

An assessment of quality of the surgical curriculum in the Pomeranian Medical University in years 2015-2017

Andrzej Żyluk, Zbigniew Szlosser, Piotr Puchalski, Ireneusz Walaszek

Department of General and Hand Surgery, Pomeranian Medical University, Szczecin, Poland; Head: Professor Andrzej Żyluk, MD

Article history: Received: 16.08.2017 Accepted: 15.02.2018 Published: 31.08.2018

ABSTRACT: The objective of this study was assessment of quality of the surgical curriculum in the Pomeranian Medical University in years 2015-2017.

Material and methods. A questionnaire-survey has been conducted in a group of 100 Polish students from the Medical Faculty just before the final test-exam in the subject surgery. Main topics of the questionnaire items concerned students' opinion on the expected usefulness of acquired surgical knowledge for future medical practice, acquired manual skills, range of knowledge learned in particular academic years and on understanding the term „skill/competency-oriented teaching” surgery.

Results. Knowledge from general and oncologic surgery was scored by students the highest when deemed as potentially most useful for future medical practice. Learning manual skills (mostly putting stitches on a pig trotter) was considered the most valuable portion of surgical curriculum. Acquisition of manual skills was also believed as closest to the term „skill/competency-oriented teaching” surgery. The sixth (last) year of studying was considered the most effective in acquiring surgical knowledge. Most responders considered time assigned for teaching surgery in the university curriculum adequate, but not optimally employed. A critical discussion of the results was done in light of the results of earlier studies and the literature.

Conclusions. Outcomes of this study showed the students' expectations in teaching surgery in the medical university curriculum and the grade of its performance. Awareness in this regard may have an effect on modification of the curriculum and methods of undergraduate surgery teaching.

KEYWORDS: surgical education, university curriculum assessment, surgery clerkship

INTRODUCTION

Teaching clinical medicine is a specific task, which consists in providing students with current medical knowledge and elements of medical practice, i.e., principles of diagnosis, decision making and treatment of patients. Teaching surgery traditionally includes the acquisition of practical, manual knowledge, e.g., the science of wound healing, removing seams, immobilizing the limbs, urethral catheterization and assisting in surgery. The proportions between theoretical knowledge and practical skills acquired during surgery courses at medical schools are a frequent subject of discussion, and the so-called „skill/competency-oriented teaching” is considered essential and desirable in training future doctors [1,2,3]. At the same time, this concept, although fashionable and often mentioned by those organizing teaching at various levels, is sometimes understood differently and not necessarily in a proper way, especially by non-surgeons.

From academic year 2016/2017, the surgery curriculum at the Pomeranian Medical University is carried out during the last 3 years of study in a block system; Previously, classes during the 4th year lasted one semester and took the form of hourly exercises. The surgery curriculum includes classes in general surgery, specific fields of surgery and urology. The 4th year includes classes conducted in 4 clinics: 3 surgical and 1 urological. During the 5th and 6th year, the exercises take place in 6 other clinics that have a general surgery and specialist profile (e.g., general and transplant or cancer surgery, etc.). In principle, knowledge of general surgery should be transferred on each of the 4th and 5th years, and during the 6th year - detailed surgical specialties. In practice, all surgical clinics participating in training have a specific profile, which slightly

disturbs the proportion between „general surgery” and specialist curriculum in favor of the latter.

The way the classes are conducted is standardized and includes transfer of theoretical knowledge during seminars conducted within 2 or 3 days before the exercise blocks. During exercise, the practical surgery curriculum involves:

- Examination of patients in patients' rooms and in treatment rooms (e.g., per rectum)
- Work in the operating room (change of wound dressings, performing simple treatments, e.g., removing stitches, application of plaster)
- Participation in work in outpatient clinics
- Classes in the operating theater (learning the surgical approach to „washing” the hands, behavior in the operating room, watching and assisting in surgery, and sometimes stitching the surgical wound. Also examination of fresh preparations of excised organs with pathological changes)
- Classes in the emergency room (usually during on-call time) - conversation and examination of patients referred to the surgeon, planning biochemical and imaging studies
- Practical exercises on models, e.g., learning to sew skin on a pig trotter preparation, learning plastic surgery techniques, e.g., „z” - plastic and sewing stitches
- Simulation exercises on trainers (usually as separate classes taking place during extra-curricular activities)

The scope of activities performed by students during exercises is not the same in each of the training clinics and is to a large extent dependent on the involvement of the instructor conducting clas-

ses, as well as on the head of clinic supervising the course. In principle, it is more desirable to conduct classes in a practical-active form, i.e., to examine patients together with an assistant, to propose treatment and perform manual activities, rather than an observational-passive approach based on, e.g., watching a surgeon operate, viewing a film recorded at the time of operation or participation in a „ceremonial” visit with a professor. It seems interesting to learn about the preferences of students as to how to conduct classes that allow them to acquire knowledge and practical skills useful in their future professional work. It was also interesting to analyze which of the areas of surgery are considered by students as potentially the most useful in practice.

The aim of the work was an attempt to assess the quality of surgery curriculum in 2014-2017, based on a survey conducted among students at the end of a three-year study period.

MATERIAL AND METHOD

The survey was conducted in a group of 100 Polish students of the 6th year of the Faculty of Medicine, prior to the final test exam in surgery. The questionnaire was not given to everyone due to the limited time available for the exam. In addition, it was considered that a 100-person group is sufficiently large (representative) to obtain reliable information on topics of interest to researchers. The time in which the students completed the questionnaire was 15 minutes. The questionnaires were anonymous. The results obtained from analysis of the questionnaire are the basis of this article. The questionnaire for the evaluation of curriculum in the subject of surgery was developed by the senior author of the work (AŻ). Questions for the questionnaire were discussed, modified and accepted or rejected by the team of clinic doctors. Topics of questions included in the questionnaire concerned opinions on specific issues in the context of their potential usefulness for future medical practice, acquired manual skills, knowledge acquired during individual years of study and so-called „skill/competency-oriented teaching”.

A slightly extended version of the same questionnaire was previously used for another study of the quality of surgery curriculum during medical studies [4].

RESULTS

The first two questions in the questionnaire concerned assessment of the benefits that students received during classes in particular fields of surgery and ways of conducting these classes. Definitely the most - as many as 82% of respondents, indicated knowledge of general surgery as potentially the most useful in future professional work; 45% indicated oncological surgery and 29% vascular surgery. Significantly fewer answers pointed to knowledge in urology (14%), thoracic surgery (10%) and hand surgery (6%).

The most valuable way to conduct classes in surgery, i.e., one that made students acquire the most knowledge or skills turned out to be manual exercises (e.g., learning to place sutures on a pig trotter) - 69%. Fewer responses indicated attendance at operations in the operating theater - 39%, exercises at the patient's bedside and discussion of cases studied - 36% and classes in specialist clinics -

32%. However, only 3% of students indicated seminar classes and computer simulations as valuable methods of acquiring knowledge.

The next questions concerned manual activities that the students performed during classes. Most often, they learned surgical sewing on a pig trotter - 74%, examined the abdominal cavity of patients in the emergency room or in the ward - 70% and removed stitches from a real wound - 62%. Less often, they performed a per rectum examination - 39%, stitched a real wound - 36% and performed urethral catheterization - 26%. The least number of students - 15% - applied plaster immobilization to the limb.

Fig. 1 illustrates the number of activities listed in question 4 that students have completed. Almost half of the students (46%) performed at least 4 out of 7 activities, and more than half (54%) performed 3 or less of the above activities.

The next question concerned evaluation of the curriculum's effectiveness during the subsequent years of study. Definitely the highest number of respondents (63%) indicated the 6th year of education as one during which they gained the most knowledge and practical skills, much less (23%) indicated the 5th year and the least (14%), the 4th year.

The next question concerned the meaning of the term „skill/competency-oriented teaching” in surgery classes, according to students.

The highest number of responses (78%) indicated learning of manual activities (sewing, removing stitches, catheterization, catheter application) as the most suitable for the term „skill/competency-oriented teaching”. For 34% of students, this term was associated with performing surgical procedures on models and trainers, for 25% - conversation and examination of patients with selected surgical diseases (e.g., acute appendicitis, hernia, gastrointestinal cancer), and only for 13% of patients learning about operational techniques during classes at the operating theater (observation of operations, assistance in surgery).

The last question concerned evaluation of the amount of time allocated to surgery classes and its use. The majority (66%) of students replied that the number of days for each year provided for surgery is adequate and sufficient to transfer knowledge assumed in the curriculum, but the use of this time is not optimal. One-third (34%) thought that the time spent on the surgery program in college was optimal and well-used.

DISCUSSION

The information obtained in the survey allowed to determine the opinions of students who completed the surgery curriculum in a medical university on the usefulness of knowledge that they learned during the course of studies and ways of its transfer.

The first conclusion concerns the suitability of knowledge from individual surgical disciplines in future medical practice. The results of the questionnaire indicate that knowledge in the scope of „general surgery” and oncological surgery will - according to students - be more useful in medical practice than in more specialized knowledge. This is a result that was rather expected, although for specialist discipline teachers, surgery can be puzzling. Similar

results were obtained in our earlier work, in which doctors' opinions were examined a few years following graduation, regarding the suitability of knowledge of particular surgical specialties in current medical practice [4]. Regardless of the future specialty chosen by the physician, the basic information resource of general and oncological surgery is a valuable element of medical education.

The second application concerns assessment of the value of individual methods of conducting surgery classes in the context of acquiring useful knowledge and skills. This problem is a bit more complex and the results of the survey are quite surprising. The students assessed manual exercises (e.g., learning to put sutures on a pig trotter) as the most valuable, considerably less (but also a lot) of respondents considered classes at the operating theater to be most useful. In our previous work, a few years after graduation doctors indicated that they had gained the most useful knowledge during classes in specialist clinics and exercises at bedside. These are traditional methods of educating doctors, requiring commitment and contact with an experienced teacher. Manual skills were placed in third place in the ranking of usability, and knowledge obtained in the operating block - on last place [4]. Similar observations can be noticed in the literature [1,2]. In the work of Kaur et al., the students' most preferred method of teaching practical surgery was discussion of examined cases in order to arrive at a proper diagnosis and therapeutic proposals - developed by students during discussion with the group supervisor [5]. It was also very important in doctors' later practice to sensitize students to the threat of malignant tumors, the so-called „oncological vigilance” [3,4]. High evaluation of manual skills (this mainly concerns sewing on a pig trotter) results from the natural fascination that accompanies the learning of simple surgical operations. It should be emphasized that for doctors specializing in surgical disciplines, practical skills acquired during studies are of little importance, as the curriculum forces them to assimilate quickly during the first weeks of work. However, for doctors who choose non-surgical disciplines, manual skills acquired during the course of study are the only opportunity to have a „taste” of practical surgery. Usually, however, in the course of non-surgical specialization, they are not continued and are gradually forgotten.

However, it is hard to explain the high place that students gave to activities at the operating theater. Watching and assisting in surgery at the beginning is an attraction for students, but - if it is the main element during the surgical block, it usually gets boring quickly, which results from limited possibilities of „viewing” the operating field by a group of 6 students (often most of them only see the backs of surgeons). Laparoscopic operations are much more extensive in this respect. Even if a student sees the operating field, he often looks (in the case of the abdomen) on a mass of intestines difficult to identify, which the operator prepares, cuts and sews; however, for the student, it is usually „dark magic” (the senior author of the work remembers this from his student experience and from the first years of work). Therefore, the usefulness of such an experience for general medical education is questionable, which is confirmed by opinions from the literature [6]. This way of conducting classes is popular in most Polish universities and results from the necessity to participate in operations of assistants conducting classes. For a group of students standing behind the back of the operational team and trying to see something, it is usually time wasted. The authors do not suggest that students are not to be taken into the operating theater for assistance. However, it is

Knowledge of which of the below mentioned surgical disciplines will in your opinion be the most useful in future professional career

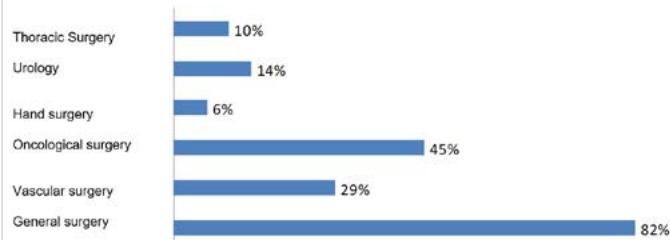


Fig.1. Chart illustrating answers to question 1 in survey.

What method of conducting surgery classes do you think is the most valuable, meaning one thanks to which you have acquired the greatest knowledge or skill

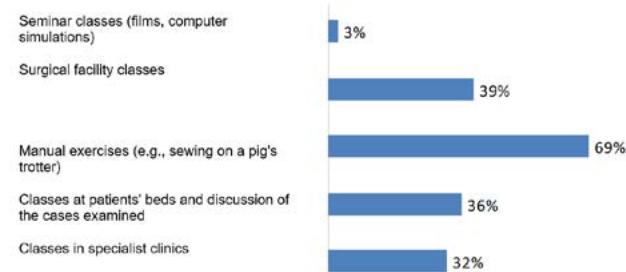


Fig.2. Chart illustrating answers to question 2 in survey.

What manual activities have you performed in surgical classes

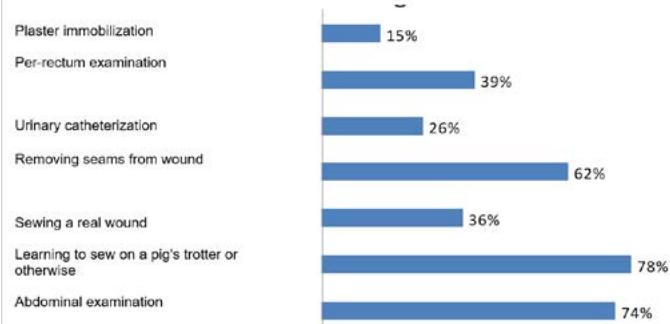


Fig.3. Chart illustrating answers to question 3 in survey.

best to show them simple operations understandable by a non-surgeon (e.g., inguinal hernia or excision of the appendix) or those in which students can examine (touch, cut) a dissected organ, e.g., a gallbladder or part of a large intestine with a tumor. Then such classes can actually give an idea of a surgical disease, the way it is treated, and can be remembered.

The results of the survey also indicated that seminar classes (including films and computer demonstrations) are very poorly evaluated in the context of acquiring useful knowledge. This is a significant observation that may come as a surprise to the organizers of academic education who advocate the transfer of medicine cur-

Tab. I. Survey assessing the teaching curriculum in the PUM study program

PLEASE SELECT ONE OR MORE ANSWERS, CIRCLE THE ANSWER OR PLACE A MARK NEXT TO IT.

1. Knowledge of which of the following surgical disciplines will be most useful in your future professional work:

- general surgery
- vascular surgery
- oncological surgery
- urology
- thoracic surgery
- hand surgery

2. Which way of conducting surgery classes do you believe to be the most valuable, i.e., one thanks to which you will acquire the most knowledge or skills that will be useful in future work

- operating theater classes - assisting in surgery
- classes in specialist clinics
- bedside classes (conversation and examination of patients) and discussion about cases studied
- manual exercises (sewing on a pig trotter)
- seminar classes (films, computer simulations)

3. What manual activities did you perform during surgery classes?

- learning to sew on a pig trotter model or other
- sewing a real wound
- removing seams
- catheterization of urinary bladder
- per rectum examination
- abdominal examination
- application of plaster immobilization

4. How many of the activities listed in point 3 did you complete during 3 years of surgery education?

- all
- 6 of 7
- 5 of 7
- 4 of 7
- 3 of 7
- 2 of 7
- 1 of 7
- none

5. On which year of the 3 years of studies did you gain most knowledge in surgery?

- 4th year
- 5th year
- 6th year

6. What do you understand by „skill/competency-oriented teaching”?

- learning manual activities (sewing, removing stitches, catheterization, catheter application)
- learning operational techniques (at the operating theater, observation of operations, assistance in surgery)
- interview and examination of patients with selected surgical diseases (acute appendicitis, hernia, follicular cholezystitis, gastrointestinal cancers) and thus acquiring knowledge about surgical problems and practical skills that may be encountered in future professional work, regardless of the specialty to be pursued
- performing surgical procedures (even advanced) on models and simulators

7. Do you think that the time spent on learning surgery at PUM is adequate to the scope of content transferred?

- the time is adequate and well used
- the time is adequate, but its use is not optimal

riculum from clinics to demonstration halls, where education of skills would take place on models and simulators. Such a trend is observed in highly developed countries and begins to be present at our universities [7,8]. It seems reasonable to note that - while the exercises on models, simulators and trainers, sometimes technically advanced and allowing for *in vitro* „intubation”, endoscopy, laparoscopic cholecystectomy, are valuable in postgraduate and specialized training, their usefulness for general medical practice is questionable.

Another conclusion concerns the number and type of manual activities performed by students during exercises. Most often it was putting sutures on a model of a pig trotter, abdominal examination (although one can have doubts whether it is a surgical skill) and removing seams from a wound. Quite surprisingly, 1/4 of students did not perform any of these activities during their three years of study! The program of sewing wounds on a pig trotter model was introduced several years ago and it seemed to us that the students would practice this skill several times over a three-year training program. The same is true for „surgical” examination of the abdominal cavity, which the student should perform several times during exercises in one year. However, it turned out that our ideas are quite far from reality. This is confirmed by the answers to the next question regarding the number of manual activities performed from the attached list. Only 10% of respondents „completed” 6 and 7 activities, and more than half performed only 3 or less. This result testifies to the need to increase involvement of assistants conducting exercises in the „preparation” of the curriculum, as well as supervision of clinic managers on the implementation of this program.

Another conclusion concerns the benefits of teaching during subsequent years of study. The vast majority of respondents (63%) indicated the 6th year of study as the one on which they gained the most knowledge and practical skills. It is a year of learning specialist disciplines, during which students circulate between 6 clinics with a defined profile: thoracic surgery, cardiac surgery, hand surgery, transplantology, vascular surgery and oncology. Such a result seems to contradict previous student declarations that „general surgery” knowledge and oncological surgery will be the most useful for them in future professional work. However, the noticeable trend (most knowledge acquired in the examination year, least during exercises from 2 years ago) may indicate the significance of memory as an important argument affecting the assessment of teaching effectiveness: it is easier to remember what is „fresh” than what is distant. Confirmation of this pheno-

menon are the observations of the older author from exercises with 5th- and 6th-year students, when - during discussion about some current surgical problem - an anatomical, biochemical or physiological context appeared. It was only exceptionally that students remembered information from the 1st or 2nd year of curriculum, sometimes very basic (e.g., from what and where urea is produced, what the blood supply of the small intestine is, what the venous outflow from the small intestine looks like, etc.). Therefore, interpretation of very poor assessment of the first year of surgery in the fourth year of study should be made with caution (though it should not be underestimated).

Another conclusion concerns the meaning of the term „skill/competency-oriented teaching” of surgery curriculum, which for most (more than 2/3) students is associated with learning of manual activities, and for 1/3, with simulation of surgical procedures on models and simulators. Regarding the first aspect, this is a result which is a repetition of the answers to previous questions and which confirms opinions from the literature [1,2]. On the other hand, the moderate success of teaching „virtual” surgery results probably from the lack of such experiences among the majority of surveyed students and their ideas about the value of such a teaching method.

The last point of the questionnaire concerned evaluation of the time devoted to surgery exercises in the medical studies curriculum. The majority of respondents answered that the time spent in the classroom for teaching surgery is sufficient to transfer knowledge provided for in the curriculum, but its use is not optimal. Such an assessment could have been expected and - probably - it may concern the majority of „large” subjects taught in medical studies. We believe that the answer of 1/3 of respondents that the time spent on training in the field of surgery was well used is a good result, indicated good preparation of the curriculum and teachers implementing the program. However, it leaves room for action to improve the effectiveness of education so that these proportions can be reversed.

CONCLUSIONS

Obtained results show the expectations of students in the field of surgery curriculum during medical studies and the degree of their implementation. The demonstration of some shortcomings should have an impact on the modification of curriculum and methodology of surgical training during the course of studies.

REFERENCES:

- Garner M.S., Gusberg R.J., Kim A.W.: The positive effect of immediate feedback on medical student education during the surgical clerkship. *J. Surg. Educ.* 2014; 71: 391–397.
- Hamaoui K., Saadeddin M., Sadideen H.: Surgical skills training: time to start early. *Clin. Teach.* 2014; 11: 179–183.
- Force J., Thomas I., Buckley F.: Reviving post-take surgical ward round teaching. *Clin. Teach.* 2014; 11: 109–115.
- Żyluk A., Puchalski P., Szlosser Z.: The usefulness of the surgical knowledge and skills acquired via the university curriculum for doctors’ medical practice several years after graduation. *J. Surg. Educ.* 2015; 72: 509–514.
- Kaur N., Gupta A., Saini P.: A needs assessment study of undergraduate surgical education. *Natl. Med. J. India.* 2011; 24: 292–293.
- O’Neill R., Shapiro M., Merchant A.: The role of the operating room in medical student education: differing perspectives of learners and educators. *J. Surg. Educ.* 2017. Doi: 10.1016/j.jsurg.2017.06.013.
- Bauer F., Rommel N., Kreutzer K., Weitz J., Wagenpfeil S., Gulati A., Wolff K.D., Kesting M.R.: A novel approach to teaching surgical skills to medical students using an ex vivo animal training model. *J. Surg. Educ.* 2014; 71: 459–465.
- Schneider E., Schenarts P.J., Shostrom V., Schenarts K.D., Evans C.H.: „I got it on Ebay!“: cost-effective approach to surgical skills laboratories. *J. Surg. Res.* 2017; 207: 190–197.

Word count: 3220 Page count: 6 Tables: – Figures: 3 References: 8

DOI: 10.5604/01.3001.0011.8177 Table of content: <https://ppch.pl/issue/11208>

Copyright: Copyright © 2018 Fundacja Polski Przegląd Chirurgiczny. Published by Index Copernicus Sp. z o. o. All rights reserved.

Competing interests: The authors declare that they have no competing interests.



The content of the journal „Polish Journal of Surgery” is circulated on the basis of the Open Access which means free and limitless access to scientific data.



This material is available under the Creative Commons - Attribution 4.0 GB. The full terms of this license are available on: <http://creativecommons.org/licenses/by-nc-sa/4.0/legalcode>

Corresponding author: Prof. dr. hab. Andrzej Żyluk; Clinic of General and Hand Surgery, Pomeranian Medical University in Szczecin, Poland; e-mail: azyluk@hotmail.com

Cite this article as: Żyluk A., Szlosser Z., Puchalski P., Walaszek I.: An assessment of quality of the surgical curriculum in the Pomeranian Medical University in years 2015-2017; Pol Przegl Chir 2018; 90 (4): 17-22
