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EVIDENCE-BASED PUBLIC HEALTH BA CURRICULUM REVISION: AN EXAMPLE OF GOOD PRACTICE

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A – study design, **B** – data collection, **C** – statistical analysis, **D** – interpretation of data, **E** – manuscript preparation, **F** – literature review, **G** – sourcing of funding

ABSTRACT

Background: The Medical University of Warsaw began teaching at the faculty of Public Health at the Division of Health Science in the academic year 2000/2001. Initially, it only offered M.A. studies; however B.A. degrees were introduced in 2003. Student self-assessment of their level of preparedness to embark on a career path upon completion of their studies, as well as their opinion on the degree to which specific education outcomes were achieved in their course of studies can be of high practical significance and can become a launchpad for the improvement and excellence of the quality of education at the faculty of Public Health.

Aim of the study: The purpose of the study was to compare opinions on achieving education outcomes and self-assessments of the perceived level of readiness to start a job of B.A. graduates at the Faculty of Public Health, Division of Health Sciences, Medical University of Warsaw.

Material and methods: The anonymous questionnaire consisted of two parts: 1. Students' self-assessment of reaching the assumed education outcomes; 2. Students' assessment of reaching the assumed education outcomes in the course of their studies. Each statement was assessed in a 5-point Likert scale. The studied population included 85 B.A. graduates (2015/16) (82 female, 3 males – 96% female). The mean age of students in the studied group was 23±7.2 years.

Results: The most important result was the high degree of compliance identified between the students' self-assessments and the assessment of the level of education outcomes achieved in the course of their studies.

Conclusions: Graduate self-assessments and opinions on the level of achieving education outcomes during B.A. studies can help to modify the curriculum in question following the principles of evidence-based education. Such studies should be carried out regularly to adapt to current graduate needs and labour market requirements.

KEYWORDS: evidence-based education, curriculum, quality of education, BA program, public health

Background

Public health education in Poland dates back to 1991 and was initiated in Krakow to cater for the needs of the dynamically changing health protection system [1]. In the majority of European countries, education in this field had started much earlier – and is believed to be marked by the foun-

dation of the first school of public health in 1924, the London School of Hygiene and Tropical Medicine [2].

Following the provisions of the Bologna Process, courses are offered in a two-degree system. The time requirement to complete the Bachelor's degree studies (academic degree I) is three years (six semesters, 180 points of the European Credit Transfer System – ECTS) and graduates obtain an undergraduate Bachelor's degree. Master's degree studies (academic degree II) extend over two years (four semesters, 120 ECTS points) and graduates are awarded a postgraduate Master's degree [3].

Currently education is provided based on the list of the education outcomes stipulated in Resolution No. 77/2012 of the Senate of the Medical University of Warsaw of 24 September 2012, which is valid for the Medical University of Warsaw since 2013/2014 [4]. The list of education outcomes is based on the European standards developed by ASPHER: *Main chapters of ASPHER's list of European Public Health Core Competences* [5]. Each University specifies the list of education outcomes, which are divided into major cognitive domains: knowledge (W), skills (U) and social competences (KS). From this, the curriculum and syllabi are developed.

Since 2000, there has been a significant increase in undergraduate and postgraduate courses within Public Health, which are now available in approximately thirty universities.

Following a considerable initial interest in studying Public Health in Poland, recent years have seen a decline, similar to other European countries, which has been caused by a variety of interconnected factors described in detail in the international literature [6-9]. These include, in particular, a lack of legal regulations concerning the public health specialist's profession, the lack of a clear definition of the professional competences of Public Health graduates and their recognition on the job market.

In the last few years, public health courses were suspended in many universities. Often all applicants are accepted, uncritically, lowering the quality of education. This applies to both undergraduate and postgraduate studies. Moreover, owing to a lack of specified competencies for public health graduates, it is often the case that the curriculum and contents taught at postgraduate level overlap with those taught at undergraduate level [10].

The Medical University of Warsaw, the largest medical university in Poland and one of the twelve medical state universities, inaugurated the faculty of Public Health at the Division of Health Science in 2000/2001. Initially, it only offered M.A. studies (first offered in the academic year 2000/2001); however, B.A. degrees were introduced in 2003 (academic year 2003/2004).

Recently, the curriculum of the B.A. at the Department of Public Health, at the Faculty of Health Sciences of the Medical University of Warsaw was updated according to the guidelines covering the suggestions of the representatives of the students and Employers' Council. The curriculum has also been evaluated by the Polish Accreditation Committee; however, this needs to be updated regularly to consider economic needs.

This study sets out to elicit the views of public health undergraduates around specific educational outcomes and their self-assessment of their readiness to start work. The graduates' opinions on the degree of achieving specific educational outcomes from their studies and their self-assessment related to their readiness for employment upon completion has practical implications, as it can become a launchpad for the improvement of the quality of education at the Faculty of Public Health. That is why, according to the principles of evidence-based education, the intended modification of Bachelor's degree studies at the Faculty of Public Health, Division of Health Sciences, Medical University of Warsaw was preceded by a detailed analysis of the opinions of graduates completing their studies in the academic year 2015/2016 on the subject.

Aim of the study

The purpose of the study was to compare opinions on achieving education outcomes and self-assessments of the perceived level of readiness to start a job of B.A. graduates at the Faculty of Public Health, Division of Health Sciences, Medical University of Warsaw.

Material and methods

Study design and setting

This study was carried out over a three-month period in the summer of 2016. Students were asked to fill in the questionnaires after graduation, when collecting the documents confirming completion of their studies in the Dean's Office. The study was conducted using the PAPI (Paper and Pen Personal Interview) method. A separate private area was used to ensure confidentiality and anonymity.

Participants

The studied population included 85 B.A. Public Health graduates (2015/16) from Division of Health Sciences, Medical University of Warsaw.

Data sources

An anonymous questionnaire was developed based on the list of education outcomes published pursuant to the resolution of the Senate of the Medical University of Warsaw and effective while developing the curricula of studies at the Faculty of Public Health, Division of Health Sciences, Medical University of Warsaw [4]. Additionally, the education outcomes in knowledge and skills were divided according to the *Main chapters of ASPHER's list of European Public Health Core Competences* [5]. ASPHER identifies seven different areas of education, within which 29 statements apply to the Knowledge (W) domain and 30 to the Skills (U) domain: methods in public health (W–4, U–3); population health and its social and economic determinants (W–4, U–4); population health and its material – physical, radiological, chemical and biological-environmental determinants (W–4, U–1); health policy, economics, organisational theory and management (W–11, U–9); health promotion: health education, health protection and disease prevention (W–2, U–3); ethics (W–4, U–2); and others (W–0, U–9).

The questionnaire consisted of two parts: 1. Students' self-assessment of reaching the assumed education outcomes; 2. Students' assessment of the level of reaching the assumed education outcomes in the course of their studies. In both areas, three cognitive domains were identified, related to knowledge (29 statements), skills (30 statements) and social competences (13 statements). Each of the statements was assessed on a 5-point Likert scale (where 1 was "I completely disagree" and 5 "I absolutely agree"). The text of each statement applied to detailed educational outcomes set out in the Senate's regulation [4].

Statistical methods

The return rate of the questionnaires was 96.6% (85/88), including not completely filled-out questionnaires, which constituted 5.0%. According to Schafer's [11] recommendation, such a percentage can be regarded as neutral. Incomplete questionnaires were excluded from the analysis. The data were digitised using an optic reader and developed as a database using the ABBYY FlexiCapture programme.

The compliance of the respondents' opinion between evaluation of achievement and self-assessment of their competence was identified using the Guttmann's split-half reliability method, and calculating the coefficient of correlation [12]. The intraclass correlation coefficient (ICC) was applied to evaluate the degree of consistency of achievement and self-assessment in each cognitive domain. The minimum value of 0.75 was taken as the limit of sufficient consistency for ICC [13]. The analysis of the degree of achieving each education outcome and the graduates' competence self-assessment was carried out using descriptive statistics (mean and standard deviation (M ± SD)). With regard to the diagonal distribution, the data were subjected to a non-parametrical analysis. The Wilcoxon signed-rank test was applied to compare the results of achievement and self-assessment [14]. The value of the outcome for significant differences was estimated using the r coefficient according to the formula proposed by Cohen [15]. Cohen's guidelines for r specify that a large outcome is 0.5, a medium outcome is 0.3 and a small outcome is 0.1 [16].

A statistical analysis was performed using the STATISTICA 12.5 software (licence of the Medical University of Warsaw). The statistical significance level was assumed in advance at 0.05.

Ethical considerations

The authors sought advice from the Ethics Committee of the Medical University of Warsaw to conduct the presented study. In the opinion of the Bioethics Committee 'non-interventional studies do not require the opinion of the Bioethics Committee in accordance with Art. 37al Pharmaceutical Law Act (Journal of Laws 2001, No. 126, item 1381)' [17].

RESULTS

Participants

The studied population included 85 B.A. Public Health graduates (2015/16) (82 females, 3 males – 96% female) from Division of Health Sciences, Medical University of Warsaw. The mean age of students in the studied group was 23 ± 7.2 years. The majority of the respondents were single (97%), while only 3% were married.

Main result

The most important result was identifying a high degree of compliance between the results of the students' self-assessments and the assessment of the level of education outcomes during the course of the studies.

Other analyses

The sum of the average [NJR1] results for the learning outcomes in the aforementioned three do-

mains in the context of their implementation during the studies and the students' self-esteem is as follows (implementation of learning outcomes vs self-assessment): Knowledge (104.8 vs 103.3; p=0.516, r coefficient=0.08), Skills (107.2 vs 110.3; p=0.019, r coefficient=0.28), and Social competences (49.3 vs 51.4; p=0.013, r coefficient=0.32).

The analysis of compliance between the evaluation of the degree of achieving education outcomes and the graduates' competence self-assessment also revealed high reliability. The reliability of Guttmann's analysis carried out in the Knowledge domain was 0.878 (ICC=0.969), in the Skills domain it was 0.864 (ICC=0.976), and for Social competence it was 0.853 (ICC=0.959).

The differences, however, were statistically insignificant in the majority of cases. Only for five of the 29 analysed statements were statistically significant differences observed (p<0.05). In the section entitled *Population health and its material – physical, radiological, chemical and biological – environmental determinants* the comparison of the implementation level with the students' self-assessment turned out to be statistically significant for the two variables. It is worth emphasising that the rest of the education outcomes presented in the section entitled *Population health and its material – physical, radiological, chemical and biological – environmental determinants* turned out to be the only one in the analysis related to the Knowledge domain for which the students evaluated their self-assessment level higher than its implementation level. The last education outcome with a statistically significant difference between the students' opinion on achieving the outcomes and the students' self-assessment applied to the education outcome in *Health promotion* (Table 1).

Table 1. Evaluation of achieving the education outcomes and self-assessment of graduates' knowledge-related competences

List of education outcomes related to the students' knowledge	Area	Mean	SD	Mean	SD	p-value[a]	Effect size[b]
		Evaluation of achieving education outcomes		Graduates' competence self-assessment			
Methods in public health[c]							
Knows theoretical and methodological basics of building health and social programme strategies	Z	3.5	1.34	3.5	1.32	0.910	0.02
Defines qualitative and quantitative methods of social studies	Z	3.6	1.27	3.2	1.36	0.024	0.40
Describes the methods used for evaluation and quality assurance in the protection system	Z	3.6	1.22	3.2	1.39	0.011	0.44
Describes institutions and IT systems used for public health related analyses	Z	3.3	1.36	3.3	1.32	0.837	0.03
Population health and its social and economic determinants							
Defines basic terms describing the health condition of the population	Z	4.4	0.85	4.2	0.97	0.236	0.25
Describes the methods of identifying the health needs of society	Z	3.9	1.28	3.8	1.26	0.784	0.05
Presents major health hazards and health problems of the Polish population, including that of local societies	Z	4.1	1.16	4.0	1.11	0.772	0.05
Presents domestic and European sources of information and population health monitoring systems	Z	3.6	1.20	3.4	1.31	0.294	0.17
Population health and its material – physical, radiological, chemical and biological – environmental determinants							
Defines the impact of behavioural and environmental factors on the health condition	Z	4.3	1.01	3.9	1.26	0.010	0.45
Correctly interprets the relationships between health and working environment	Z	4.0	1.23	4.0	1.19	0.829	0.04
Describes biological processes in the human body, as well as the structure and functions of the systems and organs in a healthy and ill body	I	3.3	1.28	3.7	1.06	0.006	0.47
Has a general knowledge of etiopathogenesis, diagnostics and treatment of selected diseases, in particular the ones with social significance	I	3.7	1.11	3.7	1.14	0.931	0.02
Health policy; economics; organisational theory and management							
Mentions the foundations of economic evaluation of health protection programmes	E	3.1	1.35	3.1	1.44	0.931	0.01

Table 1 contd.

List of education outcomes related to the students' knowledge	Area	Mean	SD	Mean	SD	p-value[a]	Effect size[b]
		Evaluation of achieving education outcomes		Graduates' competence self-assessment			
Defines economic conditions for operation of the health protection system and entities	E	3.3	1.30	3.2	1.36	0.421	0.12
Explains the impact of economic stimuli on human behaviour	E	3.5	1.27	3.5	1.38	0.979	0.00
Describes the functions of the main organisational forms of health services	Z	3.2	1.37	3.4	1.42	0.176	0.22
Presents the rules of cooperation with local authorities and local governments and other entities dealing with social prevention	Z	3.2	1.38	3.4	1.27	0.197	0.20
Enumerates all elements of the social and health insurance system	P	3.4	1.32	3.4	1.33	0.868	0.03
Describes organisational and legal aspects of the Polish health care system	EP	3.5	1.25	3.3	1.36	0.094	0.27
Presents the assumptions and directions of the health protection system reform in Poland, considering legal and financial aspects	EP	3.2	1.25	3.1	1.35	0.562	0.09
Defines legal and financial aspects of providing health benefits and implementation of health programmes	EP	3.2	1.32	3.1	1.42	0.378	0.16
Discusses the basic terms related to social communication	Z	4.1	0.99	4.0	1.21	0.882	0.03
Describes the rules of proceeding in the case of natural disasters	I	3.4	1.41	3.6	1.42	0.153	0.25
Health promotion: health education, health protection and disease prevention							
Defines concepts related to health and lifestyle	Z	4.5	0.86	4.2	1.07	0.018	0.52
Defines strategies used on different levels of preventive and health promotion interactions	Z	3.8	1.26	4.0	1.21	0.218	0.21
Ethics							
Presents the rules of law related to the protection of patients' rights and job ethics with a special consideration for the medical profession	P	3.7	1.31	3.6	1.21	0.281	0.19
Presents fundamental legal principles concerning assistance for the excluded, victims of violence, social re-adaptation etc.	P	4.0	1.20	3.9	1.14	0.845	0.04
Defines the rules of protection of intellectual property and property rights	I	3.5	1.30	3.5	1.32	0.808	0.04
Identifies legal consequences of basic formal and legal provisions related to administrative law	P	3.2	1.36	3.2	1.33	0.873	0.03

[a] Wilcoxon signed-rank test; [b] r coefficient proposed by Cohen; [c] Main chapters of ASPHER's list of European Public Health Core Competences; Z – education outcomes in public health; E – education outcomes in economy; P – education outcomes in law; EP – education outcomes in law and economy; I – education outcomes in other sciences.

Another analysis involved the comparison of the evaluation of achieving education outcomes with the self-assessment of the graduates' competences related to skills. The analysis revealed that in reference to skills, for half of the education outcomes (15/30 statements, 50%), the students rated their preparation level higher than achieving the education outcomes of their studies. For eight statements (8/30 statements, 27%) the mean evaluation of achieving the outcomes and self-assessment were on the same level, while for seven statements (7/30, 23%) the students ranked achieving the outcomes higher than their preparation. In most cases, the differences were not statistically significant. A statistically significant difference was observed for five education outcomes (Table 2).

The final analysis presented in the paper applied to the comparison of the evaluation of achieving education outcomes with the self-assessment of the graduates' social competences. The analysis revealed that in relation to social competences, for 11 out of 13 education outcomes, the students ranked their owns skills higher than achieving the outcomes in the studies. The level of two educational outcomes in

Table 2. Evaluation of achieving the education outcomes and self-assessment of graduates' skill-related competences

List of education outcomes related to the students' skills	Area	Evaluation of achieving education outcomes		Graduates' competence self-assessment		p-value[a]	Effect size[b]
		Mean	SD	Mean	SD		
Methods in public health[c]							
Develops epidemiological data using simple statistical and analytical tools	Z	3.6	1.27	3.6	1.32	0.654	0.08
Finds necessary information in professional literature, databases and other health-related sources	Z	3.9	1.26	4.1	1.18	0.044	0.37
Develops a preventive programme according to the methods	Z	3.5	1.40	3.6	1.35	0.207	0.21
Population health and its social and economic determinants							
Uses health condition measures to analyse the population's health and defines population health problems	Z	3.8	1.22	3.6	1.31	0.339	0.17
Makes a diagnosis and indicates key problems for the population health in different social groups	Z	3.8	1.29	3.7	1.36	0.597	0.10
Analyses health condition with regard to social and demographic processes	Z	3.8	1.26	3.7	1.26	0.309	0.17
Has sufficient skills to cooperate with media, the local community and NGOs in implementing health-promoting measures	Z	2.9	1.50	3.2	1.44	0.187	0.20
Population health and its material – physical, radiological, chemical and biological – environmental determinants							
Identifies environmental hazards for the population health	Z	4.1	1.11	4.0	1.15	0.527	0.13
Health policy; economics; organisational theory and management							
Identifies factors affecting the health policy of the state	Z	3.6	1.34	3.6	1.30	0.977	0.01
Categorises basic costs of health care units	E	3.4	1.32	3.4	1.34	0.883	0.03
Uses the results of analyses to propose specific (alternative) solutions in the health protection sector	Z	3.3	1.38	3.4	1.32	0.570	0.09
Analyses selected conditions of health and social problems	Z	3.8	1.23	4.0	1.11	0.065	0.38
Knows the differences between various types of contract for providing health services between payers and service providers	P	3.3	1.40	3.3	1.44	0.858	0.03
Practically follows the rules of law affecting health care business operations	P	3.1	1.42	3.3	1.37	0.105	0.27
Is able to identify political processes and defines their impact on health and health sector problems	Z	3.4	1.27	3.4	1.27	0.396	0.15
Draws conclusions from observations of basic economic phenomena in a micro- and macro-economy scale	E	3.5	1.35	3.4	1.30	0.472	0.12
Uses information about institutions developing a hazard monitoring system and methods for sharing data and communicating information to institutions	Z	3.2	1.38	3.2	1.40	0.980	0.00
Health promotion: health education, health protection and disease prevention							
Presents and evaluates different health promotion concepts and models	Z	4.0	1.07	3.9	1.15	0.886	0.03
Is able to participate in the development and implementation of local projects and actions in the public health area	Z	3.4	1.41	3.3	1.45	0.372	0.14
Uses epidemiological and sociomedical studies to evaluate patients' health needs and expectations	Z	3.5	1.27	3.7	1.28	0.768	0.28
Ethics							
Formulates opinions on social issues	Z	3.5	1.47	3.9	1.14	0.004	0.57
Follows regulations related to property rights and the protection of databases used in the everyday running of health protection entities	P	3.3	1.42	3.3	1.37	0.614	0.09

Table 2 contd.

List of education outcomes related to the students' skills	Area	Mean	SD	Mean	SD	p-value[a]	Effect size[b]
		Evaluation of achieving education outcomes		Graduates' competence self-assessment			
Others							
Applies the methods and techniques learnt to solve specific problems related to communication	I	3.6	1.36	4.0	1.20	0.008	0.44
Is able to use the acquired knowledge for interpersonal purposes when working in a group	I	3.8	1.23	4.1	1.07	0.030	0.37
Improves his/her effectiveness in contacts with other people	I	3.7	1.34	4.1	1.25	0.022	0.38
Formulates own conclusions based on theoretical knowledge	I	3.8	1.38	3.9	1.27	0.305	0.19
Justifies the need to change strategies or priorities	I	3.4	1.36	3.6	1.33	0.312	0.16
Presents his/her knowledge in writing and orally (e.g. giving presentations) on an academic level	I	3.9	1.21	4.0	1.12	0.471	0.14
Works in a team taking relevant group roles	I	3.9	1.20	4.1	1.14	0.128	0.28
Speaks a foreign language – understands the main message in complex texts in specific and abstract topics; understands discussions on topics related to public health	I	3.8	1.26	3.8	1.23	0.768	0.06

[a] Wilcoxon signed-rank test; [b] r coefficient proposed by Cohen; [c] Main chapters of ASPHER's list of European Public Health Core Competences; Z – education outcomes in public health; E – education outcomes in economy P – education outcomes in law; EP – education outcomes in law and economy; I – education outcomes in other sciences.

the social competence domain, in the context of their implementation within the curriculum, as compared to the students' self-assessment, was characterised by the same mean values (Table 3).

Table 3. Evaluation of achieving the education outcomes and self-assessment of graduates' competences related to social competences

List of education outcomes related to the students' social competences	Mean	SD	Mean	SD	p-value[a]	Effect size[b]
	Evaluation of achieving education outcomes		Graduates' competence self-assessment			
Knows his/her competence level and limitations to perform certain job tasks	3.7	1.27	3.9	1.20	0.064	0.34
Identifies problems beyond his/her competences and knows who to ask for help, considering the skills to cooperate with an interdisciplinary team	3.7	1.25	3.8	1.24	0.288	0.19
Demonstrates responsibility for local environment problems	3.6	1.30	3.8	1.26	0.087	0.29
Demonstrates respect towards patients/customers and understands their difficulties	4.3	0.93	4.4	1.03	0.095	0.36
Initiates development and implementation of local projects and activities in the public health protection area	3.5	1.36	3.6	1.36	0.433	0.12
Is an efficient time manager	3.6	1.33	4.0	1.22	0.010	0.48
Spreads the knowledge about public health objectives and tasks	3.9	1.18	4.0	1.15	0.719	0.07
Designs and completes job tasks responsibly, following the rules of OHS	3.9	1.30	3.9	1.25	0.918	0.02
Is able to complement knowledge with skills critically and independently, extending both with an interdisciplinary dimension	3.7	1.29	4.1	1.04	0.013	0.43
Is tolerant and open towards different opinions and stances, determined by different social and cultural factors	4.0	1.15	4.1	1.11	0.456	0.14
Effectively presents his/her opinions, doubts and suggestions, supporting them with arguments but observing the rules of ethics	3.8	1.29	4.0	1.09	0.229	0.22
Acknowledges the role of measures aimed to reduce occupational stress and its negative impact	3.8	1.38	3.9	1.16	0.385	0.15
Demonstrates recognition of the role of lifelong learning and caring for one's own and others' health	3.9	1.30	3.9	1.23	0.992	0.00

[a] Wilcoxon signed-rank test; [b] r coefficient proposed by Cohen.

A statistical analysis revealed that only for the two following education outcomes: *is able to complete the knowledge and skills critically and independently, extending the knowledge and skills with an interdisciplinary dimension* (mean 3.7 vs 4.1; p=0.013); and *is an efficient time manager* (mean 3.6 vs 4.0; p=0.010), the students evaluated their skills higher than the level of achieving the outcomes in the curriculum.

All analysed education outcomes, which turned out to be statistically significant, were characterised by a mean value of Cohen's d standard outcome (from 0.37 to 0.57).

Discussion

Key results

1. Despite the fact that studies in the field of Public Health at the Medical University of Warsaw have for many years a positive opinion of the Polish Accreditation Committee, the study program should be regularly modified depending on the ever-changing economic needs.

2. The results showed the urgent need to modify the first cycle programs, due to the insufficient degree of implementation of learning outcomes and the overwhelming low self-esteem of graduates in the analyzed cognitive domains: knowledge, skills and social competences

3. Introduction of changes in the study program, which will be consistent with the students' needs and labor market requirements, will result in an increase in the quality of education in the field of public health.

4. The increase in the quality of education in the field of public health and the unification of legal aspects of the profession at the health policy level may contribute to better student preparation for work and to the development of new employment opportunities for public health graduates.

Interpretation

The analysis of the obtained results revealed that the questionnaire used in the presented studies is a reliable measurement tool for students' opinions and self-assessment related to achieving education outcomes during the course of Bachelor's degree studies at the faculty of Public Health, Department of Public Health, Division of Health Science, Medical University of Warsaw.

The results of a survey conducted among graduates of B.A. degree studies at the faculty of Public Health, Department of Public Health, Faculty of Health Sciences, Medical University of Warsaw and are presented in the paper revealed an urgent need to modify the curriculum of B.A. degree studies with regard to an insufficient degree of achieving education outcomes and the prevailing negative opinion of graduates in the cognitive domains under scrutiny here: knowledge, skills and social competences.

Evaluation of the level of achieving education outcomes and graduates' self-assessment related to knowledge and skills

In the studied group, six out of 29 statements concerning the evaluation of implementing knowledge on public health in the curriculum were ranked over 4. Similar results were obtained for the students' self-assessment – the students ranked six statements over 4. It should be highlighted that for five statements the ranking was the same and this can be attributed to the majors in the public health area.

In the opinion of the authors, such consistent results are testimony to the superior quality of the courses in the degree and constitute the strength of the B.A. programme. Moreover, the content is repeated in different courses and consolidated throughout the studies, which can also contribute to such a high opinion. With regard to the fact that the outcomes apply to teaching the majors, the result is particularly important from the point of view of the provision of high-quality education at the faculty of Public Health.

Nevertheless, high rating of the educational outcome and graduates' self-assessment applied to only six of the 29 achieved outcomes, while the rest of the educational outcomes ranked much lower. According to the authors, the low self-assessment in the cognitive domain can be attributed to the fact that most of the subjects and the majority of course hours in the B.A. programme are executed in late afternoon, the time of day with the lowest efficiency level when it comes to knowledge absorption. Moreover, attending the lectures is not always obligatory. The statement is also confirmed by the results of a study concerning the graduates' skills, which turned out to be much poorer, in particular when it came to achieving educational outcomes in the public health area. In this case, self-assessment for only three statements was ranked over 4, while achieving the outcomes during the studies was ranked over 4 only in two cases.

The obtained results can confirm that the number of classes motivating the students was not sufficient in the previous curriculum. These included case seminars, classes, project assignments and practical classes in which students could acquire knowledge and develop their skills.

The results concerning the education outcome in the area of law and economy demonstrated that both the evaluation of achieving the outcome within

knowledge and skills, and the graduates' self-assessment were ranked well below 4, and ranged from 3.1 to 3.5. According to the authors, the results are not surprising, since they apply to difficult knowledge areas as are law and economy. As mentioned above, the subjects were mainly taught in theoretical classes and the students did not have enough practical courses to develop relevant skills.

Evaluating the level of achieving the education outcome and graduates' self-assessment in relation to social competences

Another element of the study included an analysis of the graduates' opinion on implementing the content related to developing social skills in the curriculum and the graduates' self-assessment in the area. When comparing the results of self-assessment in the social competences area with the results of studies on knowledge and skills, one notes that they are ranked the highest of all the scales analysed in the questionnaire. The authors are of the opinion that the graduates' self-assessment related to social competences is extremely satisfactory, as it is among the most important factors conditioning success on the labour market. According to the authors, this ranking is surprising, as it contradicts opinions traditionally expressed by employers, who emphasise a lack of skills related to teamwork, communication, negotiation, conflict resolution and creativity in Public Health graduates [18]. In an attempt to interpret this, the authors have identified several possible factors. One of them is that graduates are able to verify their competence level during an internship or their performance while still studying. The literature confirms this thesis but, also, students themselves as well as internship supervisors or employers notice a positive impact of the internship experience on the level of social competences [19]. Due to the nature of social competences, their list is only partly related to public health and is far more universal than the outcomes related to knowledge and skills. Since all students complete their internship, and many of them start working when still studying, it can provide an opportunity for a positive review of one's social competences, which are very important for any profession irrespective of discipline.

Notwithstanding the factors contributing to students' self-esteem in the area of social competences, there is one more important element which needs to be emphasised from the point of view of the curriculum, i.e. the students' opinion of education outcomes in developing their social competences during their studies. In the previous curriculum, the number of classes devoted to the development of social competences was insufficient. The competences were only developed in psychosocial skills courses, comprising 20 seminar hours in year one of studies.

Generalisability of the study results

Following an analysis of the graduate's self-assessment and their opinions on achieving the assumed education outcomes during the Bachelor's degree at the Faculty of Public Health, Medical University of Warsaw, a number of changes which could improve the quality of education were introduced into the curriculum for the academic year 2017/2018. First and foremost, the total number of lecture hours was reduced from 2,900 to 2,600 in favour of seminars and classes to improve students' skills. Moreover, subjects not directly related to achieving education outcomes in the area of public health were removed from the curriculum. These included: *Elements of medical engineering*, *Mathematical methods* and *Biometrology*. The order in which subjects were taught was also changed, e.g. *Microbiology* is now taught in year I instead of year III, as students should complete a course in *Microbiology* before they learn *Epidemiology*. With regard to the low self-esteem of the graduates in relation to economy, a new subject appeared in the curriculum – *Introduction to economic mathematics,* comprising ten hours of classes to be completed directly before *Introduction to economy*.

Modifications in the curriculum also covered the teaching of foreign languages. From 2017/2018 onwards, students will learn two foreign languages for the duration of their B.A.: English and a second foreign language of their choice.

Taking into consideration the very low rating of achieving the outcomes of classes developing social competences, a module called: *Competences expected by employers* was introduced into the B.A. curriculum for 2017/2018. During three years of studies, students will complete a total of 124 hours of the following classes devoted to the development of social competence: *Learning techniques* (10 hours), *Interpersonal communication* (16 hours), *Coping with stress* (10 hours), *Self-management in time* (16 hours), *Speaking in public and giving presentations* (16 hours), *Media communication* (16 hours), *Intercultural competences* (10 hours), *Networking* (10 hours), *Team-building* (10 hours), and *Negotiations and mediations* (10 hours).

Furthermore, changes were implemented not only in the B.A. curriculum but also in teaching methods. According to global trends of student-oriented teaching, the following seven subjects will be taught following the blended-learning formula: *Philosophy and introduction to ethics, Introduction to law, Civil law, Microeconomy, Macroeconomy, Introduction to demography* and *Propaedeutics of public health*. The literature

provides evidence of the positive impact of this form of education on its quality and students' involvement in the educational process [20].

Limitations

A possible limitation of the presented results may be the research tool used, which is an original non-standardized questionnaire. Due to the characteristics of the questionnaire and the study group, the obtained results cannot be compared with any study. However, the construction of the survey and the type of questions asked allows for the introduction of specific solutions in the public health curriculum at Medical University of Warsaw.

Recommendations

The module introduced in the Department of Public Health, Faculty of Health Sciences, Public Health Division, at the Medical University of Warsaw is the only module in Poland, on a B.A. level, which is so innovative and responding to the needs of employers. It also develops students' social competences according to the expectations of the social and economic environment, and external stakeholders. The research presented in this paper will be continued in the coming years in order to assess the effectiveness and efficiency of the education program modified in terms of employers' expectations.

Conclusions

Studies of graduates' self-assessment and opinions on the level of achieving education outcomes during B.A studies can help to modify the academic curriculum following the principles of evidence-based education, and should be carried out regularly in order to keep up with the current needs of the graduates themselves and the labour market requirements. The analysis will be repeated in three years' time among graduates who complete their B.A. programme according to the modified curriculum.

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