

ORIGINAL PAPER

Assessment of Knowledge, Attitudes and Competencies of Health Professionals Attended an International Training Programme in Public Health

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Abstract

Background: Continuing education is a fundamental aspect of health personnel professional life. These enable health professionals improve patient-centred care, stay current and provide quality services.

Objectives: To assess knowledge, attitudes and competencies from the interprofessional training programme in public health held in cooperation with WHO/EURO.

Methods: A structured questioner for self-ratings on perceived seminar usefulness and implementation was placed on the internet followed by email notification to the 300 participants. We have received 128 completed questionnaires (42.5%).

Programme effects were tested by categorical analysis using Pearson chi-Square or Fisher's exact test. Logistic regression was used to reveal correlation between implementation of competencies according to discipline and type of employer. All tests were considered to be significant at a 5% level. Analysis was carried out using SPSS 20.0.

Findings: 85.9% ($p = 0.021 < 0.05$) of the participants applied the knowledge they acquired in the seminar. The application of the competencies in public health services differed according to position ($p < 0.05$). Supervisors achieved higher scores (81.4%) in the administration and management than the officers (48.5%). Health professionals felt that their performance has been improved and consequently the quality of the services (75%).

Conclusion: The international programme gave them confidence that the acquired knowledge and skills were equal to those of their European colleagues and that they are able to deal with public health issues and to provide the respective services.

Key Words Public health, international partnership, self-ratings, electronic questionnaire

Introduction

Continuing education programmes enable health professionals to improve patient-centred care, by educating them on new interventions, providing the patients with guidelines for the modification of their treatment, the self-management of their illness while they become more active listeners with the patients. The collaboration between health professionals is improved as well as their knowledge, skills and attitudes (Regnier et al. 2005, Overstreet et al. 2006).

The evaluation is a fundamental and necessary process for each programme. Its aim is to indicate whether the programme has achieved its goals, possible deviations from them as well as the added value and the efficiency of the intervention (CDC 1999). It can be performed in several ways and methods, described in the international literature as pre, post and retrospective tests, global and self ratings etc (Lockyer 2003, Weiner et al. 2009). The performance of the health professionals is assessed by colleagues, and patients, but also is evaluated by the self ratings that involve a self assessment of the employee's individual performance (Prat et al. 2000, Nimon et al. 2011).

Each method has advantages and disadvantages such as social desirability bias (Lam and Bengo 2003). Some methods are more popular than others and are used more frequently such as the global and self ratings (Swick et al 2006), but there is a need for incorporating competencies assessment in the daily practice. The environment into which knowledge is applied should support reforms and adopt changes. Therefore the creation of an alliance/collaboration of all relevant stakeholders is required to guide the actions, to encourage the prompt occurrence of benefits and their stability. The experience of the organization in adopting changes as well as the involvement of staff with the appropriate competencies (Farris et al. 2009) is of great importance.

At the same time the Administration should establish the appropriate organizational and administrative mechanisms so that the

training can be effective in order to enable the understanding of new knowledge and skills and the practical implementation of planned reforms (Rouiller and Goldstein 1993, Lapao and Dussault 2011).

In Greece a similar culture of the officers' skills assessment has not yet been established. The efforts have so far been fragmented and do not introduce objective criteria based on international scientific data and best practices. The personnel assessment is largely based on the evaluator's personal assessments. As a result most officers take a negative view of their assessment. However a recent study found that the assessment is gaining ground among health professionals, who find it necessary in order to improve their performance (Andrioti et al. 2010).

The purpose of this study was to assess with the method of self ratings the performance of the employees who attended the training programme "Public Health Policy and Systems in the European Region" their skills and the extent to which they applied the knowledge acquired.

The identity of the programme

In 2004, the Hellenic Ministry of Health and Social Solidarity, the National School of Public Health (NSPH) Athens Greece, the World Health Organization, Regional Office for Europe (WHO/EURO) and the Nordic School of Public Health, Sweden, partnered to create a continuing education course in public health for Greek health professionals, aimed at giving the international dimension and conveyed best practices to the trainees. WHO/EURO provided training to 300 participants (12 courses) and the Nordic School of Public Health to 100 participants (4 courses). This study concerns the training provided by WHO/EURO. It took place from February 2006 until December 2007.

In each interdisciplinary course 25 professionals from a range of governmental agencies participated, such as public health and welfare services, employment agencies, Health Regions, hospitals, health centres, medical offices, local level agencies, prefectures, the organization for the

Development of Workforce, and the Ministry of Health. The open call of interest was publicly advertised to address all the professionals who were employed in health services, across organizations and occupations such as doctors, nurses, midwives, administrators, technicians, social workers, and psychologists. The selection of participants was done by a three member Selection Committee of the NSPH, taking into consideration, educational background, seniority, and position in accordance with the goals of the programme.

This was an interdisciplinary competency-based curriculum with 120 hours classroom or internet-based instruction and competencies demonstration followed by 30 hours study visit to WHO/EURO. It was organized at regional level (ex 17 Health Regions (HR) now merged to 7). Each HR could choose between classroom and e-learning course as well as study visit abroad.

The curriculum was based on a set of core competencies (Table 1) that all public health workers must demonstrate to ensure that skills are in line with defined international standards and the needs of local population as described by the Public Health Functions Steering Committee in 2000.

Methods

The research team created a questionnaire based on the international literature, using docs. google, which was placed online. The questionnaire included 18 closed questions. The questions referred to the professional and demographic profile, the seminar's usefulness, the improvement of their skills, implementation of knowledge and the areas to which they had applied their competencies. They were also asked to assess how the knowledge and the skills affected their work and to raise any issues that did not allow them to apply their knowledge and skills.

In September 2011, the research team using the trainees' files from the administration

office sent to all 300 participants an e-mail with the appropriate cover letter and the web address of the questionnaire, explaining the reasons of the research, asking them to complete the questionnaire, ensuring their anonymity.

Some e-mails returned back either because contact details were incomplete or because the employee had been transferred, retired or changed job. In that case a telephone contact was made with the relevant service, their colleagues and their supervisors. 2 reminders were sent to all the participants. The questionnaires were collected from October to December 2011. We got 128 completed questionnaires (42.7%).

Statistical analyses were performed with the use of SPSS software, version 20.0. Descriptive statistics were used to estimate the frequencies of the study variables.

Differences between selected variables and the main outcome of the study were assessed with the use of two-sided chi-square and Fisher's exact tests.

Logistic regression was applied to determine factors that influence seminar's usefulness and its ultimate use. For all cases, a p-value of less than 0.05 was considered to indicate statistical significance.

Results

The profile of the sample is presented on Table 2. The assessment of knowledge gained from the programme was useful to health professionals. Overall, 86% applied the knowledge they acquired by attending the training, at work.

The variables studied as to their effect on the application of knowledge and the core competencies they felt confident to demonstrate were: gender, age, position, profession, years in service, employer and Health Region, i.e. demographic and socioeconomic factors, as proposed in international literature.

Table 1. Core competencies in public health and the respective training topics provided by WHO/EURO

Core competencies in Public Health	WHO/EURO topic
Analytic assessment	<ul style="list-style-type: none"> • Health for all database
Policy development/ programme planning	<ul style="list-style-type: none"> • Health Evidence Network • Health Impact Assessment
Communication	<ul style="list-style-type: none"> • European Country Strategy in support to Health Policy and Systems Development
Cultural competency	<ul style="list-style-type: none"> • Health inequalities in Europe: concepts, trends, measurement issues
Community dimensions of practice	<ul style="list-style-type: none"> • Public Health Policy at local level • Strengthening the primary level of care: how a systems approach can help
Basic public health sciences	<ul style="list-style-type: none"> • Public Health and Public Health Services: the case of countries in South-eastern Europe • WHO policy on Environmental Health • Medicines policies and health systems • WHO policy on Communicable diseases • WHO policy on Non-communicable diseases with special emphasis on prevention • WHO policy on Substance Abuse (mental health, alcohol, drugs)
Financial planning and management	<ul style="list-style-type: none"> • Health system financing concepts, and challenges facing countries of the European region
Leadership and systems thinking	<ul style="list-style-type: none"> • Health Systems Challenges in Europe • Overview of Public Health Services and their reforms in Europe • Human Resources for Health in the European Region
Emergency preparedness	<ul style="list-style-type: none"> • Disaster preparedness and response (theory and practice) • Highlight on recent reforms of Hospital Systems and Emergency Medical Services in Europe

Table 2. Professionals' characteristics

	N	%
Gender		
Men	30	23
Women	98	77
Age groups		
<35	23	18
35-44	41	50
>45	64	32
Health Region		
1 st	50	39
2 nd	10	8
3 ^d	6	5
4 th	12	9
5 th	14	11
6 th	22	17
7 th	14	11
Discipline		
Doctors	22	17.2
Nurses	23	18.0
Administrative personnel	52	40.6
Allied* personnel	31	24.2
Position		
Supervisor	44	34
Officer	84	66
Years in service		
≤5 years	10	8
6-10 years	31	24
11-20 years	33	26
21 > years	54	42
Employer		
Central and Regional Health Authority	68	53
Hospitals	42	33
Primary Health Care	18	14

* includes: pharmacists, biologists, engineers, chemists, social scientists

Table 3. Assessment of knowledge after having attended the programme

Health Region	Application of knowledge N (%)	Non Application of knowledge N (%)	p - value
1 st	44 (40%)	6 (33%)	p=0.125
2 nd	6 (5.5%)	4 (22%)	
3 ^d	4 (4%)	2 (11%)	
4 th	12 (11%)	-	
5 th	12 (11%)	2 (11%)	
6 th	19 (17%)	3 (17%)	
7 th	13 (12%)	1 (6%)	
Gender			
Men	25 (23%)	5 (28%)	p=0.764
Women	85 (77%)	13 (72%)	
Age			
<35	21 (19%)	2 (11%)	p=0.225
35-44	32 (29%)	9 (50%)	
45+	57 (52%)	7 (39%)	
Profession			
Doctors	19 (17%)	3 (17%)	p=0.458
Nurses	20 (18%)	3 (17%)	
Administrators	42 (38%)	10 (56%)	
Others	29 (26%)	2 (11%)	
Position			
Supervisor	44 (40%)	-	p<0.001
Officer	66 (60%)	18 (100%)	
Years in service			
≤5	10 (9%)	-	p=0.310
6-10	24 (22%)	7 (39%)	
11-20	28 (25.5%)	5 (28%)	
21+	48 (44%)	6 (33%)	
Employer			
Central and Regional Health Authority	59 (54%)	9 (50%)	0.195
Hospitals	38 (34.5%)	4 (22%)	
Primary health care	13 (12%)	5 (28%)	

Table 4. Core Competencies in Public Health that professionals felt confident to demonstrate

Competencies (N=128 persons, N=308 responses)	Responses		Percent of Cases
	N	Percent	
Analytic assessment	40	13.0%	37.4%
Policy development/programme planning	33	10.7%	30.8%
Communication	66	21.4%	61.7%
Cultural competency	12	3.9%	11.2%
Community dimensions of practice	23	7.5%	21.5%
Basic public health sciences	34	11.0%	31.8%
Financial planning and management	21	6.8%	19.6%
Leadership and systems thinking	34	11.0%	31.8%
Emergency preparedness	22	7.1%	20.6%
Research	23	7.5%	21.5%
Total	308	100.0%	287.9%

Table 5. Core Competencies in Public Health that professionals felt confident to demonstrate according to discipline

Competencies	Discipline							
	Doctors		Nurses		Administrator		Others	
	N	Response %	N	Response %	N	Response %	N	Response %
Analytic assessment	12	63.2%	8	40.0%	14	35.0%	6	21.4%
Policy development/programme planning	8	42.1%	5	25.0%	8	20.0%	12	42.9%
Communication	16	84.2%	14	70.0%	25	62.5%	11	39.3%
Cultural competency	6	31.6%	2	10.0%	2	5.0%	2	7.1%
Community dimensions of practice	8	42.1%	6	30.0%	2	5.0%	7	25.0%
Basic public health sciences	13	68.4%	8	40.0%	1	2.5%	12	42.9%
Financial planning and management	2	10.5%	4	20.0%	12	30.0%	3	10.7%
Leadership and systems thinking	2	10.5%	3	15.0%	20	50.0%	9	32.1%
Emergency preparedness	4	21.1%	6	30.0%	7	17.5%	5	17.9%
Research	4	21.1%	7	35.0%	3	7.5%	9	32.1%
Total	19	394.7%	20	315.0%	40	235.0%	28	271.4%

Table 6. Core Competencies in Public Health that professionals felt confident to demonstrate according to employer

Comptencies	Employer							
	Central and Regional Health Authorities		Hospitals		Primary Health Care		Total	
	N	Response %	N	Response %	N	Response %	N	Response %
Analytic assessment	18	32.1%	17	44.7%	5	38.5%	40	37.4%
Policy development/programme planning	21	37.5%	8	21.1%	4	30.8%	33	30.8%
Communication	28	50.0%	28	73.7%	10	76.9%	66	61.7%
Cultural competency	0	0.0%	9	23.7%	3	23.1%	12	11.2%
Community dimensions of practice	9	16.1%	9	23.7%	5	38.5%	23	21.5%
Basic public health sciences	12	21.4%	16	42.1%	6	46.2%	34	31.8%
Financial planning and management	10	17.9%	8	21.1%	3	23.1%	21	19.6%
Leadership and systems thinking	24	42.9%	8	21.1%	2	15.4%	34	31.8%
Emergency preparedness	9	16.1%	10	26.3%	3	23.1%	22	20.6%
Research	12	21.4%	11	28.9%	0	0.0%	23	21.5%
Total	56	255.4%	38	326.3%	13	315.4%	107	287.9%

Table 7. Public health services provided by health professionals (N=128 persons, N=208 responses)

Public Health Services	Responses		Percent of Cases
	N	Percent	
Administration	67	32.2%	61.5%
Education and training	50	24.0%	45.9%
Health service provision	32	15.4%	29.4%
Social services	23	11.1%	21.1%
Research and studies	36	17.3%	33.0%
Total	208	100.0%	190.8%

Table 8. Public health services provided by health professionals, according to position

Public Health Services	Position					
	Supervisor		Officer		Total	
	N	Response %	N	Response %	N	Response %
Administration	35	81.4%	32	48.5%	67	61.5%
Education and training	19	44.2%	31	47.0%	50	45.9%
Health service provision	14	32.6%	18	27.3%	32	29.4%
Social services	9	20.9%	14	21.2%	23	21.1%
Research and studies	12	27.9%	24	36.4%	36	33.0%
Total	43	207.0%	66	180.3%	109	190.8%

Table 9. Public health services provided by health professionals, according to discipline

Public Health Services	Discipline									
	Doctor		Nurse		Administrator		Others		Total	
	N	Response %	N	Response %	N	Response %	N	Response %	N	Response %
Administration	5	26.3%	12	60.0%	36	85.7%	14	50.0%	67	61.5%
Education and training	10	52.6%	10	50.0%	18	42.9%	12	42.9%	50	45.9%
Health service provision	8	42.1%	16	80.0%	3	7.1%	5	17.9%	32	29.4%
Social services	6	31.6%	6	30.0%	3	7.1%	8	28.6%	23	21.1%
Research and studies	11	57.9%	9	45.0%	7	16.7%	9	32.1%	36	33.0%
Total	19	210.5%	20	265.0%	42	159.5%	28	171.4%	109	190.8%

Table 10. Public health services provided by health professionals, according to employer

	Employer							
	Central & Regional Health Authorities		Hospitals		Primary Health Care		Total	
	N	Response %	N	Response %	N	Response %	N	Response %
Administration	43	75.4%	19	50.0%	5	35.7%	67	61.5%
Education and training	26	45.6%	19	50.0%	5	35.7%	50	45.9%
Health service provision	11	19.3%	19	50.0%	2	14.3%	32	29.4%
Social services	7	12.3%	10	26.3%	6	42.9%	23	21.1%
Research and studies	18	31.6%	13	34.2%	5	35.7%	36	33.0%
Total	57	184.2%	38	210.5%	14	164.3%	109	190.8%

Table 11 . Perceptions on the impact of their performance to provided services (N=128 persons, N=161 responses)

Outcomes	Responses		Percent of Cases
	N	Percent	
Responsiveness	42	26.1%	36.2%
Accessibility	32	19.9%	27.6%
Quality	87	54.0%	75.0%
Total	161	100.0%	138.8%

Table 12. Perceptions of health professionals on the outcomes of their performance according to position

Outcomes	Position					
	Supervisor		Officer		Total	
	N	Response %	N	Response %	N	Response %
Responsiveness	19	45.2%	23	31.1%	42	36.2%
Accessibility	11	26.1%	21	28.4%	32	27.6%
Quality	38	90.5%	49	66.2%	87	75.0%
Total	42	100.0%	74	100.0%	116	100.0%

Table 13. Perceived obstacles in applying competencies (N=128 persons, N=108 responses)

Obstacles	Responses		Percent of Cases
	N	Percent	
Reactions from supervisors	11	10.2%	25.0%
Reactions from colleagues	7	6.5%	15.9%
Indifference from the supervisors	15	13.9%	34.1%
Indifference from the colleagues	19	17.6%	43.2%
Lack of infrastructure	30	27.8%	68.2%
Feeling that nothing will change	22	20.4%	50.0%
I had no motivation	4	3.7%	9.1%
Total	108	100.0%	245.5%

Table 14. Perceived obstacles in applying competencies, according to profession

	Profession							
	Doctor		Nurse		Administrator		Others	
	N	Response %	N	Response %	N	Response %	N	Response %
Reactions from supervisors	2	20.0%	5	41.7%	3	20.0%	1	14.3%
Reactions from colleagues	1	10.0%	5	41.7%	1	6.7%	0	0.0%
Indifference from the supervisors	6	60.0%	4	33.3%	2	13.3%	3	42.9%
Indifference from the colleagues	7	70.0%	5	41.7%	4	26.7%	3	42.9%
Lack of infrastructure	6	60.0%	8	66.7%	10	66.7%	6	85.7%
Feeling that nothing will change	7	70.0%	5	41.7%	9	60.0%	1	14.3%
I had no motivation	1	10.0%	0	0.0%	3	20.0%	0	0.0%
Total	10	300.0%	12	266.7%	15	213.3%	7	200.0%

Table 15. Perceived obstacles in applying competencies, according to employer

	Employer					
	Central & Regional Health Authorities		Hospitals		Primary Health Care	
	N	Response %	N	Response %	N	Response %
Reactions from supervisors	5	26.3%	6	33.3%	0	0.0%
Reactions from colleagues	1	5.3%	6	33.3%	0	0.0%
Indifference from the supervisors	5	26.3%	8	44.4%	2	28.6%
Indifference from the colleagues	4	21.1%	13	72.2%	2	28.6%
Lack of infrastructure	11	57.9%	13	72.2%	6	85.7%
Feeling that nothing will change	11	57.9%	8	44.4%	3	42.9%
I had no motivation	1	5.3%	2	11.1%	1	14.3%
Total	19	200.0%	18	311.1%	7	200.0%

Table 16. Odds ratio, professionals' benefit from the training course and impact of working environment

Variables	Odds Ratio	95% CI	p-value
Doctors/ Others	0.52	0.07 – 3.72	0.52
Nurses/Others	0.44	0.065 – 2.98	0.40
Admin/Others	0.32	0.065 – 1.61	0.17
Central & Regional Health Authority/ Primary health care settings	2.43	0.66 – 9.02	0.18
Hospitals/ Primary health care settings	3.28	0.73 – 14.71	0.12

The results of the descriptive analysis on the application of knowledge and on the tests carried out are summarized in Table 3.

Based on Table 3, the seven Health Regions were represented in equal percentages in both categories (application non-application of knowledge $p > 0.05$). In addition the application of knowledge and skills did not depend on gender, age, specialty, years in service and employer ($p > 0.05$ in all cases).

Concerning the position, all supervisors (N=44, 100%) said that they applied the knowledge and skills acquired from the training, while the respective percentage for the officers was 79% (66/84, $p < 0.001$).

Employer, position and discipline were used to study which competencies they felt confident to demonstrate, the public health services where they applied them and the results of such application. These were all multiple response questions.

Core Competencies in Public Health that professionals felt confident to demonstrate

The results of the descriptive analysis are presented in Table 4. 21 persons did not answer to any variable. From the 107 who answered "yes", even to at least one variable, the responses were as follows: Overall, 107 participants gave 308 positive answers (66 for communication with clients, colleagues and supervisors, 40 for assessment and 34 for public health and leadership and systems thinking accordingly). The percentage was as follows: 21.4% on communication with clients, supervisors and colleagues, 13% on performing analytic assessment, and 11% on basic public health sciences and leadership and systems thinking.

Of the participants (N=107) 61.7% reported that they were able to demonstrate their competencies in communication as well as in assessment by 37.4% and by 31.8% in basic public health sciences and in leadership and systems thinking. The lower percentages were achieved in cultural skills (11.2%). Each person gave 2.87 answers.

Core Competencies in Public Health that professionals felt confident to demonstrate according to position

Among the 107 persons who answered "Yes" even to at least one of the variables of core competencies in public health, 42 were supervisors and 65 were officers. The relationship between the application of competencies and the position was not statistically significant (Chi-Square Test =17.188, $p = 0.07 > 0.05$).

Core Competencies in Public Health that professionals felt confident to demonstrate according to discipline

Among the 107 respondents 19 were physicians, 20 were nurses, 40 were administrators and 28 various other specialties. The application of competencies differed between the occupational categories (Chi-Square Test =104.77, $p < 0.001$). More specifically, doctors felt confident to demonstrate their skills more frequently in basic public health sciences (68.4%) compared with other disciplines (nurses: 40%, vs. administrators: 2.5% vs. other: 42.9%). Additionally, the use of skills in assessment was higher among doctors (doctors: 63.2%, nurses: 40%, vs. administrators: 35% vs. other: 21%) (Table 5).

Core Competencies in Public Health that professionals felt confident to demonstrate according to employer

Among the 107 respondents 56 were working in Central and Regional Health Authorities, 38 in hospitals and 13 in primary health care. The demonstration of competencies differed significantly among the type of employer (Chi-Square Test =48.641, $p < 0.001$). As it is apparent from Table 6, the use of competencies in public health was more frequent among participants working in hospitals and primary health care units compared to those working in Central and Regional Health Authorities (Central and Regional Health Authorities:

21.4%, Hospitals: 42.1%, Primary Health Care: 46.2%). On the other hand, none of the participants working in Central and Regional Health Authorities used their competencies in cultural communication while none of the participants working in Primary Health Care used their skills in research.

Public Health Services provision

Concerning the public health services provided by health professionals 109 individuals answered and 208 responses were given (Table 7).

Each person gave 1.91 positive responses. On the total there were 208 positive responses (67 for the administration, 50 for education and training, and 36 for studies and research). 32.2% were positive responses for the administration, 24.0% for education and training, and 17.3% for studies and research. Among the 109 individuals who answered, 61.5% reported that they worked with administration, 45.9% with education and training, 33% with studies and research and only 21% with social services.

Public Health Services provision according to position

The results are presented in Table 8. Among the 109 respondents, 43 were supervisors and 66 were employees. The provision of public health services differed significantly among the different positions (Chi-Square Test = 13.18, $p = 0.022 < 0.05$). More specifically, the administration was significantly higher among supervisors (supervisors: 81.4% vs. officers: 48.5%).

Public Health Services provision according to discipline

According to discipline the results are presented in Table 9.

The provision of public health services varied according to discipline. The difference was statistically significant (Chi-Square Test = 80.41, $p < 0.001$). Doctors applied their skills to services related to research and studies (58%) and less to administration (26%). Nurses applied their skills more in health service provision (80%) and less (30%) to social services as well as administrators (7%). Administrators and other health

professionals applied their skills more to the provision of organizational and administrative services (86% and 50% respectively).

Public Health Services provision according to employer

The provided services differed significantly according to employer ($\chi^2=31.08$, $p=0.001$) (Table 10). As it is expected skills regarding administration were implemented more frequently among Central and Regional Health Authorities (75%) and health service provision skills were applied more frequently to NHS Hospitals (50%).

Perceptions on the impact of their performance to the provided services

Participant's perceptions on the impact of applied knowledge and skills on the outcomes of the provided services are listed in Table 11.

Each person gave 1.39 positive responses. On the total there were 161 positive responses (87 on the improvement of quality of services, 42 on the improvement of responsiveness and 32 on the improvement of accessibility). 54.0% of the responses were positive on the improvement of quality, 26.1% on the improvement of responsiveness and 19.9% on the improvement of accessibility.

Among participants, with regard to application of knowledge and skills acquired, positive answer to the improvement of quality gave 75.0%, while the relevant percentages of responsiveness and accessibility were 36.2% and 27.6% respectively.

Perceptions on the impact of their performance to the provided services according to position

Results are presented in Table 12. Supervisors (90.5%) were more likely than officers (66.2%) to perceive that the quality of services offered increased as a result of their performance after attending the training (Chi-Square Test = 17.28, $p=0.002 < 0.05$). According to discipline and employer no statistical significance was observed ($p=0.390$ and $p=0.05$ respectively).

Finally health professionals were asked to identify any obstacles in their workplace that did not allow them to apply the knowledge they acquired in the training.

Perceived obstacles in applying their competencies

The results are presented in (Table 13). 44 people answered this question and each person gave 2.45 responses. On the total there were 108 positive responses (30 on the lack of infrastructure, 22 on the feeling that nothing will change, and 19 on the indifference from the colleagues). 27.8% of the responses were positive on the lack of infrastructure, 20.4% on the feeling that nothing will change, and 17.6% on the indifference from the colleagues.

Of the participants 68.2.% mentioned among the obstacles that did not allow them to use the knowledge acquired from the training, was the lack of infrastructure, 50.0% the feeling that nothing would change, and 43.2% the indifference from the colleagues.

Perceived obstacles in applying their competencies according to profession

Obstacles that did not allow the use of knowledge acquired from the training differed significantly among discipline (Chi-Square Test= 33.25, $p=0.04 < 0.05$). Nurses mentioned more frequently than the other professionals reactions from colleagues, while no motivation was mentioned only from doctors and administrative staff (Table 14).

Perceived obstacles in applying their competencies according to employer

The results are presented in Table 15. Significantly more professionals working in hospitals reported an indifference from colleagues compared to those working with Central and Regional Health Authorities and Primary Health Care (Chi-Square Test=25.64, $p=0.029 < 0.05$).

Logistic Regression

The research team examined the extent to which the different categories of health professionals benefited from attending the seminar and how their professional

environment affected their performance. We applied logistic regression analysis (dependent variable was the application of knowledge and competencies), and the independent (explanatory variables) were the discipline and the employer.

In Table 16 the combined effect of the above mentioned factors on outcome is presented. None of these variables have a significant effect on the odds of using their competencies in public health services ($p > 0.05$ in all cases).

Discussion

It is difficult to estimate the extent to which each module affected the improvement of health professionals' skills. The trainees after having attended the training tend to want to apply new knowledge and to develop the competencies acquired to their professional environment (Ewert et al. 2011). It has been reported in studies that they increased their knowledge by 14-20% and their self-confidence concerning the management of the symptoms of the disease and the contact with the patients (Pelayo et al. 2011). In any case it is more difficult to apply knowledge than to understand learning in other words to turn knowledge into applied competencies (Ridde et al. 2009) because improving skills depends on other external factors and in particular on the existence of a supportive environment that encourages organizational changes (Roiller and Goldstein 1993). A supportive professional environment helps trainees to apply the knowledge and the competencies acquired while many different interventions along with a supportive environment can convert knowledge and skills into more practical effective action (Drexel et al. 2011).

The present study indicated that a high percentage (85.9%) concerning the supervisors (100%) and the officers (78%), ($p < 0.001$) applied the knowledge and competencies acquired by attending the World Health Organization's seminar at work, which indicated that the seminar succeeded in its objectives.

They considered that their competencies in public health had been improved, and they

felt confident to demonstrate them regardless of their position, discipline and employer, ($p > 0.05$). This means that the employees felt self confident to use the acquired knowledge, regardless of their workplace, and profession.

Yet public health services provision differed according to position ($p < 0.05$). The supervisors (81.4%), as expected had the opportunity to apply their knowledge and skills to a greater extent in administration in relation to officers (48.5%), $p < 0.05$.

Furthermore, public health services provision differed, according to discipline ($p < 0.05$). The doctors used their knowledge more in public health issues (57.9%) in relation to the allied personnel. The nurses applied their knowledge more to the provision of health services (80%) and the administrative personnel to the provision of organizational and administrative services (85.7%). It would be useful to study the extent to which health professionals benefited from the seminar by comparing their knowledge and skills before and after the training.

They believed that the patients-users benefited since the quality of services had been improved as a result of the application of knowledge and competencies gained from the seminar (75%) and this was statistically significant according to position ($p < 0.05$). The 90.5% of the supervisors believed that the quality of the provided services had been improved in relation to the 66.2% of the officers.

The logistic regression indicated no statistically significant relationship between the extent to which different disciplines benefited from the application of knowledge and competencies at work under the impact of the working environment ($p\text{-value} > 0.05$).

Regarding the perceived obstacles at the workplace that influenced their performance, 68.2% of the participants, felt that the lack of infrastructure was a constraint on the application of the knowledge acquired while 50.0% had a feeling that nothing would change, and 43.2% reported the indifference from the colleagues and showed no statistically significant difference according to position, discipline and employer ($p > 0.05$).

These findings indicated the difficulties that health professionals face when they applied current knowledge and competencies. This is due not only to the difficult economic situation that the country faces (Kaitelidou and Kouli 2012), but also to the hierarchical structure of the Greek health system, that allows little freedom and less initiatives to employees and in which changes take place very slowly.

As already mentioned, apart from the educational programmes a supportive environment is required in the workplace, otherwise any educational intervention will improve the knowledge but without enabling health professionals to turn it into applied competencies. As a result no direct benefit for the organization and the users of the services can be achieved.

In Greece, the absence of a supportive working environment is very frequent since there is no job description for health professionals and the personnel assessments are based only on global and self-ratings. The assignments and re-assignments of the employees but also the decisions of the supervisors are based on non-transparent criteria since usually the existing legislation is not applied. In addition, the economic crisis in our country led to a 40% reduction of the average working wage in the public sector, among the lowest in the European Union. The effects of the economic crisis are already evident. In 2011, 5% of the workforce in the health sector was forced to quit job on the basis of a new legislation passed on for resource saving underlining the deployment of the limited personnel which has an average age > 50 years, is underpaid, tired and poorly motivated, to a fundamental issue. Nevertheless the personnel of all categories totalled approximately 90,000 professionals that provided care to over 2.5 million patients. However, the quality of care should be taken into consideration (Ministry of Health 2011).

The analysis indicated no statistically significant relationship between the demographic characteristics (gender, age, years in service, employer and Health

Region) $p > 0.05$, and this was consistent with the existing literature (Atreja et al. 2008).

The programme provided knowledge on the European dimension of the problems that health systems face. It gave confidence that their knowledge was comparable with that of their European colleagues and that all the countries faced common public health issues.

Acknowledgements

Special thanks to John Kaplanis, IT consultant, who created the electronic version of the questionnaire, and Irene Grimani Biostatistician, for helping with the statistical analysis.

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