May 1st to May 31st, 2023. Participation in the survey was voluntary and anonymous. Since the data collection for this study aimed to gather insights from HPMMDRs across all regions of Italy, to ensure comprehensive representation, the survey was distributed through the representatives of each Hygiene and Preventive Medicine Residency School (HPMRS) in every region, with the assistance of SItI's *Consulta degli Specializzandi* social networks. The representatives were provided with a direct link to the survey, which they were requested to disseminate among their fellow colleagues using these networks.

Survey development and composition: rapid review of literature

To ensure the accuracy and relevance of our study, a rapid literature review was conducted from January to April 2023 using scientific databases such as PubMed, Web of Science, and Scopus. Grey literature was also explored using Google site search. Specific search strings were formulated for each survey field, with comprehensive strings provided in the supplementary materials.

The questionnaire, consisting of four sections, gathered demographic and medical history data (Section 1), assessed compliance with preventive measures and lifestyle using the Simple Lifestyle Indicator Questionnaire (SLIQ) [20] score in Section 2, examined the perceived importance of Preventive Medicine in Public Health schools (Section 3), and assessed participants' interest in the field (Section 4). The survey included both closed-ended multiple-choice and open-ended questions to capture a comprehensive understanding of respondents' perspectives. Further details on each section are available in the supplementary materials.

SLIQ score

The Simple Lifestyle Indicator Questionnaire (SLIQ) is a tool designed to assess individual lifestyle choices, covering diet, physical activity, sleep, stress management, and substance use. The questionnaire aims to provide a quick evaluation of overall lifestyle, with scores categorized into unhealthy (0-4), intermediate (5-7), and healthy (8-10) lifestyle categories. The total score indicates areas that may need improvement, offering a convenient way to identify and address lifestyle habits.

Exposure variables and outcome

Information about age, gender, living area, internship year, medical history and habits, vaccinations done and vaccine hesitancy were considered as exposure variables, while outcomes were lifestyle (SLIQ score), medical habits; interest, confidence and training received in Preventive Medicine, availability to undergo preventive medicine screenings and impact they are considered to have on health.

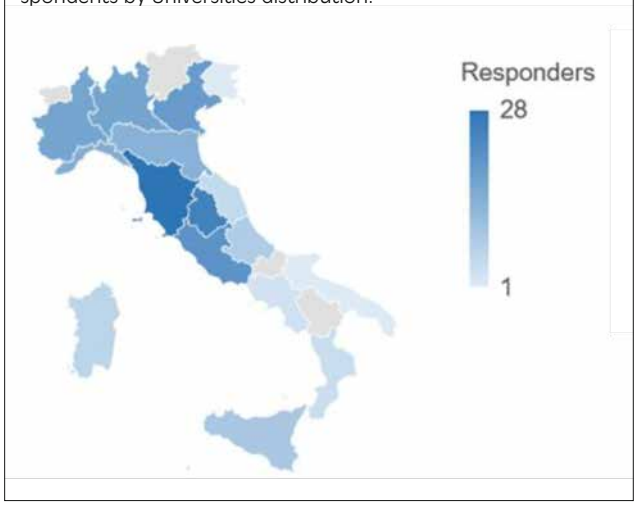
Data collection strategy

After a pretesting phase carried out within the working group to evaluate the questions and the suitability of the variables for statistical analysis, the online questionnaire was published on google web forms disseminated through official and unofficial channels to the hygiene and preventive medicine residents (HPMMDR). The answers collection ended when approximately 200 respondents were reached, which represents approximately 10 percent of the target population, estimated at 2,000 individuals.

Statistical Analysis

A comprehensive statistical analysis used descriptive methods to summarize data. Association analysis employed parametric and non-parametric tests, exploring relationships between variables. The study employed hierarchical cluster analysis to identify patterns in a dataset. Due to the ordered discrete nature of the dependent variable (SLIQ score), ordinary least squares regression was avoided to prevent estimation bias. Instead, an ordered logit model was used to analyze the impact of independent variables on the ordinal categorical dependent variable. Independent variables

Fig. 1. Cartogram representing the regional distribution of respondents by Universities distribution.



included demographics, interest in prevention, training importance, perceived utility of disease prevention, familiarity with risk scores, application of guidelines, and perceived impact on population health. Additionally, a cluster analysis and dendrogram were used to assess distances among responses to "interest on the subject" questions, providing insights into potential groupings based on participants' responses. This dual-method approach aimed to offer a comprehensive understanding of patterns and relationships in the data.

Results

Descriptive analysis

Demographics

A total of 193 HPMMDRs completed the online survey, 57.0% of which identified as female, 40.4% as male and 0.5% as non-binary, whereas 2.1% preferred not to specify their gender. The median age of respondents was 31 years. The majority of respondents attended the second year of internship (36.3%), followed by 3rd year (26.9%), 1st year (24.4%) and 4th year (12.4%), coherently with the total proportion of scholarships funded by the Italian Ministry of University and Research[21]. Although heterogeneously distributed, most respondents attended Central Italy Universities (52.3%), followed by those in Northern Italy (35.8%), Islands (7.8%) and Southern Italy (4.1%) ones (Fig. 1). Most of respondents were originally from Northern or Central Italy (33.2 and 31.6%, respectively), followed by Southern Italy (20.7%), Islands (13.0%) and foreign countries (1.6%) (Fig. 1).

Anamnestic data

Table I shows the anamnestic characteristics of the sample. Most of the respondents reported no previous medical conditions about themselves, but some of them within their families. Around 2/3 of them visited their General Practitioner in the past year and reported receiving two or more non-mandatory vaccination boosters or contracting two or more pathogens for which there is a vaccine (Supplementary Fig. 1) over the past ten years.

SLIQ score

Among the 193 respondents, 48 individuals were classified as having a healthy lifestyle, while 128 fell into the intermediate category. On the other hand, 17 respondents were categorized as having an unhealthy lifestyle.

Universities and Interest in Prevention

University education on prevention showed substantial variability among respondents, with an average score of 3.6 out of 6. 54.4% of the total respondents reported having a personal intermediate level of knowledge on the topic, 19.7% a low one, and 25.9% declared themselves to be well-versed in the subject of prevention. As for the covered topics, the most frequently reported theme is that of infectious diseases, while the least addressed one is alcohol (Supplementary Fig. 2).

The mean interest in prevention and health promotion was 5.17 out of 6. Similar results were reported for the questions "How important do you consider it for a specialist in Hygiene and Preventive Medicine to receive education from their School in concepts and clinical skills

Tab. I. Anamnestic characterisation of the sample.

		N	%
Previous medical condition	0	130	67.4%
	1	45	23.80%
	2+	18	9.30%
Medical conditions of family members	0	36	18.7%
	1	44	22.30%
	2+	113	58.50%
At least one visit by the General Practitioner in the last 5 years	No	68	36.2%
	Yes	120	63.8%
Booster dose of DTaP vaccine (or part of it) in the last 10 years	No	30	3.2%
	Yes	152	16.0%
	Can be	11	1.2%
Volontary vaccines	None	44	24.6%
	Yes	26	14.5%
	Many	109	60.9%
Yearly vaccination against influenza	Never	43	4.5%
	Always	102	10.8%
	Sometimes	48	5.1%
If sometimes, at least once in the last 5 years?	No	33	37.9%
	Yes	54	62.1%
At least one consueling by the travel ambulatory in the last 5 years	No	117	60.6%
	Yes	76	39.4%
Hesitations regarding COVID-19 vaccination	No	177	91.7%
	Yes	16	8.3%

related to prevention?" (5.56 out of 6), "How useful do you consider it for a specialist in Hygiene and Preventive Medicine to be involved in identifying and preventing diseases for which a patient has risk factors?" (5.37 out of 6) and "How useful do you consider it for a specialist in Hygiene and Preventive Medicine to be knowledgeable about and apply risk scores and guidelines dedicated to the prevention of diseases for which a patient has risk factors?" (5.19 out of 6). As for the impact of the general population, the mean score was 4.85 out of 6. Additionally, when questioned "Would you ever seek out a specialist of this kind, if they were affiliated with the National Sanitary System (SSN), to assess your risk and perform targeted screenings?", 71.7% of respondents answered affirmatively, 21.7% "maybe," 6.6% were unwilling to consult this type of health figure. For a specialist not affiliated with the SSN the percentages were 40.8%, 41.3% and 17.9%, respectively. Most respondents (74.6%) suggested a biannual schedule for visits. Almost 91.8% of respondents expressed interest in receiving informational materials on the topic.

Statistical analysis

Major results emerged from the statistical analysis are displayed in Table II. Furthermore, residents living outside Italy showed the median lowest score in both interest in Preventive Medicine and impact considered Preventive Medicine has on health (3 out of 10, vs 5 out of 10 of Northern and Central Italy and 6 out of 10 of Southern Italy and Islands).

Increased vaccination-related variables showed a higher SLIQ score (p = [0.026-0.001]) depending on the variable considered), and more doubts on COVID-19 vaccination.

The sole statistically relevant result of the ordered logit regression was among SLIQ score and "How useful do you consider it for a specialist in Hygiene and Preventive Medicine to be knowledgeable about and apply risk scores and guidelines dedicated to the prevention of diseases for which a patient has risk factors?" (OR = 11.3, p = 0.03). A dendrogram was built to visually discriminate questions categories based on respondents' answers about their interest on "Preventive Medicine Physician". Two main clusters are identifiable in the graph (Fig. 2).

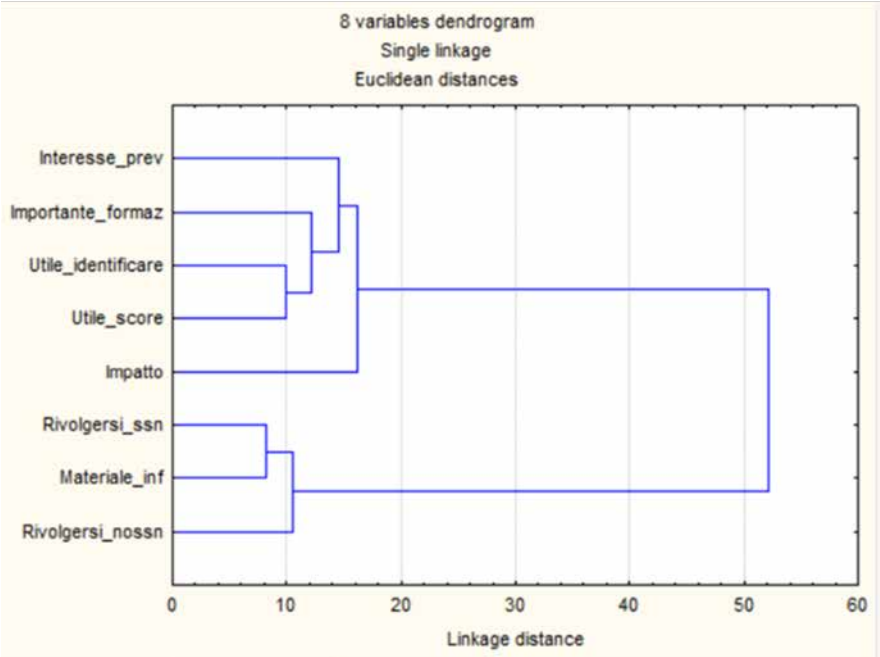
Discussion

Emphasizing the role of surveys in Public Health research [22], particularly in gauging specialists' perspectives, numerous studies have delved into Public Health Residents' interest in prevention, exploring professional goals, profiles, or provided services [23-25]. Our study investigates interest in the "Public Health specialist" role in Italy and its potential correlation with individual lifestyles, acknowledging challenges in recognizing preventive specialists akin to Hygiene Physicians. Despite evidence supporting preventive interventions' effectiveness, global utilization remains low [26-28]. Respondents confirmed limited emphasis by Universities, with around 29% and 50% unable to indicate any prevention interventions planned by their HPMRSs. Additionally, 54.4% and 19.7% respectively indicated intermediate or low levels of knowledge in this field. In 1997, a survey [29] revealed clinicians' underestimation of patient interest in preventive care after general practitioner visits. Assessing patient needs during each visit identified a gap between requests and service delivery, prompting consideration of Clinical

Tab. II. Main associations emerged from the statistical analysis.

Variables		Association/ correlation	p-value
Age	Declared level of education received on prevention	Negative (ρ = -0.151)	p = 0.040
	Availability to undergo targeted screenings affiliated with the SSN	Positive	p = 0.020
Gender	GP visits	Higher in female	p = 0.002
	Interest in Preventive Medicine	Higher in female	p = 0.010
Internship year	SLIQ score	Positive	p = 0.030
Residing in Southern Italy or island regions	Interest in Preventive Medicine	Positive	p = 0.055
	Impact considered Preventive Medicine has on health	Positive	p = 0.008
Being positive for previous medical conditions	Performed a GP visit in the last 5 years	Positive	p = 0.007
	Interest in Preventive Medicine	Positive	p = 0.030
Having performed a GP visit in the last 5 years	Interest in Preventive Medicine	Positive	p = 0.020
Vaccinations undergone	Doubts on Covid-19 vaccination	Negative	p = [0,026-0,001]
	SLIQ Score	Positive	p = [0,014-0.00]
Flu vaccination at least one time in the previous five years	Interest in having a Preventive Medicine counselling outside the SSN	Positive	p = 0.054
Doubts on COVID-19 vaccine	Teaching about prevention	Negative	p = 0.030
	Considering useful the Preventive Medicine physician	Negative	p = 0.020

Fig. 2. Dendrogram of the "interest in the Preventive Medicine Physician" section questions by given interes scores.



Interesse_prev: What is your interest in prevention and health promotion?; Importante_formaz: How important do you consider it for a specialist in Hygiene and Preventive Medicine to receive education from their School in concepts and clinical skills related to prevention?; Utile_identificare: How useful do you consider it for a Specialist in Hygiene and Preventive Medicine to be involved in identifying and preventing diseases for which a patient has risk factors?; Utile_score: How useful do you consider it for a Specialist in Hygiene and Preventive Medicine to be knowledgeable about and apply risk scores and guidelines dedicated to the prevention of diseases for which a patient has risk factors?; Impatto: How much do you believe a professional like this could have an impact on the health of a population?; Rivolgersi_ssn: Would you ever seek out a specialist of this kind, if they were affiliated with the National Health Service, to assess your risk and perform targeted screenings?; Materiale_inf: Would you appreciate having informative materials available on this topic (such as seminars, podcasts, etc.)?; Rivolgersi_nossn: If this specialist were not part of the Public Healthcare system, would you consider seeking their services at least once in your lifetime?

Preventive Medicine to integrate patient care, preventive services, and lifestyle interventions within or beyond established healthcare systems [30]. Our study spotlights HPMMDRs' interest on this topic as well, with a mean reached score for the question "What is your interest in the field of health prevention and promotion" of 5.17 out of 6, confirming what already reported [27].

Furthermore, the adoption of the SLIQ score allowed to investigate any correlations among lifestyle and interest in prevention. Approximately 66% of the survey participants fell into the "Intermediate" category, followed by around 25% of them categorized as "healthy" and 9% as "unhealthy", similarly with previous health specialists data [31] and general population results [20]. Lifestyle related to a high perceived "Importance of Specialist in Public Health and Preventive Medicine's Knowledge and Application of Risk Scores and Guidelines for Disease Prevention for Patients with Risk Factors", ($p = 0.03$) and a weak positive correlation with the perception of the figure's utility. Despite the recognized importance of risk scores [32, 33], their application still faces barriers to diffusion and interpretation, despite focusing on guidelines during medical training to be notably supportive for their further application [34].

Supporting this evidence, a lifestyle medicine curriculum for Preventive Medicine residents, usually results in enhancing residents' personal health habits [35].

Both men and women found the Preventive Medicine Physicians equally beneficial. However, women tended to have a more frequent positive medical history and sought consultations with their General Practitioners (GPs) more often. Previous studies confirm a lower interest in health and less frequent interactions with GPs of men [36], as well as a least pronounced interest in prevention, a higher inclination towards risky health behaviours [37]. Gender disparities in health have been widely investigated in literature. Our homogenous sample might partially mitigate the cultural variable of the matter. Further studies will be needed to investigate this intricate evidence.

Age played a significant role in the willingness to access Preventive Medicine, particularly if funded by the SSN. Younger individuals were more inclined to access it. On the other hand, those who wouldn't access it (21.7% "maybe", 6.6% "unwilling") perceived it as less useful and impactful. Individuals who would seek Preventive Medicine services even fee-based perceived it as highly useful and impactful. This suggests that older age groups might be more interested if cost considerations were not a barrier.

Dendrogram analysis reveals two clusters: one

emphasizing broader themes, societal impact, and the comprehensive role, and the other focusing on individual engagement, preferences for health services, and informational materials. This nuanced segmentation highlights the need for tailored strategies in healthcare policy and research initiatives. Most respondents indicated an intermediate level of knowledge on Preventive Medicine, with an interestingly high number of HPMMDRs reporting their HPMRS not organizing prevention interventions on the general population or students. Individuals who received education on Preventive Medicine, on par with those with silent medical history, tended to consider themselves more knowledgeable about prevention.

HPMMDRs from southern regions and islands showed higher interest in the Preventive Physician figure and its impact. Interestingly, this result might support previous evidence on how populations' dependence on health services might be higher in less-served areas [38]. Italian SSN allows ASL autonomy on prevention programs, resulting in different levels of engagement [39], Older infrastructures, limited professionals hinder preventive interventions [40], with all Regions showing attendance rates below the minimal standards to be in the South and Islands areas [41].

Vaccination-related variables were significantly associated with SLIQ score ($p < 0.001$), indicating greater adherence to vaccinations related to a higher SLIQ score, in line with previous studies [42]. Doubting on vaccines efficacy was associated with receiving less prevention teaching ($p = 0.026$) and considering the Preventive Physician less useful ($p = 0.02$). Data highlighted a link between a positive medical history and attitudes towards vaccination, differently from what similar studies [43] reported. Moreover, those with a positive medical history often had a positive family medical history as well and consulted their GP in the last 5 years. Conversely, those with a positive family medical history tended to have higher vaccination and consultations with Travel Physician rate.

Those who received fewer vaccinations, including boosters and influenza vaccines, expressed more doubts about COVID-19 vaccination, as previously stated in other European studies [44].

Primary Care Specialists play a crucial role in improving health outcomes [45] and trust in healthcare professionals is linked to higher treatment satisfaction and willingness to be treated [46]. COVID-19 pandemic highlighted the importance of active communication between preventive services, primary care providers, and the population [47]. Establishing trust, especially during emergencies, is challenging but essential. Italy's widespread network of GPs played a vital role in promoting COVID-19 vaccination uptake [47], showcasing the impact of physicians' enthusiasm on patients' perceptions of reliability and adherence to therapies [48].

Responses support the significance of acquiring clinical skills in prevention, with the question regarding the importance of Hygiene and Preventive Medicine specialists training in clinical skills receiving the highest average score of 5.6 out of 6. However, a 2022 survey indicated that Public Health physicians encounter difficulties in positioning as Preventive Medicine practitioners [49].

With 92% of respondents expressing interest in informational material on Preventive Medicine, the study suggests the need for ongoing research. It advocates strengthening the identity of Public Health specialists through targeted studies and specialized training for a more impactful contribution to global health systems [50].

Our study offers substantial evidence to support policy decisions, aligning with the emphasis on prevention in Ministerial Decree 77/2022, "New models and standards for Primary Care development in the National Health System" [51] and in the allocation of funds in the National Recovery and Resilience Plan [52].

Strengths and Limitations

This study stands out due to its unique approach, providing a national platform for collaboration among Health Professionals in Preventive Medicine and Medical Doctors in Residency (HPMMDRs). Rigorous survey design, question development, and the application of a validated score ensure reproducibility. The dendrogram distribution confirms internal coherence, and collaboration among health specialists ensures a comprehensive exploration of the subject.

Our study has limitations, including potential participation bias in voluntary surveys and possible selection bias due to online distribution among specific regions. Uneven regional representation may affect generalizability. The survey's length and the need for specific insights may have deterred participation. Additionally, the lack of scientific validation requires further studies for data validation.

Conclusions

Our study reveals a strong interest and willingness to learn, providing a promising foundation for advancing this field in Public Healthcare. The findings emphasize the need to support Preventive Medicine physicians within Public Health services and advocate for the continued development of our "Preventive Medicine Physician" study team. Identifying shared priorities can guide the establishment of standardized objectives, and given the growing recognition of prevention's importance, concrete actions are needed for effective interventions. Further studies are essential to support the development of a robust Preventive Medicine Physician figure.

Ethics approval

Approval for ethical review was not required for this study, as the methods utilized in data collection and analysis ensured the complete anonymity of participants. Furthermore, only aggregated data was presented.

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Consent to participate

Not applicable.

Consent for publication

Not applicable.

Code availability

Not applicable.

Availability of data and material

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of interest statement

None.

Authors' contributions

GA: Conceptualization, Methodology, Formal analysis, Investigation, Resources, Data Curation, Writing-Original draft preparation, Writing-Reviewing and Editing, Visualization, Project Administration. AL: Methodology, Resources, Data Curation, Writing - Reviewing and Editing, Visualization. PF: Methodology, Formal analysis, Investigation, Writing-Reviewing and Editing. EL: Resources, Writing-Reviewing and Editing, Visualization. GG: Writing-Reviewing and Editing, Visualization. EL: Writing-Reviewing and Editing, Visualization. MU: Investigation, Writing-Reviewing and Editing, Visualization, Supervision, Project Administration. MCN: Validation, Writing-Reviewing and Editing, Visualization, Supervision, Project Administration.

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Supplementary Materials

Work group

Our work group, established with the aim to precisely define the professional profile of the Preventive Medicine physician, consisted of HPMMDRs and was part of the Italian HPMMDRs network, named Medical Residents' Council (Consulta degli Specializzandi), which is a branch of the Italian Society of Hygiene, Preventive Medicine and Public Health (Società Italiana di Igiene, Medicina Preventiva e Sanità Pubblica, SItI).

Search strings

- Section 2: ("survey" OR "questionnaire") AND (("health behaviours" OR "preventive behaviours") OR ("routine visits" OR "doctor visits") OR ("vaccination history" OR "vaccine compliance" OR "booster doses" OR "vaccine boosters" OR "optional vaccines" OR "recommended vaccines" OR "influenza vaccination" OR "flu shot") OR ("Travel Medicine clinics" OR "travel vaccination")).
- Section 3: ("Preventive Medicine" OR "preventive care" OR "health promotion" OR "public health") AND ("community-oriented" OR "community-based" OR "community health initiatives") AND ("training" OR "education" OR "clinical skills") AND ("Preventive Medicine" OR "hygiene") AND ("education" OR "training" OR "learning" OR "lessons").
- Section 4: ("survey" OR "questionnaire" OR "study") AND ("perspectives" OR "views" OR "attitudes" OR "interests") AND ("training" OR "knowledge" OR "education") AND ("health specialists" OR "health experts" OR "health professionals" OR "interns" OR "medical residents" OR "resident medical practitioner*") AND ("population health" OR "public health").

Survey development and composition

Demographics and Medical History

The survey collected demographic variables, including age, gender, attended Public Health school, internship year, place of origin, personal medical history, and family medical history. These variables provided insights into the characteristics and backgrounds of the participants.

Interest, Knowledge, and Compliance of Medical Residents

The second section focused on HPMMDRs' health behaviours and vaccination history. It gathered information on routine doctor visits, booster doses for vaccines, compliance with optional and recommended vaccines, annual influenza vaccination, travel medicine consultations, and the use of the SLIQ score for lifestyle assessment. These questions highlighted engagement of participants with preventive measures and health promotion.

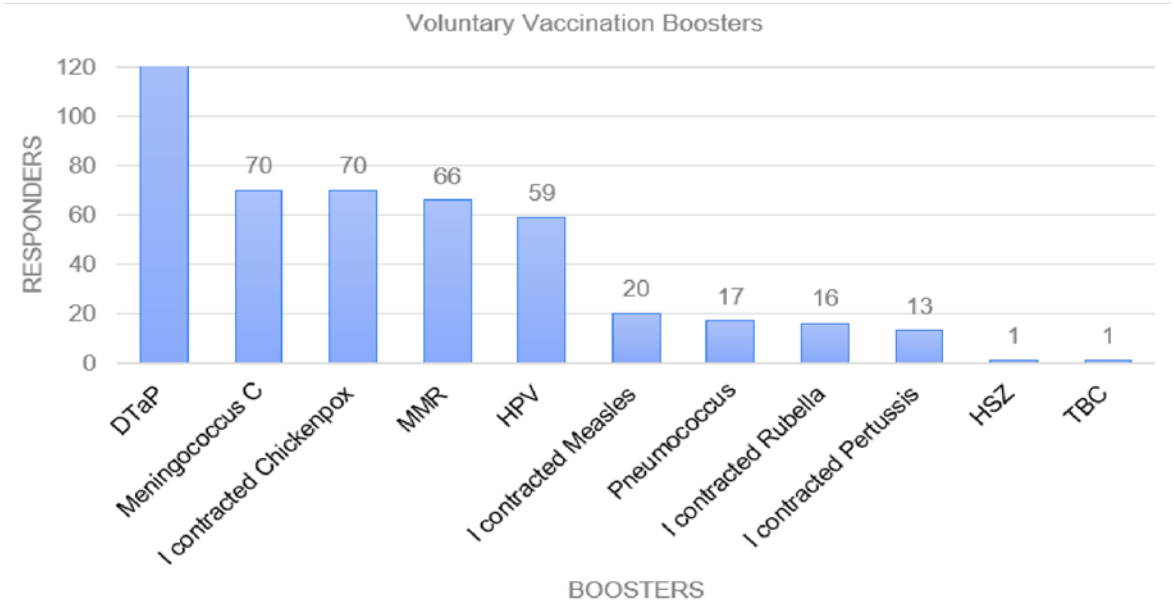
Hygiene and Preventive Medicine Residency Schools' Prevention Interventions

This part explored the preventive and health promotion activities of participants' HPMRSs. It inquired about community-oriented and HPMMDRs-focused initiatives, training on Preventive Medicine, education on prevention-related concepts, and clinical skills for Hygiene and Preventive Medicine specialized physicians. The questions aimed to understand the scope and significance of Preventive Medicine education provided by the universities.

Level of Interest in Preventive Medicine

The last section examined HPMMDRs' interest in Preventive Medicine and their perspectives on physicians in Hygiene and Preventive Medicine. It covered self-perceived training, the importance of education, the usefulness of specialists in disease identification and prevention, willingness to seek out specialists within or outside the National Health Service (*Servizio Sanitario Nazionale,* SSN), and the impact of these specialists on population health. The section also addressed participants' interest in accessing informative materials on Preventive Medicine.

Fig. S1. Bar graph illustrating the number of voluntary booster vaccinations administered to the respondents.



DTaP: Diphtheria, Tetanus, and Pertussis; MMR: Measles, Mumps, and Rubella; HPV: Human Papillomavirus; HSZ: Herpes Zoster; TBC: Tuberculosis.

Fig. S2. Bar graph depicting the primary preventive measures implemented for university students and the general population within Italian Universities.