

REQUIREMENTS FOR OCCUPATIONAL MEDICINE TRAINING IN EUROPE POSTULATED BY POLISH PROFESSIONALS

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Abstract. In order to determine common key competences required for occupational medicine specialists across Europe, a questionnaire has been developed and disseminated in several European countries.

The questionnaire contained 115 subjects relating to eight fields of activity of an occupational medicine physician (occupational hazards to health, assessment of disability and fitness for work, communications, research methods, management, environmental medicine, occupational health law and ethics, and health promotion). Items in each part were classified into three categories: knowledge, experience and skills. For each of the subjects respondents were asked to allocate a score from 0 to 5, where 0 = not necessary, 1 = of minimal importance and 5 = most important or essential.

In Poland the questionnaire was distributed between two groups of specialists: group I – chief administrators of occupational health services, and group II – relatively younger occupational medicine physicians participating in a specialist training. A comprehensive analysis of the completed questionnaires had three dimensions: (a) substantive (classification of the importance of particular key competences, as perceived by Polish specialists in occupational medicine), (b) personal (differences in opinions among occupational medicine physicians and an attempt to explain these differences in sociological terms), (c) comparative (evaluation and interpretation of similarities and differences between two groups).

A hierarchy of requirements for occupational medicine training in Poland was constructed, with one set of competences recognized by the respondents as needless and others as useful with different grade of importance. Surprisingly, a wide diversity of opinions among respondents has given rise to the explanation hypotheses, some of them being verified using the material gathered.

BACKGROUND

Good occupational health practice is shortly speaking an occupational health practice appropriate to objective needs and subjective demands of the working population. This appropriateness is usually obtained partly by an effective training system and well-defined specialist training programmes for occupational medicine physicians. Nowadays during the ongoing process of European integration this also means that some common key competences have to be met.

The set of such competences in occupational medicine (which may be treated also as a proposed requirements for occupational medicine training) was prepared at the beginning of 1997 on the initiative of the European Association of Schools of Occupational Medicine in collaboration with the Occupational Medicine Section of the Union of European Medical Specialities and the European Network of Societies of Occupational Physicians.

A questionnaire developed, distributed and collected in some European countries, was based on the knowledge, experience and abilities, used in occupational medicine specialist training in the United Kingdom and was similar to that of several other states of Europe (1,2,3,4).

The questionnaire contained 115 subjects divided into eight parts, related to eight fields of activities of an occupational medicine physicians (occupational hazards to health, assessment of disability and fitness for work, communications, research methods, management, environmental medicine, occupational health law and ethics, health promotion). Items in each part were classified into 3 categories: knowledge, experience and skills, considered for the purpose of the study as the elements of professional competence (2,3). For each of the subjects, respondents were asked to allocate a score from 0 to 5, where 0 = not necessary, 1 = of minimal importance and 5 = most important or essential (respondents could also score 2, 3 or 4 if they believed that the topic was of some less or more significant importance).

The questionnaire, translated into Polish, with the supplement containing some general status questions, was then distributed throughout the country among two groups of specialists: group I — chief administrators of occupational health services (physicians — experienced specialists in occupational medicine) participating in a conference held at The Nofer Institute of Occupational Medicine in May 1997, and group II — relatively younger not yet experienced occupational medicine physicians participating in a preparatory specialist training at the Institute. A comprehensive analysis of the questionnaires completed by 48 persons from group I and 41 from group II had three dimensions:

1. **substantive** (classification of the importance of particular key competences, as perceived by Polish specialists in occupational medicine),
2. **personal** (differences in opinions among occupational medicine physicians and an attempt to explain these differences in sociological terms),
3. **comparative** (evaluation and interpretation of similarities and differences between the two groups studied).

On the basis of the analysis, a hierarchy of requirements for occupational medicine training in Poland was constructed, with one set of competences recognized by the respondents as needless and the other found useful but with varying degree of importance to the training programme. Surprisingly, a wide diversity of opinions

among respondents has given rise to the explanation hypotheses, some of them being verified using the material gathered.

The average scores of competence elements and their groups (in various configurations) together with the average scores ascribed by individuals are as a matter of fact **the approval indices of items included in the questionnaire** as the training requirements in occupational medicine specialist training process. At various levels of data aggregation the following two modifications of these indices may therefore be used:

- (a) collective or group approval indices for the whole or some part of the set of competences including the particular competence elements,
- (b) individual approval indices for the whole or some part of the set of competences.

Both kinds of these indices were used in our study to compare the opinions of two different groups of respondents in view of particular competences and their sets. In order to distinguish these two groups one was called an 'experienced' group, and the other an 'inexperienced' group. We would like to present the results of the analysis together with some conclusions drawn from our study.

RESULTS

Table 1 summarizes the results of the analysis concerning **the general level of competences** in eight areas of activities in which occupational medicine physicians are involved.

Table 1. The approval indices relating to particular fields of activity of the occupational medicine physician (average score in a given set of competences) in two groups of respondents

Fields of activity of the occupational medicine physician	Experienced		Inexperienced	
	Avg score	Rank	Avg score	Rank
Occupational hazards to health	4.18	1	4.11	1
Health promotion	4.07	2	3.87	2
Assessment of disability and fitness for work	3.83	3	3.78	3
Occupational health law and ethics	3.80	4	3.38	5
Environmental medicine	3.75	5	3.51	4
Communications	3.70	6	3.33	6
Research methods	3.57	7	2.96	8
Management	3.52	8	3.08	7

The use of the approval index allowed us to clasasify them according to the importance ascribed by the respondents.

At this level of analysis there were no significant differences between the two studied groups. The ranking resulting from the scores of the inexperienced group was similar to that of the experienced group of occupational medicine physicians. For both groups the most important areas of professional activities (also the most important aspects of specialist training) were: occupational hazards to health and health promotion, whereas management and research methods were found least important.

It is worth noting that in all eight areas the average approval indices for training requirements included in the questionnaire were significantly lower in the inexperienced group, with a growing variation at lower grades of importance. In the experienced group all the areas of professional activities included in the questionnaire had the approval indices higher than 3.5 while in the other group only half of them.

The results of the analysis at the general level showed that such qualities as possession of formal specialist degree in occupational medicine, specialist professional experience, and holding a managerial position in occupational health services did not significantly differentiate the distribution of opinions on training requirements in occupational medicine and the grade of importance resulting from this distribution.

However, the lack of these qualities (in the inexperienced group) resulted in a lower approval of proposed training requirements, especially those with lower grades of importance. It is possible though to conclude that **specialist experience in occupational medicine practice together with involvement in the administrative decision making process influence positively the awareness of these areas of activity, which to the less experienced and 'executively oriented' people seem less important or even unnecessary.**

Table 2. The approval indices relating to the types of competences needed in particular fields of activity of the occupational medicine physician (average score in a given type of competences) in two groups of respondents

Types of competences needed in particular fields of OMPH activity	Experienced		Inexperienced	
	Avg score	Rank	Avg score	Rank
Experience related to occupational hazards to health	4.70	1	3.84	6
Knowledge on occupational hazards to health	4.38	2	4.33	1
Knowledge on health promotion	4.22	3	4.11	3
Skills in environmental medicine	4.19	4	3.93	5
Skills referred to occupational hazards to health	4.16	5	4.08	4
Knowledge on assessment of disability and fitness for work	4.04	6	4.18	2
Experience in health promotion	4.00	7	3.83	7
Skills in health promotion	3.90	8	3.52	9
Skills in assessment of disability and fitness for work	3.88	9	3.54	8
Skills in management	3.86	10	3.36	15
Knowledge on occupational health law and ethics	3.84	11	3.44	12
Experience in environmental medicine	3.84	11	3.49	10
Skills in communications	3.82	12	3.36	15
Skills in occupational health law and ethics	3.71	13	3.46	11
Knowledge on research methods	3.70	14	3.04	18
Experience in communications	3.69	15	3.22	16
Experience referred to occupational law and ethics	3.67	16	2.93	20
Knowledge on communications	3.59	17	3.37	14
Knowledge on environmental medicine	3.59	17	3.41	13
Skills in research methods	3.57	18	3.01	19
Experience in assessment of disability and fitness for work	3.54	19	3.54	8
Experience in management	3.35	20	3.09	17
Experience in research methods	3.25	21	2.20	22
Knowledge on management	3.21	22	2.67	21

Table 2 shows the results of a **more detailed analysis taking into consideration particular elements of competences** (knowledge, skills and experience).

Apart from the trends highlighted in Table 1, we can observe here some interesting differences between the experienced and inexperienced groups. In the collective opinion of the former, experience in the area of occupational health hazards was the most essential competence (it gained very high approval index, placing it at the very beginning of the ranking list), whereas in the opinion of the inexperienced group this kind of competence was not so important (only the sixth ranking place). On the other hand all three elements of the **assessment of disability and fitness for work** were more important for the inexperienced respondents. Knowledge in this field of activity was given by them the second place and only the sixth by the experienced ones. Experience in this field was

Table 3. Elements of knowledge, experience and skills in different fields of activity most important in occupational medicine training (elements with the highest approval indices = average scores in a given type of activity) in the opinions of two groups of respondents

Elements of knowledge, experience and skills (elements of competences) — requirements for occupational medicine training (avg scores: 4.5 and more)	Experienced		Inexperienced	
	Avg score	Rank	Avg score	Rank
Knowledge on clinical features and investigation of occupational diseases	4.85	1	4.73	4
Knowledge on physical, chemical, biological, ergonomic, psychosocial and other hazards to health in the workplace, and the illnesses which they cause and related illnesses	4.77	2	4.56	6
Skills in taking a clinical history including a detailed occupational history, and carrying out a clinical examination proficiently	4.73	3	4.83	1
Knowledge on emergency treatment of acute poisoning and injury at work	4.71	4	4.66	5
Experience in clinical assessment of disability and fitness for work in a range of occupations, both preplacement and in workers who have become injured/ill where in post	4.71	4	4.76	3
Knowledge on principles of assessing fitness for work	4.65	5	4.73	4
Skills in undertaking assessments of working environments and identifying hazards	4.63	6	4.15	15
Knowledge on statutory and advisory requirements of fitness for specific jobs	4.63	6	4.78	2
Knowledge on major health risks relevant to the working populations	4.60	7	4.44	9
Knowledge on physical, chemical and biological hazards to health arising in the environment from industrial activities	4.58	8	4.20	13
Knowledge on acts, regulations, codes of practice and guidance governing occupational health and safety including the reporting of occupational injury and disease	4.54	9	4.32	12
Skills in organizing appropriate investigations for the diagnosis of occupational diseases, liaising, if necessary, with doctors in other clinical specialties	4.50	10	4.39	10
Experience in management of workers developing disease or injury in the course of their employment	4.31	16	4.54	7

given the eight place by the inexperienced while the nineteenth place by the experienced (with the same approval index which resulted from the generally lower level of approval in the group of inexperienced).

The next two tables present the results of a more comprehensive analysis of particular items of the questionnaire. It may be of some interest to look at these competence requirements, which were assessed in both groups as most important (approval indices 4.5 and more) and as least important in the process of specialist training (approval indices below 3.00) (Table 3).

In the experienced group 12 items were given the highest collective approval indices (4.5 and more); in the group of inexperienced - only 8, of which 7 were the same as in the former group. It shows a concurrence of opinions in two groups as to the most important training requirements (Table 4).

The proportion of items considered least important in two groups differed from the previous one. In the experienced group only 10 items were given indices lower than 3.00 with as many as 28 in the inexperienced group. Eight items were given in both groups more or less similarly low indices.

The arrangement of competences (or requirements for occupational medicine training) found most and least important in the collective opinions of both groups confirms the conclusions formulated before. In the inexperienced group the scores were lower, which resulted from more frequent unimportance qualification than in the group of experienced physicians.

We would like to draw attention to some interesting methodological details. In the original questionnaire one of the skills in occupational hazards to health was formulated as follows:

“Undertake assessments of working environments, recognize hazards, conduct preliminary quantitative measurements, arrange and interpret more detailed measurements and advise on control measures”.

In the questionnaire addressed to our respondents this competence (this requirement) was divided into two parts:

1. “undertake assessments of working environments, recognize hazards”, and
2. “conduct preliminary quantitative measurements, arrange and interpret more detailed measurements and advise on control measures”.

It has turned out that the first of the two items was among those assessed relatively high (the collective approval index in the experienced group — 4.63, in the inexperienced group — 4.15) but the second one among those assessed extremely low (experienced — 2.56, inexperienced — 2.95). Thus some doubts arose concerning the relevance or reliability of the assessment of such complex items.

Each of our respondents (from both groups) obtained an approval index relating to the whole set of requirements (the average of all scores). These indices were grouped as follows: low (less than 3.00), medium (from 3.00 to 3.99) and high (4.00 and more). Tables 5-7 show the relationship between these approval categories and gender, age and duration of employment within OHS in two groups of respondents.

In general, gender itself had no impact on the approval indices (the way in which competences were assessed). Such an impact was visible only in individual groups taken separately. In particular:

- women from the experienced group more often than men attributed higher scores to the proposed competences,



Table 4. Elements of knowledge, experience and skills in different fields of activity least important in occupational medicine training (elements with the highest approval indices = average scores in a given type of activity) in the opinions of two groups of respondents

Elements of knowledge, experience and skills (elements of competences) — requirements for occupational medicine training (avg scores less than 3.00)	Experienced		Inexperienced	
	Avg score	Rank	Avg score	Rank
Skills in converting a problem into a researchable question	2.98	56	2.41	65
Experience in monitoring absence attributable to sickness	2.88	57	2.46	64
Knowledge on industrial relations	2.88	57	2.59	61
Experience related to participation in audit	2.88	57	2.49	63
Experience related to management of workers with alcohol/drug problems	2.85	58	3.41	38
Knowledge on management structures in different organisations	2.85	58	2.59	61
Experience in at least two organisations/businesses with different structures and styles of management	2.81	59	2.93	52
Knowledge on principles of integrated pollution control and on control of major industrial accidental hazards	2.81	59	3.00	49
Skills in conducting preliminary quantitative measurements, arranging and interpreting more detailed measurements and advising on control measures	2.56	60	2.95	51
Experience in use of basic occupational hygiene equipment	2.42	61	2.98	50
Experience in preparation of written reports on a range of topics for various leaderships such as managers, unions and health professionals	3.54	43	2.98	50
Skills in recognizing and initiating the investigation of clusters of disease in a work force	3.48	46	2.95	51
Skills in reporting on an investigation orally and in writing	3.52	44	2.95	51
Experience in oral presentation to a range of audiences with use of audiovisual aids	3.73	36	2.93	52
Experience in advising on, supporting and monitoring the implementation of occupational health and safety legislation	3.67	39	2.93	52
Knowledge on the role of other professional groups with an interest in environmental health	3.04	55	2.93	52
Skills in recognizing limits of own competence and being able to liaise with a statistician or other expert if appropriate	3.69	38	2.90	53
Experience in providing training	3.69	38	2.90	53
Skills in advising on absence attributable to sickness	3.33	49	2.85	54
Experience in managing a budget	3.19	52	2.80	55
Skills in participating effectively as a member, secretary or chair of a committee	3.40	47	2.78	56
Knowledge on industrial compensation systems	3.15	53	2.76	57
Knowledge on principles and practice of management	3.48	46	2.73	58
Skills in designing a training programme	3.48	46	2.68	59
Knowledge on ethical considerations in research	3.54	43	2.66	60
Knowledge on how to manage a budget	3.33	49	2.56	62
Skills in carrying out simple statistical manipulations to summarise data	3.38	48	2.41	65
Knowledge on designing a training course	3.10	54	2.37	66
Knowledge on principles of audit	3.10	54	2.27	67
Experience in conducting at least one formal scientific investigation including definition of the study question, preparing a protocol, collecting data, analysing data (with help from a statistician if appropriate), interpreting the findings and writing a report	3.25	51	2.20	68

Table 5. The approval indices (average score in the whole questionnaire) and gender in two groups of respondents (%)

Approval index	Experienced			Inexperienced			Together	
	M	W	Total	M	W	Total	M	W
Less than 3.00	13	22	17	29	24	26	19	23
3.00..3.99	52	26	39	36	52	46	46	40
4.00 and more	35	52	43	36	24	28	35	38
	100	100	100	100	100	100	100	100
(N)	(23)	(23)	(46)	(14)	(25)	(39)	(37)	(48)

● as for the inexperienced group the reluctance of some women to assess the proposed competences very high or very low was observed whereas men distributed indices more or less equally in all three categories.

It is worth noting that the experienced group taken as a whole, showed a tendency towards significantly high assessment, while in the inexperienced group we found normal distribution (more medium indices, less high and low indices) (Table 6).

Table 6. The approval indices (average score in the whole questionnaire) and age in two groups of respondents (%)

Approval index	Experienced		Inexperienced	
	under 55 years	55 years and more	under 40 years	40 years and more
Less than 3.00	14	20	37	16
3.00..3.99	43	36	32	58
4.00 and more	43	44	32	26
	100	100	100	100
(N)	(21)	(25)	(19)	(19)

Among experienced physicians relatively older people were inclined to attribute low scores, and relatively younger ones often attributed medium scores.

Among younger inexperienced physicians the approval indices were distributed equally, among relatively older respondents the normal distribution of indices was observed (Table 7).

Table 7. The approval indices (average score in the whole questionnaire) and age duration of employment in OHS in two groups of respondents (%)

Approval index	Experienced		Inexperienced	
	less than 25 years	25 years and more	less than 10 years	10 years and more
Less than 3.00	17	18	20	33
3.00..3.99	39	41	50	44
4.00 and more	43	41	30	22
	100	100	100	100
(N)	(23)	(22)	(20)	(18)

The duration of employment within OHS did not differentiate the scores and approval indices in the experienced group, this is probably due to the fact that in both categories distinguished, the employment was relatively long.

In the inexperienced group, physicians with a longer duration of employment within OHS were conducive to lower, indices and with a shorter duration of employment to higher indices.

It is surprising that the opinions of respondents concerning the importance of competences proposed in the questionnaire were highly diversified. The question arises, what are the differences between estimations of the same group of items done by particular respondents. In other words, who were the physicians whose opinions on the requirements for occupational medicine training differed considerably (sometimes even extremely) from the opinion of others (concerning the general status) in the two groups studied.

To answer this and some other questions not mentioned here we needed to standardize the method of comparison between the respondents with regard to their opinions on the importance of various sets of competences. For this purpose an index of divergence of individual opinions was elaborated (being a sort of reverse or reciprocity of the well-known Spearman's rank correlation coefficient (see Appendix).

Using this divergence index and also some general data on the respondents (gender, age and duration of employment within OHS) we made an attempt to describe in both groups under study the 'social profiles' of 'non-conformists' (persons with the greatest divergence indices) and 'conformists' (persons with the smallest divergence indices). Table 8 shows the results of this comparison.

Table 8. 'Social profiles' of 'non-conformists' and 'conformists'

Individ. opinion divergence index	Experienced	Inexperienced
Lowest indices (conformists)	Relatively older persons (55 years of age and more) with longer duration of employment in OHS (above 25 years)	Relatively older persons (40 years and more) with shorter duration of employment in OHS (less than 10 years) or just starting work in this sector
Highest indices (non-conformists)	Persons not differentiated by the criteria used here	Relatively younger persons (under 40 years) with longer duration of employment in OHS (10 years and more)

CONCLUSIONS

1. Significant differences and similarities, were found both between two groups of respondents ('experienced' and 'inexperienced') and between the individuals. Greater differences and smaller similarities existed between individuals. Opposite trends were observed between the two groups studied.

2. A higher approval of the whole set of competences (requirements for the occupational medicine training) in the experienced group was probably due to the fact that this proposal was prepared by more experienced occupational medicine experts with similar education background.

3. Personal factors influenced the attitudes towards requirements (competences) in a rather selective way. The impact was not very strong but it should be taken into consideration in the analysis of educational behaviour of future occupational physicians.

4. In the opinion of Polish occupational medicine physicians some requirements for specialist training were more important than others and some were less significant or not important at all. The differences in the opinions of the experienced and inexperienced respondents showed that, perhaps, some requirements should play more and others less important role than indicated in the current training programmes. In order to verify this hypotheses two steps should be undertaken. Firstly, the set of competences, serving as a model for the occupational medicine training in Europe should be developed. Secondly, the process aimed at adjusting training programmes to objective needs and subjective demands to be met by occupational medicine physicians in their future work should be successfully implemented.

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APPENDIX

INDEX OF DIVERGENCE OF INDIVIDUAL OPINIONS

Formula:

$$D = \frac{\sum \sqrt{(x_{1...n} - y_{1...n})^2}}{5N}$$

where:

$x_{1...n}$ — is a score ascribed to an item by person X

$y_{1...n}$ — is a score ascribed to an item by person Y

$1...n$ — is a number of item to which the difference between scores relates (the same for X and Y)

N — is a number of items in the assessed block (field of activity)

5 — the constant number in this study (the greatest possible difference between two scores).

The range of the index — **from 0** (total similarity of scores)
to 1 (total dissimilarity: each difference between scores is 5)

Practically, the index value over 0.5 shows great divergence of opinions of two persons.

The average range of indices referring to a given set of items (a given field of activity) shows conformism/non-conformism of opinions of a person or a group of persons in relation to this set of items (this field of activity).

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