SURGERY COURSE EVALUATION. EXPECTATIONS OF MEDICAL STUDENTS IN SURGERY ROTATION? FROM BENCH TO BEDSIDE

MARcin ŚNIadecki1, Marta KiSZKIELIS2, Dariusz WyDRA1

Chair and Department of Gynecology, Gynecologic Oncology and Gynecologic Endocrinology,
Medical University in Gdańsk1
Kierownik: dr hab. D. G. Wydra
Memorial M. Skłodowska-Curie Independent Public Provincial Hospital in Szczecin2
Dyrektor: dr n. med. M. Pietrzak

The curriculum of the Medical Faculty is a result of a compromise between the need to upgrade and extend the material and the immutability of study duration. In result of reduction of time for acquisition of basic practical skills.

The aim of the study was to evaluate the current curriculum by students and answer the question: What are the students’ expectations of teaching surgery? and to compare the opinion in two academic centers in Poland.

Material and methods. The survey embraced 85 students of the Medical Faculty of IV (25.9%), V (22.35%) and VI (51.75%) year of the Medical University of Gdańsk and VI year students of the Pomeranian University of Szczecin (PUM- 34%). Students completed a 19-item questionnaire, send by e-mail. Questions were closed (yes / no or grades 1-5) with the option of opinion adding to each item. The Statistica (version 9) package for calculations was used. Differences with p<0.05 was considered statistically significant. Qualitative data (opinions) were prepared in the form of summary tables, generalized or quoted.

Results. Satisfaction with the education of students amounted to 2,1-2,4 (on a scale 1-5). There is a weak association between gender and choice of surgical specialties. Declaring an interest in surgery does not affect the assessment of classes. Most students believe that the amount of theoretical classes is sufficient, there is lack of practical classes. Among procedures they want to learn, most often were mentioned: bladder catheterization, suturing, wound treatment and putting stomach tube. Additionally, they pay attention to the lack of affordable learning materials.

Conclusions. Students expect a full „non-corridor” utilization of classes, learn and practice the basic and most frequent activities at the patient. They are dissatisfied with the current training methods, and would be taught in a diverse and active way.

Key words: surgery, teaching, learning, students, medicine

* The authors declare the study was not financed from any sources
has been noticeable for a long time now. Edu-
cation in surgery in those countries is focused
on the process of developing the skills that
enable a confident start in medical practice (1).
Therefore, it seems important to consider the
options of performing selected medical proce-
dures during block classes in surgery (on
phantom models and later on patients) under
the supervision of departmental assistants.
Practical skills cannot be learnt even from the
best textbooks. Entries in the “Medical student
practical skill record” often do not prove the
ability to correctly perform the listed proce-
dures.

A more structured surgery curriculum
would enable the acquisition of necessary
practical skills defined at individual education
stages. The American and German experience
in this area constitutes interesting examples
of creating such curricula. This trend is sub-
scribed to by, among others, the teachers from
the Surgical Clinical Correlates In Anatomy
course for American students of 1st year in
Medicine, which from the very beginning
teaches the students clinical thinking and
directs them towards selecting the appropriate
specialisation (2).

Yet another American university has pre-
pared the list of essential skills, based on the
experience of teachers and students alike,
known as the “Stanford 25 Initiative” (3). In
Poland, science clubs operate in a similar man-
ner, focusing on selected, specific for the given
class, skills. However, in order to gain the skills
necessary in basic medical practice, each stu-
dent would have to join all the clubs. Which,
of course, is not possible. Participation in such
classes results mainly from personal student
interests, although, some of the members are
young people feeling they receive inadequate
practical knowledge in the standard education
system.

A different approach to teaching is exhibited
by the University of Freiburg, Germany, where
the education system is subject to standardisa-
tion (the so-called AO – Approbationsordnung),
there are no science clubs, and the students
write their thesis (doctoral thesis) while at the
University. The classes in series of blocks on
particular subjects focus on the medical com-
plaints most commonly encountered in practice
(they knowledge and algorithms of manage-
ment are evaluated by a practical test consist-
ing of several “stations” – cases – i.e. by the
so-called Objective Structured Clinical Ex-
amination, OSCE). Students feeling the need
for contact with medical practice can partici-
pate in duty hours of their senior colleagues.

Over the past few years, the role of “e-
learning” and IT systems for patient manage-
ment and medical history maintenance has
increased in medicine. In the future, it will
result in less time spent with the patient and
thus in the lowering of skill level. Therefore,
the limited time available for education should
be utilised to the maximum, with particular
focus on practical classes owing to which the
student may feel adequately prepared for
practicing medicine.

The aim of this study was the evaluation of
the current state of affairs and the expecta-
tions of students from the Medical Faculty of
the Medical University in Gdańsk and the
Pomeranian Medical University towards edu-
cation in surgery. It was to determine wheth-
er the suggested educational solutions pre-
sented in the questionnaire meet with stu-
dents’ approval and what, in their opinion,
should the balance between theory and prac-
tice look like. The authors also aimed at pro-
viding material for discussion on this issue,
which would enable the comparison of expecta-
tions of medical students with the require-
ments of faculty members. In result, students
could see notable benefits of improved medical
care quality, while education itself would be
the source of passion and satisfaction. It could
also prove useful in preparing the list of es-
sential skills in other specialisations.

MATERIAL AND METHODS

The materials were answers to questions
included in the survey form: “Evaluation of
and expectations for surgery education of stu-
dents from the Faculty of Medicine, Medical
University in Gdańsk”. The questionnaires
were distributed by the student group tutors
among the 4th-6th year medical students who
had completed the surgery block course for the
given year (academic year 2007/2008). The
anonymous survey covered 19 questions con-
cerning surgery education (content, organisa-
tion and manner of conducting classes). There
was also an option of providing individual com-
ments to each question. The form contained
general and detailed questions, i.e. about the
respondent’s gender and year (questions 1. and
2.), level of meeting the expectations for surgery education (3.), specialisation plans (4.), percentage of class use (5.), attendance at lectures and opinions on such classes (6.-8.), list of procedures every physician should be able to perform irrespective of chosen specialisation (9.), list of tests and diagnostic procedures every physician should be familiar with irrespective of chosen specialisation (10.), opinions on: the distribution of different forms of classes (11.), the course of a day of classes (12.), brochure with guidelines on skills acquired upon the completion of a surgery course (13.), usefulness and content of the surgery course book (14.-15.), how the examination topics discussed during lectures affect the attendance (16.), how the presentation of clinical cases affects the attendance at lectures (17.), extracurricular broadening of knowledge (18.), seminars addressing the most common patient complaints in surgery (19). The criteria for selecting the questions were their similarity with topics from the surgery course in Germany (University of Freiburg) and versatility, i.e. selection of at least one examination and one procedure which are generally medical, or could be specific for a given department or be of clinical significance. The suggested procedures to be learnt by students were partially derived from the curriculum of surgery course for medical students at the University of Freiburg (4), attended by one of the authors (MS) under the SOKRATES/ERASMUS (LLP) scheme in the academic year 2006/2007. Students from the University of Freiburg can learn about the above procedures from a demonstration movie and practice, e.g. on a gastroscopey phantom model, knee arthroscopy phantom model, or on the presentation participants (the assistant, themselves and fellow students) the focused abdominal sonography for trauma (FAST) principles in the University Medical Admissions Department. The remaining examinations and procedures were suggested by members of science clubs and the study authors upon consultations with specialists, interns and students of the Medical University of Gdańsk (MUG). For the purposes of comparison of evaluation results and expectations of students from the Medical University of Gdańsk, the survey was also conducted among the students from the Pomeranian Medical University (PMU) over a similar period.

**Statistical methods**

Student’s t-test was used for quantitative analysis. The correlation between the groups and evaluated characteristics for qualitative data was tested by the chi-squared test (corrected for numerical strength). The result with the significance level $p < 0.05$ was deemed statistically significant. All calculations were performed with the use of STATISTICA 9 software, the Polish version.

**RESULTS**

There were 85 medical students (56 4th-6th year students from MUG and 29 6th year students from PMU) participating in the survey. Table 1 (questions 1. and 2.) presents the characteristics of student population taking part in the study. The percentage of males and females did not differ between the 6th year student groups from both Universities.

In question No 3, about meeting the expectations for surgery education, students were inclined to select “does not quite meet them” (mean of 2.089 in the MUG group and 2.3793 in the PMU group, with possible answers from 1 to 5; $p = \text{NS}, t$-test for independent variables). In the MUG group, those most satisfied were the 5th year students, while the satisfaction of 6th year students dropped below the level of those starting their surgery education (Chart 1). Only one individual (in the PMU group) answered that the surgery education “definitely meets” the expectations. There was no statistically significant correlation between the
student affiliation with a given university and their specialisation plans in relation to surgery (question 4 about the specialisation plans) – a similar percentage of students in both groups planned to undertake surgical specialisation (51.7% PMU and 51% MUG, \( p = \text{NS} \), chi-squared test). However, a weak correlation between the gender and specialisation plans related to surgery was observed \( (V^2 \text{ test value} = 3.11, \ p = 0.078) \). Students from Gdańsk and Szczecin evaluated the time utilised in classes similarly \( (t \text{-test}, \ p = 0.925) \). Its mean value was 33.9\% (5\%-99\%) for PMU and 33.5\% (0\%-75\%) for MUG of the time used in classes (question No 5). According to the evaluators, the selection of surgical specialisation has no impact on the level of satisfaction with classes.

Among those wishing to specialise in surgery, 33\% were satisfied with classes, while among those not planning to undertake such specialisation – 34\% \( (p = 0.85119, \ t \text{-test}) \). There was no correlation observed between the level of meeting the expectations towards the course and the planned selection of surgical specialisation \( (p = 0.16489, \ \text{chi-squared}) \) either. Due to the difference in question No 6 concerning attendance at lectures (there are no lectures in surgery for 6th year students at PMU), it was not possible to perform the comparison between the two groups. However, the percentage of those not attending lectures at MUG was higher than the percentage of students believing that seminars at PMU are not worth attending \( (65.5\% \text{ vs } 35.7\%, \ p = 0.0098, \ t \text{-test}) \). The majority of students in both groups believed that there was a sufficient amount of theoretical classes (69% PMU and 85% MUG, question No 7) offered. However, the difference in the percentage of opinions on the number of seminars or lectures between the groups was not statistically significant \( (p = 0.09, \ t \text{-test}) \). All students from the PMU group deemed the offered number of seminars necessary, while only 64.15\% of MUG students judged the number of lectures as useful (question No 8). That difference was statistically significant \( (p = 0.0002) \).

Table 2 presents the procedures which, according to students, every physician should be able to perform irrespective of specialisation (question No 9, students marked “yes” or “no”). The most highly rated in both groups were the urinary catheterisation and suture removal. In the MUG group, wound dressing also ranked high, while in the PMU group the required skills ranking third were the gastric probe insertion and gastric lavage. The least frequently selected skills included the insertion and maintenance of surgical drain (pleural, peritoneal), pericardial puncture, removal (resection) of a small skin lesion with tissue margin. Students differed in their opinions only on the issue of wound dressing. The tests and diagnostic procedures every physician should be familiar with irrespective of specialisation (question No 10) included, in order from the most frequently marked with “yes” to the least frequently selected (combined MUG and PMU answers): the FAST method (94\% of respondents), the assessment and interpretation of cervical smear according to the Bethesda system (57.3\%), endoscopy of upper (46\%) and lower gastrointestinal tract (41.5\%), barium/uroplolinum enema (39\%), diagnostic laparoscopy (28.3\%), knee arthroscopy (22\%), shoulder arthroscopy (20.7\%). A correlation was observed between gender and the frequency of selecting the skill of assessment and interpretation of cervical smear \( (p = 0.01961, \ \text{chi-squared test}) \). The students indicated in the questionnaire what percentage of hours they should, in their opinion, be allocated to individual forms of classes (question No 11). Lectures should account for, respectively: 5.38%...
Table 2. Procedures every physician should be able to perform irrespective of splenization

<table>
<thead>
<tr>
<th>Procedure</th>
<th>“Yes” answered by MUG students (%)</th>
<th>“Yes” answered by PMU students (%)</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urinary catheterisation</td>
<td>100</td>
<td>96,55</td>
<td>ns</td>
</tr>
<tr>
<td>Collection of arterial blood sample for abg and assessment of obtained results</td>
<td>92,86</td>
<td>89,6</td>
<td>ns</td>
</tr>
<tr>
<td>Wound dressing – stitching, dressing with the use of basic and specialist dressing materials</td>
<td>98</td>
<td>79,3</td>
<td>p=0.0032</td>
</tr>
<tr>
<td>Suture removal</td>
<td>100</td>
<td>96,6</td>
<td>ns</td>
</tr>
<tr>
<td>Abscess incision</td>
<td>78</td>
<td>76</td>
<td>ns</td>
</tr>
<tr>
<td>Decompression of inflammatory infiltration in the wound</td>
<td>78</td>
<td>82,7</td>
<td>ns</td>
</tr>
<tr>
<td>Gastric probe insertion – gastric lavage</td>
<td>83,6</td>
<td>93,1</td>
<td>ns</td>
</tr>
<tr>
<td>Knowledge on immobilising dressings</td>
<td>91,1</td>
<td>89,6</td>
<td>ns</td>
</tr>
<tr>
<td>Enema in intussusception</td>
<td>59,3</td>
<td>62,1</td>
<td>ns</td>
</tr>
<tr>
<td>Pleural puncture</td>
<td>72,7</td>
<td>78,6</td>
<td>ns</td>
</tr>
<tr>
<td>Peritoneal puncture</td>
<td>52,7</td>
<td>55,2</td>
<td>ns</td>
</tr>
<tr>
<td>Pericardial puncture</td>
<td>51,85</td>
<td>41,4</td>
<td>ns</td>
</tr>
<tr>
<td>Insertion and maintenance of surgical drain (pleural, peritoneal)</td>
<td>50</td>
<td>55,2</td>
<td>ns</td>
</tr>
<tr>
<td>Removal (resection) of a small skin lesion with tissue margin</td>
<td>51,85</td>
<td>55,2</td>
<td>ns</td>
</tr>
</tbody>
</table>

and 3.6%, practical classes in departments: 29.3% and 30.3%, assisting during surgical procedures: 25.4% and 27.06%, seminars (as “discussion on clinical cases”): 20.8% and 19.31%, duty hours: 15.2% and 15.17%, other forms of classes: 1.6% and 3.28%. The differences between the groups were not statistically significant (t-test). When asked “what should a week of classes in the surgery department consist of?” (question No 12), the MUG and PMU students answered in a similar manner: patient examination course (demonstration, practicing the techniques, unassisted examination of the patient): 98% and 86% ($p < 0.05$), patient medical history taking and discussion of the case with the physician conducting the classes: 42.8% and 50%, participation in the medical visit (round): 69.6% and 68%, duty hours (4 h), assisting during surgery or classes in a clinic (to choose from by 2 students in a group of 6): 98.2% and 93%, seeing patients together with the duty surgeon in the Emergency Department: 98.2% and 93%, seminars – cases, e.g. the most common problems with patients: 94.6% and 81% (case report ($p = 0.0511$), seminars – the most common reasons for patient admittance to the department: 92.9% and 83%, surgical stitching course (conducted in the 1st week of classes by one of the departments for all the students from the class block): 98.2% and 93%, ultrasound examination for surgical purposes course: 94.6% and 86%. The differences between the groups (with the exception of patient examination course) were not statistically significant.

A brochure discussing the issues deemed fundamental and universal for medical students, the knowledge of which should be obligatory after a surgery course, would be received by the majority of students (76.4% MUG and 75% PMU) rather well or very well (question No 13). A short course book (between a dozen or so and twenty-something pages) containing the description of basic diagnostic and medical procedures would prove useful for even more students (94.6% MUG and 93.1% PMU; question No 14). Such a publication would contain the description of the same procedures as those listed earlier (100% of answers in both groups; question No 15). Examination questions covering only the material discussed during lectures had small impact on the decision to attend them (55.2% of MUG students and 52.72% of PMU students answered “rather yes” and “definitely yes”, question No 16). It should be noted that presentation and discussion on case reports during lectures would induce higher motivation in students (67.2% MUG and 69% PMU answered it would quite or definitely influence their attendance at lectures – question No 17). The difference between the two motivating factors was not statistically significant ($p = 0.4828$). 41.8% of MUG students and 34.5% of PMU
students supplemented their knowledge on surgery, e.g. through participation in science club activities or through taking duty hours (question No 18). The majority of students (87% MUG and 89.65% PMU) judged as relevant the seminars addressing the issue of questions most frequently directed by surgical patients to physicians (question No 19).

Table 3 presents the most common opinions in terms of education as a whole and specific issues or questions. The discussion section elaborates on the obtained results and is supplemented with student opinions.

**DISCUSSION**

O’Herrin and colleagues, in their survey conducted on a similar group of students, have shown that students’ interest in a career in surgery rose after the course (7% vs 40%) (5). The biggest influence on their interest was the large number of cases in which they could be involved, and the smallest – rounds. In the present survey, almost the same number of students after a surgery course was interested in surgical specialisation as not (approx. 51% vs 49%). The lack of correlation between the level of meeting the expectations for the course and the declared choice of surgical specialisation suggests that higher interest in surgical specialisation does not translate into satisfaction with the course. Similar results have been obtained in an American study which has shown that the level of competence at university had no bearing on the selection of surgery as specialisation (6). All the students from the PMU group deemed seminars necessary, while only slightly more than a half of MUG students believed lectures were necessary. However, this does not indicate that seminars are superior to lectures, since there are no lectures offered at PMU during the 6th year of studies. Still, it may be assumed that seminars are more needed for students, since none of the PMU students expressed a negative opinion on them. Taking into account the survey results (question about the classes distribution in%), an ideal distribution of forms of classes would be as follows: lectures – 5% of hours, classes at departments – 33% of hours, assisting in surgical procedures – 25% of hours, seminars – 20% of hours, duty hours – 12.5% of hours. The remaining time could be distributed between other forms of classes – students listed here mainly practical classes on phantom models. On the other hand, they did not list advanced surgical techniques, although some practical classes, e.g. laparoscopic, might appear attractive and not expensive (7). An additional form of education might also be

<table>
<thead>
<tr>
<th>Subject</th>
<th>Frequency or a different reason</th>
<th>Examples</th>
</tr>
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<tbody>
<tr>
<td>General</td>
<td>several coincident opinions for each general statement</td>
<td>significant dependence on the department and on individual assistants; “the student follows the patient” – “it would be a good idea to assign patients to students, so they would have to pay particular attention to them at the department”; “standing idle”, discrimination of women, a 3-part examination where the only important things are “what the almighty lecturer decides”</td>
</tr>
<tr>
<td>Lectures</td>
<td>interesting opinions</td>
<td>“It is always that practical experience or clinical cases present much better an issue that is hard to understand or remember.”; “It would be a good idea to include discussion or make the lectures more attractive by adding short movies, mind maps, mnemonics, patient visits”</td>
</tr>
<tr>
<td>Practical classes</td>
<td>several opinions</td>
<td>“Classes in smaller groups, practice on phantom models”; “Sticking to the curriculum – assistants provide information on any topic they choose”; “You have to fight with the assistant and competition of other students to perform any surgical procedure”</td>
</tr>
<tr>
<td>Materials</td>
<td>course book – common opinions course book – several opinions</td>
<td>“The brochure should contain material discussed during classes; skills that can really be gained during classes”; “Course book – yes, but not everything served on a silver platter; should be useful for somebody who is not going to be a surgeon, provided that at least some of the described procedures will be demonstrated to students; practical classes should match the course book”; “Demonstration of procedures is more important than the course book”</td>
</tr>
</tbody>
</table>
sending educational bulletins prepared by surgery specialists to students (8).

Students notice the need for learning the easy, most commonly performed, procedures, and opt out the difficult ones performed less often. Finnish students had the highest chance (90%) of excising a birthmark in the course of their studies, and the lowest – of inserting Sengstake-Blakmoore tube (out of 10 different procedures). The chance of performing a procedure was correlated with the use of a student record book. On the other hand, it was found that participation in scientific research reduced the above chance (9). The most highly valued by students in the present study were the proposed different courses, e.g. patient examination, surgical stitching or ultrasound examination. Of lower interest were seminars (practical), and the lowest – patient medical history record maintenance and participation in rounds. Among those with positive opinion on rounds, there was a comment made: “Rounds – yes, if there are cases reviewed by a physician or student”. Students would like to actively participate in the work of surgeons in the operating block. For instance, in Germany students are mobilised to assisting by “Student am Tisch” – the obligation of assisting in procedures during the classes in the block system (with the approval by surgeon’s stamp).

In addition, surveys often bring to attention the “corridor” education which includes both waiting for the assistant and the 30-person rounds “that is e.g. 6 physicians, 2 nurses, 5 emergency care students, 5 rehabilitation students, 5 medical students and 2 interns” during which students cannot hear much. This evidences lack of proper work and class organisation. Common opinions were that student groups are too large and that 1 assistant for a group of 6-8 students is definitely not sufficient “while at parallel classes of English Division 1 assistant has 2 students”. A means of reducing the “overcrowding” suggested by many students would be the possibility of doing duty hours instead of the compulsory attendance at morning classes (e.g. up to 30% of hours) or more efficient use of class time. In the opinion of respondents, quote: “Practical classes should be interchangeable with assisting in procedures – those wishing to do so, go to the procedure. And during practical classes we do not stand idle or learn for the 100th time how to prepare a medical history report (BECAUSE WE HAVE ALREADY LEARNT THAT AT INTERNAL MEDICINE DEPARTMENT!!!) but we practice=learn the surgery in practice.”

Students’ opinions on the brochure and the course book concerned their content: they should discuss the procedures that may be practiced or at least observed during classes, should present them “step by step” and “according to the latest standards” (MUG students opinions) so they can always be referred to during classes. Particular attention was drawn to the usefulness of procedure description and characteristic “surgical” terminology (PMU). The emphasis was placed on “short”, i.e. one that serves as a compendium, point of referral during classes. Several respondents, not planning to pursue surgery in the future, pointed out the above aspect.

The below-presented opinions derived from questionnaires are characteristic for the evaluation of surgery classes: “You often hear that clubs teach this or that, but the fact is that the practical classes time should be utilised to the maximum for learning, and not the situation where if you want to learn something interesting you have to sacrifice your free afternoon; and practice, practice, and more practice, practice, patients, practice, what to do with them and in what order, and better how to diagnose appendicitis rather than how to prepare them for liver transplantation.” Yet another opinion is similar: “The 4th year student can list the indications and complications of many complicate-sounding procedures but is lost when it comes to the diagnosis of classic acute appendicitis.” A particularly negative opinion on surgery education indicates the weak points of this course during medical studies: “Unfortunately, the course in surgery (three years) did not provide me with any practical skills, and the 4th year did not even deliver any theoretical knowledge, unfortunately a good surgery textbook is hard to come by, a course book and/or good seminars published on Extranet (MUG intranet) are needed. It is pity that I had to learn such basic skills as scrubbing and stitching during practical classes and could not practice them during surgery classes.” Table 3 presents selected, most common, opinions and comments.

The decisive factor in choosing a career in surgery is having positive role models (10). Such role models could only be solid teachers
who arouse the thirst for knowledge and practical skills and are of high moral standing themselves. The student does not have to declare willingness to be a surgeon but emphasises the need for basic skills. Resignation from a career in surgery may be motivated by the social role (particularly among females) (6), therefore the gaining of basic skills while at university is of particular importance. The confirmation of observation among the respondents that there exists a weak correlation between gender and specialisation plans as regards surgery should not discriminate against women. The higher percentage of females participating in the survey might be explained by the student population structure as well as their higher dissatisfaction with classes.

Finally, it is worth quoting one material comment of a student concerning the last question in the survey: “To me, a physician who cannot explain why he wants to perform a procedure/examination will not get any recognition, respect or, most importantly, trust.”

The study presents material and conclusions that could be one of the starting points in the search for modern and effective methods of surgery education during medical studies.

The opinions included in the survey may be deemed representative and reliable for the students from Medical Faculty, while their anonymous and independent nature guarantees the provision of honest answers. The results and student opinions suggest yet another question, not covered by the survey: “Do you feel well prepared for practicing medical profession?” A question posed in such a form would provide direct answers. However, in view of the results of the present study, it seems easy to formulate. It is obvious that to be a physician it is not enough to mechanically learn the techniques of patient examination and simple procedure performance, but an individual and friendly approach to others is also needed. The above was not analysed in the survey and constitutes the main limitation of the study.

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