

# What do clinicians think of the anatomical knowledge of medical students? Results of a survey

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*Human anatomy is one of basic courses in medical education. It usually takes place during the first year of the medical school syllabus. However, the results of the course, if defined as profound anatomical knowledge, are not applied by the students until several years after the final anatomy examination. The aim of the study was to evaluate the anatomical knowledge of senior medical students. For this reason a survey was distributed among teachers responsible for clinical rotas. The results of the study were intended to give the answer to the question, "What do students remember several years after the anatomy examination?" as expressed by their clinical teachers. The questionnaire included four closed questions and one open question. The closed questions concerned general anatomical knowledge, whether the anatomy course should be extended and whether additional courses should be introduced and included a question about student knowledge of particular systems. The open question concerned ways of improving anatomical education. As a result of the survey it was observed that surgical specialists had a significantly lower opinion of the medical knowledge of their students than had medical specialists. Most of the suggestions for improving anatomical education were related to introducing clinical applications of anatomical knowledge.*

**Key words:** anatomy teaching, medical education, human anatomy

## INTRODUCTION

The course of anatomy is basic to medical education. Not only does it fill most students' lives at the beginning of their medical studies, but it is also one of the first "real" examinations the young student has to pass. The human anatomy course is meant to build a framework for the remaining basic and clinical sciences as well as to prepare future practitioners to understand patients' symptoms and to perform the proper physical examinations.

However, it is difficult to evaluate the influence of anatomical education, which takes place during the first year of a basic sciences course, on everyday medical practice. We therefore considered it valuable to obtain

the opinions of senior clinicians concerning the anatomical knowledge of participants of clinical courses.

## MATERIAL AND METHODS

A questionnaire was prepared consisting of four direct and one open-style question. The questions in the questionnaire concerned general opinions on the students' anatomical knowledge, evaluation of their skills in particular areas and suggestions regarding improvements in the teaching of anatomy.

The questionnaire was distributed among clinical specialists by one of the authors (E.W.). Only physicians involved in teaching medical students were asked to complete the questionnaire.

A total of 96 answers were collected. The answers were grouped according to the department of the respondent. For the purpose of the study respondents were allocated to medical or surgical groups. The medical specialties included in the study were endocrinology, nephrology and internal medicine (39 respondents) and the surgical specialties were general, trauma and vascular surgery, urology, general and paediatric orthopaedics (57 respondents).

The data collected was statistically analysed by means of Statistica 6.0 (Statsoft). The descriptive analysis consisted of an analysis of frequency of given answers for nominal data and mean and standard deviation for ordinal data. The Mann-Whitney test was used for evaluation of ordinal data and the  $\chi^2$  test was used to evaluate differences in nominal data between professional subgroups.

## RESULTS

The results are presented according to questions from the questionnaire.

### 1. Do you think that students attending classes at your department have the proper general anatomical knowledge?

Of all the respondents 32 (33.3%) answered "yes" to this question. Forty seven (49%) felt that the anatomical knowledge of students was inadequate. 17.7% chose the "Hard to say" option. However, the answers differed significantly depending on the professional subtype. The results are presented in Table 1.

### 2. Do you think that the anatomy teaching syllabus should be extended?

Overall, 29.1% of respondents answered "yes" to this question, 49% said "no" and 21.9% had no opinion on this topic. As will be discussed further,

the general view of the respondents was that the amount of the detailed anatomical knowledge should be limited during the course. The majority of the respondents thought the change would be beneficial to the students as they could improve their knowledge of general and practical information.

### 3. Do you think that implementation of additional and optional anatomy courses providing more detailed information would be valuable for students especially interested in the subject?

54.2% of the respondents thought that such courses might be valuable. 26.0% disapproved of the idea and 19.8% had no opinion at all. No significant differences were observed between medical and surgical specialists. Many of the respondents suggested the implementation of anatomy courses which were related to the subjects of clinical training and which could take place during clinical rota. This, in the opinion of most clinicians, would constitute a great improvement in the teaching of anatomy to medical students.

### 4. Evaluation of knowledge of particular systems

The percentage of received answers is shown in Table 2 and presented as frequencies of answers in Figure 1. Analysis of the recognition of the anatomical knowledge of students was performed separately for medical and surgical specialties. The answers given by the respondents who had a firm opinion on student knowledge are presented as means and standard deviations, and the results are presented in Table 3.

### 5. Suggestions for educational improvements

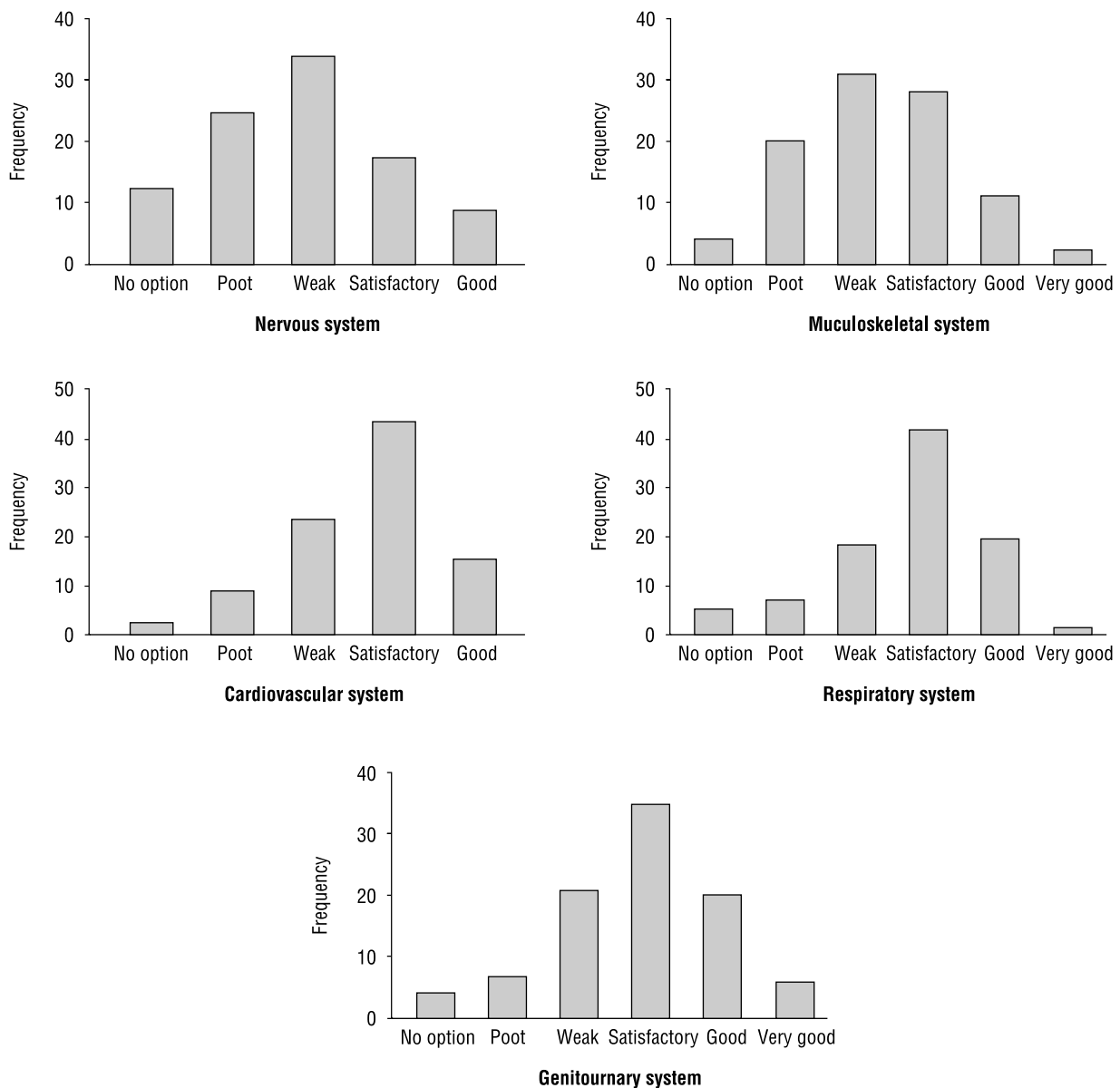
56% of the respondents answered this open-style question. Most of the suggestions (16 out of

**Table 1.** Frequencies of answers to nominal questions according to respondent's specialisation. The values represent the numbers of answers. Statistically significant p values  $\leq 0.05$  of the  $\chi^2$  are marked in bold font

	Question 1. Do you think that students [...] have the proper general anatomical knowledge?		Question 2. Do you think that the anatomy teaching syllabus should be extended?		Question 3. Do you think that implementation of additional and optional anatomy courses [...] would be valuable for students especially interested in the subject?	
	Surgical	Medical	Surgical	Medical	Surgical	Medical
Yes	9	23	17	11	33	19
No	39	8	30	17	13	12
Hard to say	9	8	10	11	11	8
p	<b>&lt; 0.001</b>		0.447		0.625	

**Table 2.** Rating of students' knowledge of particular systems. Values given are percentages

Rate	Nervous system	Musculo-skeletal system	Cardiovascular system	Respiratory system	Genitourinary system
No opinion	11.5	4.2	3.1	5.2	5.2
Poor	26.0	20.8	8.3	8.3	8.3
Weak	36.5	32.3	25.0	18.8	21.9
Satisfactory	17.7	29.2	46.9	44.8	36.5
Good	8.3	11.5	16.7	19.8	20.8
Very good	0.0	2.1	0.0	2.1	5.2



**Figure 1.** Knowledge of particular body systems presented as frequencies of single answers.

**Table 3.** Comparison of mean results of recognition of students' knowledge of particular systems by surgical and medical specialists. Values presented as means  $\pm$  standard deviation. Statistically significant p values  $\leq 0.05$  marked in bold font

Specialty		Nervous system	Musculo-skeletal system	Cardio-vascular system	Respiratory system	Genitourinary system
Surgical specialties	Mean $\pm$ SD	1.88 $\pm$ 0.79	2.24 $\pm$ 0.98	2.44 $\pm$ 0.83	2.62 $\pm$ 0.91	2.71 $\pm$ 0.98
	Z	2.379	1.540	4.183	3.274	2.239
	p	0.017	0.123	< 0.001	0.001	0.025
Medical specialties	Mean $\pm$ SD	2.41 $\pm$ 1.05	2.61 $\pm$ 1.04	3.18 $\pm$ 0.65	3.24 $\pm$ 0.82	3.21 $\pm$ 1.01

Z — result of the Mann-Whitney test

54 answers) concerned implementation of more clinically relevant information in gross anatomy teaching. Some of the respondents (12 out of 54 answers) suggested the introduction of an additional, compulsory or optional clinical anatomy course that would be conducted at the beginning of the second half of medical studies. At this point students are introduced to clinical sciences and identify their skills and fields of interest. Of 54 answers 8 hinted that excess detail should be removed from the anatomical syllabus and that it should include more clinically relevant knowledge. Few respondents mentioned the application of computerised teaching aids as a way of improving the teaching of anatomy.

## DISCUSSION

The low level of anatomical education of medical graduates may definitely result in serious or, even, life-threatening complications. To our knowledge, this is the first study performed in Poland that evaluates the perception of clinical specialists of the anatomical knowledge of medical students and graduates. The discussion regarding the anatomical knowledge of students and medical graduates has continued for some time, especially since the paper by Sinclair [10], who recently warned of the poor anatomical education of medical graduates.

The problem of anatomy teaching resides in its place in the current medical curriculum. The anatomy course typically takes place at the beginning of medical education, when few students have identified their own field of interest. Its placement in the first year of the basic science course results in a significant delay in the application of textbook knowledge into practice. This was also observed by Cottam [2], who noticed that the majority of responding clinicians and heads of residence programmes observed no significant change in the

anatomical education of residents. However, proper anatomical knowledge is a recognised background to safe medical practice, especially in residents [7].

The general course of anatomical training was identified as acceptable by the respondent. Of the clinicians who suggested improvements in the practical part of the course, the majority suggested the traditional dissection-based model of anatomy teaching [3, 4] with just few a voices for new teaching aids such as computer models [5, 12]. Similar opinions are shown in the paper by Older [8], who recently wrote about great importance of dissection-based anatomical training, calling it a "paramount of medical education", influencing the future attitude of the practitioner towards his or her patients.

The trend toward problem-based learning (PBL) has gained ground in medical education as elsewhere, as it is supposed to improve both understanding and memorisation [1]. However, there needs to be a balance between theory and practice. In a recent Dutch study it turned out that PBL students judged their basic sciences, especially anatomical knowledge, inadequate while starting their internships [9]. Generally, the results of PBL students in basic sciences tests are worse than non-PBL ones [11]. The PBL based approach to anatomy teaching should therefore probably be introduced carefully with respect to regular teaching methods.

The overloading of medical education with detailed information has been identified by the British General Medical Council. In a paper published in 1993 [6] it suggested that a limitation in the amount of highly detailed information included in undergraduate medical training might result in an improvement in general medical knowledge.

It is widely recognised that specialisations have narrowed. The amount of detailed knowledge which each

particular specialist has to deal with is considerable. Most of clinical teachers therefore agree that additional detailed courses should be introduced for students interested in particular clinical fields. The idea is a good one, although it may be difficult to implement.

The results of our study indicated an interesting fact that has not been clearly recognised in the previous studies. Perception of an inadequate anatomical knowledge was strictly connected with the surgical specialty of the respondents. Medical specialists in general felt that the knowledge of anatomy displayed by medical students was satisfactory. The difference in opinion between the two groups of respondents can be explained by the fact that surgeons have a better opportunity to check students' anatomical knowledge.

The research resulted in an avid discussion amongst Anatomy Department staff members. The staff were familiar with most of the disadvantages of the course, although it was agreed that an internal audit could significantly improve the quality of the human anatomy course.

The study also revealed the interesting fact that clinicians were keenly interested in the problem of proper anatomy teaching, since its results directly influence students' comprehension of clinical knowledge. This finding is consistent with the conclusions of Waterson and Stewart [13].

Furthermore, our study serves as a reminder that proper anatomical education is essential for medical graduates to practice medicine safely, both in surgical and medical specialties, and any effort taken to improve the anatomical knowledge of medical graduates will be worthwhile.

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