European survey on knowledge and attitudes of public health professionals on public health genomics: pilot study

Annalisa Rosso [1], Elvira D'Andrea [1], Marco Di Marco [1], Erica Pitini [1], Brigid Unim [1], Corrado De Vito [1], Carolina Marzuillo [1], Paolo Villari [1]

(1) Department of Public Health and Infectious Diseases, Sapienza University of Rome.

CORRESPONDING AUTHOR: *Dr. Annalisa Rosso. Department of Public Health and Infectious Diseases, Sapienza University of Rome. Piazzale Aldo Moro 5, 00185 Rome, Italy - E-mail: annalisa.rosso@uniroma1.it - Tel: +390649694304 - Fax: +300649914449*

DOI: ***10.2427/12531***
Accepted on May 30, 2017

ABSTRACT

Background: During the past decade a debate has arisen on the possible utility of genomic science for public health purposes. Within this context, a survey is being conducted to assess attitudes of European public health (PH) professionals belonging to European Public Health Association (EUPHA) network regarding their role in the implementation of public health genomics (PHG), and their knowledge and attitudes regarding genetic testing and the delivery of genetic services.
Methods: A pilot on-line survey was conducted on professionals from Sapienza University of Rome and the Vrije University of Amsterdam. The survey tool is composed of 5 sections: Personal details, Professional activity, Knowledge on genetic testing and delivery of genetic services, Attitudes on genetic testing and delivery of genetic services, Attitudes on the role of PH professionals in PHG.
Results: 34 people responded to the questionnaire, mostly medical doctors (61.8%). No respondents correctly identified all evidence-based applications of genetic testing. More than one third of respondents agreed that it would be more important to invest resources in the social and environmental causes of ill health than in genetic testing. Nearly 70% thought that PHG needs to be grounded on evidence of effectiveness, a lower rate agreed ii should be grounded on cost-effectiveness. The rate of agreement with the proposed roles of PH professionals in PHG was very high.
Conclusion: This pilot study showed a positive attitude but the need to improve knowledge of PH professionals on PHG. It provided useful input for the implementation of the survey to all members of the EUPHA network

Key words: Public Health Genomics, Public health professionals, survey, knowledge, attitudes

INTRODUCTION

Over the last decade, further to the continuous development of genomic applications for use in clinical practice, several surveys have been conducted to evaluate knowledge, attitudes and professional behaviors of physicians on this topic, identifying gaps in their knowledge and in the capacity to incorporate these new

TABLE 1. Socio-demographic characteristics of respondents

CHARACTERISTICS	N (%)
Gender	
Female	26 (76.5)
Male	8 (23.5)
Age	
≤35	10(29.4)
36-45	7 (20.6)
>45	17 (50.0)
Personal/family history of genetic disorder/hereditary syndrome	
Yes	5 (14.7)
No	29 (85.3)
Type of health professional	
PH professional not involved in PHG	16 (47.1)
PH professional involved in PHG	6 (17.7)
Not PH professional not involved in PHG	9 (26.5)
Not PH professional involved in PHG	3 (8.7)
Highest academic degree	
Bachelor	10 (29.3)
Master's	3 (8.9)
Doctorate	17(50.0)
Specialization	4 (11.8)
Area of degree	
Medicine	21 (61.7)
Biology	10 (29.4)
Other (mathematics=1, chemistry=1, epidemiology=1)	3 (8.9)
Sector of work	
Academic	28 (82.4)
Hospital	5 (14.7)
Public health service	1(2.9)
Information on genetic screening in undergraduate training	
Yes	20 (58.8)
No	14 (41.2)
Information on genetic screening in postgraduate training	
Yes	21 (61.8)
No	11 (32.3)
Not applicable	2 (5.9)

technologies into practice. [1-6] Only one study has so far addressed knowledge and attitudes of public health professionals on genomic applications, showing that while they have the necessary attitudinal background to contribute to the proper use of predictive genetic testing for chronic diseases, there is the need to increase their methodological knowledge in this field. [7]

Public health professionals may play different roles in the translation of genomics research into health benefits for individuals and populations: they may act as the "honest brokers" responsible for evaluating the effectiveness of genomic applications; they may use genomics tools to evaluate the health impact of public health interventions on different subsets of the population; most importantly, public health professionals can contribute to modelling and evaluating the implementation of evidence based genomic applications. [8] Assessing and developing their capacity in this field is therefore a crucial element for the incorporation of genomics into public health (Public Health Genomics-PHG).

In view of fostering the integration of PHG into public health practice in Europe, a survey will be conducted on a sample of European public health professionals belonging to the network of the European Public Health Association (EUPHA) to assess their knowledge and attitudes regarding PHG. The survey will be conducted within the project "Personalized pREvention of Chronic DIseases consortium (PRECeDI)", funded by the EU program Marie Skłodowska-Curie Research and Innovation Staff Exchange (RISE). The aim of this paper is to describe the pilot phase of the survey conducted with the aim to assess to ensure practicability, validity of the survey questionnaire and interpretation of answers.

METHODS

A specific questionnaire was developed to assess knowledge and attitudes of European public health professionals on PHG, consisting of 33 items grouped into five sections: A. Professional details (4 questions); B. Professional activity (7 questions); C. Knowledge on genetic testing and delivery of genetic services (8 questions); D. Attitudes on genetic testing and delivery of genetic services (8 questions); E. Attitudes on the role of public health professionals in PHG (6 questions). A first draft of the questionnaire was shared with the participants in the Round Table organized by the EUPHA Section on PHG at the 8th European Public Health Conference (Milan, 14-17 October 2015), who were contacted via e-mail in April 2016 to access a first draft of the on-line survey, and with all PRECeDI project partners. Following this first consultation, which lead to some rephrasing to improve the clarity of some questions, it was decided to create a filter question that would give access to a reduced version of the questionnaire for some professional groups not involved in genomics. It was assumed, in fact, that EUPHA network members belong to one of the following categories: public health (PH) professionals involved in PHG activities; PH professionals not involved in PHG; not PH professionals involved in PHG (e.g. geneticists); not PH professionals not involved in PHG (e.g. infectious diseases specialists). The filter question directed respondents not directly involved in PHG activities to a reduced version of the questionnaire, including only four items in both sections C and D (see supplement).

A link to the final version of the self-administered anonymous online questionnaire (see supplement) was e-mailed to 61 staff members from the Department of Public Health and Infectious Diseases of Sapienza University and 10 members from the Department of Genetics from the Vrije University in Amsterdam. Staff members from different backgrounds were selected with the aim to guarantee the representativeness of the different profiles of EUPHA network members as outlined above. An information letter with details of the study, including its purpose and an

TABLE 2. Attitudes of respondents on the role of PH professionals in PHG, N (%)

Statement	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
Public health thinking should consider that risk factors can affect subsets of the population differently based on genetic susceptibility.	10(32.3)	19(61.3)	0	1(3.2)	1(3.2)
Public health professionals should be involved in the continuous assessment of the utility and validity of emerging genomic applications	11(35.5)	19 (61.3)	1(3.2)	0	0
Public health programs should actively implement genomic applications that are evidence-based (e.g. BRCA testing for relatives of known mutation carriers).	12(38.7)	16(51.6)	3(9.7)	0	0
Public health professionals should measure the utilization of genetic services in order to assess unmet needs and inequalities of access to services	9(29.0)	18(58.1)	4(12.9)	0	0
Public health professionals should measure in practice outcomes, process indicators and value added of genomic applications	8(25.8)	21(67.7)	2(6.5)	0	0
I think that in the future public health programmes (e.g. cancer screening, chronic diseases prevention programmes) will make a stronger use of genetic information.	10(32.3)	19(61.3)	2(6.4)	0	0

internet link for the survey, was sent to the participants by email. A reminder email was sent two weeks later.

Attitudes on the role of PH professionals in the implementation of PHG and on genetic testing and delivery of genetic services were assessed through a five-point Likert scale ("strongly agree", "agree", neither agree nor disagree", "disagree", "strongly disagree"), while knowledge was assessed through closed answers questions, some of which allowed multiple answers. Statistical analysis was performed with Stata version 12.0 software (Stata Corporation, College Station, TX, USA) using, for this pilot phase, descriptive analysis (frequencies, percentages, mean values, SD). Cronbach alpha score was calculated for questions belonging to the last section "Attitudes regarding the roles of public health professionals in PHG", in order to measure its internal consistency. All data were processed anonymously.

RESULTS

Thirty-four participants (response rate: 47.9%) completed the survey after the reminder. The age of the respondents ranged from 28 to 64 years (mean age: 43.4 years±9.8), 76.5% were female (Table 1). Nearly a half of respondents (47%) were PH professionals not involved in PHG, 61.8% of them were medical doctors, 82.4% worked in the academic sector and 14.7% in a hospital (Table 1). PHG represented one of the main areas of work for 11.8% of the sample (data not shown). Nine respondents (26.5%) had access to the whole set of questions, while 25 (73.5%) accessed the 25-items version of the questionnaire.

With regards to knowledge, no respondent could correctly identify all applications that are currently based on an evidence of effectiveness (based on the definition of genetic testing provided by the National Human Genome Research Institute-National Institutes of Health, USA) [9]. The rate of correct answers was higher among professionals involved in PHG (55%.6 correctly identified at least seven applications vs 24.0% among not PHG professionals). Similarly, a higher rate of professionals working in PHG correctly identified all clinical conditions for which there is (and there is not) evidence supporting the implementation of genetic testing compared to those not involved in genomics' activities (55.6% vs 8.0%).

In terms of attitudes, more than one third of respondents agreed that it would be more important to invest resources in the social and environmental causes of ill health than in implementing genetic testing. The rate of agreement with this statement was lower among professionals involved in PHG activities (55.6% vs 84.0%). Nearly 70% of respondents thought that genetic testing should be introduced in clinical practice only with evidence of efficacy (all professionals working in PHG strongly agreed with this statement), while a lower rate of respondents thought that it should necessarily be grounded on cost-effectiveness, also among professionals working in PHG (55.6% vs 60.0% in not PHG professionals).

Finally, attitudes regarding the tole of PH professionals in the actual integration of genomics into public health activities were very positive (Table 2). There was no clear disagreement with any of the statements included in the questionnaires, with a few exceptions regarding the issue that "public health thinking should consider that risk factors can affect subsets of the population differently based on genetic susceptibility" (Table 2). With regards to this dimension, it was also possible to calculate Cronbach's

alpha, which resulted in a value of 0.77, showing a good level of internal consistency in the section of the questionnaire assessing attitudes regarding the role of PH professionals in PHG.

DISCUSSION

The sample of this pilot study showed a very positive attitude towards PHG, but the need to improve knowledge on the appropriateness of genetic testing and on delivery models of genetic services. Some deficiencies in knowledge were also found among professionals involved in PHG activities. These preliminary results are consistent with the findings of the study conducted on the members of the Italian Society of Hygiene, Preventive Medicine and Public Health (S.It.I.), [3] which indicated the need for additional training on genomic for public health professionals in Italy. However, it must be noted that a quite high proportion of respondents to this pilot phase were not PH professionals not involved in PH activities (26.5%): we expect the rate of respondents belonging to this group to be much lower in the final survey conducted on the EUPHA network - since it is mainly composed of European national PH society members who will fall in one of the two groups of PH professionals, probably also changing the trend of response rates provided.

The small sample size did not allow an analysis of the determinants of attitudes and knowledge, which was, however, beyond the scope of this pilot study, being investigated once the survey addressed to all members of the EUPHA network will be completed. Also, differences in response rates between the two groups of PHG and not PHG professionals should be interpreted with caution, given the small number of respondents, in particular PHG professionals.

The pilot study was successful in testing the clarity and structure of the questionnaire, with some of the comments provided used to improve the formulation of questions, and internal consistency of one of its sections. It was not possible to measure internal consistency on section D, since the different items included address a very heterogeneous group of issues, ranging from attitudes towards evidence based medicine to attitudes towards the organizational models for a genetic service. The final survey was launched in February 2017 and is currently ongoing.

Acknowledgments

The survey of EUPHA network members is conducted within the project "Personalized pREvention of Chronic DIseases consortium (PRECeDI)" funded by the European Union Horizon 2020 research and innovation programme MSCA-RISE-2014 (Marie Skłodowska-Curie Research and Innovation Staff Exchange), under grant agreement N°645740.

The authors wish to thank Prof. Martina Cornel and Dr. Carla Van El from the VU University in Amsterdam for the support in conducting the pilot phase of the survey in the Department of Clinical Genetics.

References

1. Petersen KE, Prows CA, Martin LJ, Maglo KN. Personalized medicine, availability, and group disparity: an inquiry into how physicians perceive and rate the elements and barriers of personalized medicine. Public Health Genomics 2014;17(4):209-20.
2. Selkirk CG, Weissman SM, Anderson A, Hulick PJ. Physicians' preparedness for integration of genomic and pharmacogenetic testing into practice within a major healthcare system. Genet Test Mol Biomarkers 2013;17(3):219-25.
3. Marzuillo C, De Vito C, Boccia S, et al. Knowledge, attitudes and behavior of physicians regarding predictive genetic tests for breast and colorectal cancer. Prev Med 2013;57(5):477-82.
4. Bellcross, C.A., Kolor, K., Goddard, K.A., Coates, R.J., Reyes, M., Khoury, M.J. Awareness and utilization of BRCA1/2 testing among U.S. primary care physicians. AmJ Prev Med 2011;40:61–66.
5. Nippert, I., Harris, H.J., Julian-Reynier, C., et al. Confidence of primary care physicians in their ability to carry out basic medical genetic tasks—a European survey in five countries—Part 1. J Community Genet 2011;2:1–11.
6. Freedman, A.N., Wideroff, L., Olson, L., et al. US physicians' attitudes toward genetic testing for cancer susceptibility. Am J Med Genet, 2003;Part A 1 120A;63–71.
7. Marzuillo C, De Vito C, D'Addario M, et al. Are public health professionals prepared for public health genomics? A cross-sectional survey in Italy. BMC Health Serv Res 2014;14:239.
8. Khoury MJ, Bowen MS, Burke W, et al. Current priorities for public health practice in addressing the role of human genomics in improving population health. Am J Prev Med 2011;40:486-93.
9. https://www.genome.gov/19516567/faq-about-genetic-testing/ [last access 24/05/2017]