

Perception of small group learning among medical students and tutors in the Anaesthesiology department at Sahlgrenska Academy Gothenburg: A comparison between teaching hospitals

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Abstract

Background: The anesthesia teaching module at Gothenburg University is intended for fourth year medical students and integrated in the eighth semester of the Medical training program, oriented toward surgical disciplines. Because of a steadily increasing number of medical students the teaching of anaesthesia takes place at several different hospitals. Although syllabus, learning outcomes and literature are the same, the curricula and learning activities during group sessions differs between hospitals as well as group size. This could have an effect on how both students and teachers perceive and perform during the two week curriculum. **Aim:** To evaluate if the different conditions during group learning activities in our teaching locations in any way affect the attitudes among students and teachers involved in this learning activity, or the performance in the final assessment. **Method:** A cross-sectional mid-term analysis during four weeks in October 2014 was conducted by distribution of questionnaires in the classrooms and in tutor meetings. Retrospective analysis of course evaluations and final assessment of last semester were conducted. Comparisons were made between students and tutors taking part in the group sessions in two different teaching hospitals. **Results:** In total 19 students and 8 teachers/tutors participated in the study, of which 8 students and 3 tutors were from teaching location 1. Corresponding number participating students and tutors in location 2 were 11 and 5. A small group size during group sessions (2-3 students) in combination with a less problem based learning method (location 1) resulted in somewhat less negative statements regarding small group sessions both from student and tutors, but the difference was very small when compared to sessions with 5-6 students and a more problem based learning method (location 2). The results of the final assessment did not differ between location 1 and 2. **Conclusion:** In this small pilot study, the small group sessions during the anaesthesia teaching module are highly appreciated both from the learning and teaching perspective regardless of group size or learning method used. The different conditions in our teaching hospitals do not seem to affect the performance of the students in the final assessments. A more structured analysis, engaging larger groups is needed to draw any further conclusions.

Introduction

Motivation

Collaborative learning activities in small groups are more and more common in medical education. Emphasis is often put on making the medical students solve patient cases in small groups with a tutor facilitating the learning process, also known as problem based learning (PBL) (Bardes & Hayes, 1995; Dent & Harden, 2009; Harden & Crosby, 2000; Schmidt & Moust, 1995). Conventional lecture based teaching has consequently declined in the curricula of medical programs. Student centered learning (SCL) in higher education has received considerable attention in recent years within the educational literature (Plush, 2014; Ramsden, 2003). Well-defined learning outcomes in combination with specially designed learning activities, sometimes in small groups, aim to stimulate the students to actively seek information and participate in discussions. The idea is to facilitate the students to learn for life and not for the assessment and is a strongly recommended learning strategy amongst European student organizations (Attard, Di loio, Geven, & Santa, 2010). The ideology origin from older learning theories as the constructivism by Piaget, “learning by doing” concept by Dewey, the “work-shop” concept by Pestalozzi and Freinet as well as the sociocultural perspective on learning by Vygotskij. The modern learning strategies in higher education are often put in relation to or in contrast to the conventional lecture-based teaching and they have been questioned since the quality of learning is regarded more dependent on performance of the tutor and the sociocultural structure of the student group compared to conventional didactic methods (Colliver, 2000; Dochy, Segers, Van den Bossche, & Gijbels, 2003; Frambach, Driessen, Beh, & van der Vleuten, 2014; Kirschner, Sweller, & Clark, 2006; Visschers-Pleijers, Dolmans, de Leng, Wolfhagen, & van der Vleuten, 2006).

Educational context

This study was carried out among fourth year medical students and their tutors, participating in the anesthesia teaching module at Gothenburg University, which lasts two weeks and is integrated in the eighth semester of the Medical training program, oriented towards surgical disciplines. The other teaching modules of this semester besides anaesthesia consist of surgery, orthopedic surgery, radiology and oncology. Far from all of the medical students will become anesthesiologist but most of them will attend the emergency departments early on in their professional career and almost all of them will sooner or later encounter patients with different levels of organ failure. It is therefore important that all medical students know the basics of how to handle the acutely ill patient. The learning outcomes of the anesthesia

module are aimed at supplying the students with tools to achieve these skills. For the last decade the curriculum has been thoroughly revised and aimed at founding the students' collection of knowledge on practical patient work together with a clinical tutor in the operation rooms and critical care wards. Practical clinical work under supervision is combined with small group seminars where hand-picked relevant patient cases are processed in combination with practices on patient manikins, facilitated by a group tutor, and to some extent by conventional lectures. The aim is to help the students achieve both theoretical and clinical skills aligned with the learning outcomes of the course module using a student centered approach and stimulate lifelong learning. In this study we chose to focus on the learning activities during the small group sessions that take place at several occasions during the two week curriculum. Due to a steadily increasing number of medical students, teaching of the anesthesia module takes place at several different hospitals which form the University Hospital in Gothenburg. Depending on the different functions of these hospitals the curricula and small group session learning activities somewhat differs although the syllabus, literature and learning outcomes are the same. The students are assessed at the end of semester by a test consisting of five multiple essay questions (MEQ) followed by "in real life" (IRL) patient simulation with an actor. A course evaluation is requested for each teaching module of the whole undergraduate course. During spring in 2014, 92 % of the students that took the final MEQ assessment reached the limit of 67% of the maximum score required to pass. However, the faculty has expressed concerns regarding the variety of tutorial methods and material that are used during small-group sessions and have asked for a coordination process between the teaching locations of the conglomerate of hospitals that constitute the University hospital. These concerns are partly due to lower scores in local course evaluations from one of the teaching hospitals. This pilot study is consequently aimed at comparing students and teachers perception of the learning activities during small-group sessions in two different teaching locations within the University Hospital, as well as comparing the final assessment results and course evaluations of the medical students in these two locations.

Research questions

Does the satisfaction of students' and tutors' differ during small group learning activities when comparing two different teaching locations with different group size and learning methods?

Is there any difference in the students' performance in the final assessment depending on teaching location?

Is there a need for coordination of learning methods during group sessions between the teaching locations as to improve attitudes and performance of the students?

Methods

Auscultation

In the beginning of the second semester 2014 auscultations in tutor meetings and during curricular activities were performed in location 1 and 2 in order to observe preferred learning methods as well as group/tutor interaction during group sessions.

Mid-term evaluation of attitudes

A cross-sectional qualitative mid-term analysis of the attitudes towards the learning activities during group sessions was performed. During four weeks in October 2014, anonymous questionnaires were distributed in the classrooms and in tutor meetings. The distribution took place in two of our teaching locations within the University hospital, named location 1 and 2. Responses to a three-question evaluation based on the students' and tutors' experiences during group sessions (open answers) were analysed (Appendix 1 and 2). The answers to each question were compiled and divided into four groups: students from location 1, students from location 2, tutors from location 1 and tutors from location 2. The data in questionnaires were analysed in five steps according to Taylor-Powell and Renner, using content analysis and a coding scheme (Bishop-Clark & Dietz-Uhler, 2012). The answers of the questions regarding learning during group sessions were divided into statements and the number of highly positive, moderately positive and negative statements was counted according to this coding scheme.

A	Statement highly supportive of group education	0=no	1=yes
B	Statement moderately supportive of group education	0=no	1=yes
C	Statement negative of group education	0=no	1=yes

Comparisons were made between students and tutors in location 1 and 2 as well as between all students and tutors.

Course evaluations and final assessment

A retrospective analysis of the scores of the web-based local course evaluations from last semesters' anesthesia training module was performed and a comparison made between the scores of location 1 and 2. Total mean score of all ten questions as well as the mean scores of

each question in location 1 and 2 were calculated and compared. A retrospective comparison of last semester final assessment results between students from location 1 and 2 was made.

Statistical calculations

For comparisons of cross sectional mid-term and end-of term course evaluations an unpaired t-test was used. For comparisons of final assessment results unpaired t-tests and Wilcoxon sign rank tests were used. A p-value of <0.05 was considered significant. Median and percentiles as well as mean and standard deviations were used for descriptive statistics. Descriptive statistics and tests were performed with software Microsoft Excel® 14.0 (©Microsoft corp. 2010) and Statview 5.0.1® (©SAS Institute Inc. 1998).

Results

Auscultation

Observations during tutor meetings and learning activities in the different teaching hospitals showed that in location 1 group size during sessions were small (2-3 students per tutor). The preferred learning method used during group sessions was power point-presentations, lecturing and the tutor asking questions to activate the students. Case scenarios as a foundation for small group discussion were also used, but to a lesser extent. In location 2 the observed group size was larger (5-6 students per tutor) and a problem based learning approach dominated during group sessions. Although the learning methods during group sessions not were a “pure” version of PBL, the tutors preferably used case scenarios, real cases presented by the students and the white board in order to activate the students. One of the students was often in charge of the white board during case discussions. In location 2 there were more discussions and interactions between students and between students and tutors during the small-group sessions.

Mid-term evaluation of attitudes

A total of 19 students and 8 teachers answered the questionnaires. From location 1, eight students and three teachers participated. From location 2, eleven students and five teachers participated. When compiling the answers of the three questions, an overall satisfaction with the tutorial group sessions was expressed, both among students and teachers. The students' attitudes were very positive regardless of teaching locality. Several students described that they felt privileged as they had close access to a tutor during the two week course and that the seminars stimulated their activity during discussions because of the small group. One student expressed concern that the structure of the group could have influence on how active the participants were. Some students pointed out that the performance of the tutor was essential to

how active they were during the discussions. Tutors that were able to deliver information in accordance to the level that the students felt were reasonable without too much theoretical overload and who stimulated them to actively participate in discussions were highly appreciated. The tutors seemed to have more concerns regarding the learning during small group sessions, mostly expressed as thoughts on their own ability to activate the students during sessions and difficulty in covering the learning outcomes.

Location 1 vs. location 2

The content analysis showed that the students from location 1, where a group size of 2-3 students and a more lecture based method were used during group sessions, had somewhat less negative statements (C) regarding small group learning. The count was 2 negative statement in eight students (mean value 0.3) compared to the students from location two, where the group consisted of 5-6 students and the preferred learning method was problem based, with 5 negative statements in eleven students (mean value 0.5). However, the difference was not statistically significant. The number of highly positive statements (A) and moderately positive statements (B) did not differ between the students of location 1 and 2. The count was 21 vs. 19 (A) and 9 vs. 15 (B) with corresponding mean values 2.6 vs. 1.7 (A) and 1.1 vs. 1.4 (B). The tutors of location 1 had significantly less negative statements, 3 negative statements in 3 teachers (mean value 1.0) when compared to the teachers in location 2 with 10 negative statements in 5 teachers (mean value 2.0), $p < 0.05$. On the other hand the five tutors of location 2 had a tendency towards a more positive attitude expressed as 18 highly and 6 moderately positive statements (mean value 6 and 2) compared to the three tutors from location 1 whose answers consisted of 8 highly positive and 1 moderately positive statement (mean value 4 and 0.5) but the difference was not statistically significant. These results remained after adding the highly positive and moderately positive statements into one group (A+B).

Students vs. Tutors

Among the 16 students and 8 tutors that participated in the mid-term survey regarding the learning during small group sessions, the tutors expressed most enthusiasm, counted as 26 highly positive statements (A) as compared to the students 31 highly positive statements (mean value 3.3 vs. 1.9), $p < 0.05$. The tutors also produced a larger amount of negative statements (C), 13 compared to the students' 6 negative statements (mean value 1.6 vs. 0.4), $p < 0.05$. When combining the number of highly positive and moderately positive statements

(A+B) there was no large difference found between student and tutors, 54 vs. 33 (mean values 3.3 vs. 4.1).

Course evaluations

In the first semester of 2014 a total of 51.8% (41 of 79) of the medical students participated in the course evaluations regarding the anesthesia training module. In location 1, the survey was answered by 68.3% (28 of 41) of the students and in location 2 the answering frequency was 34.2 % (13 of 38). The 10 question survey gives a score ranging from 1 to 6 points (Likert scale). In location 1 the mean scores of each question ranged from 4.14 to 5.71 points (mean 5.17 points) and in location 2 corresponding score was 3.85 to 5.38 points (mean 4.73 points). There was a statistically significant difference between location 1 and 2, when comparing the mean scores of all the questions, $p < 0.05$. However, when comparing the score distribution of each question, there was no statistically significant difference between location 1 and 2. There was a tendency towards less satisfaction among a small part of the participating students at location 2.

Final assessment

In the first semester of 2014 there was no difference between the results of the final MEQ exam of students in teaching location 1 and 2. A number of 74 of 79 students passed the exam. There were also no considerable differences in the results of the final assessments of practical and non-theoretical skills that followed the MEQ assessment, as 36 of 38 and 34 of 36 students passed the final IRL simulation assessment in location 1 and 2 respectively.

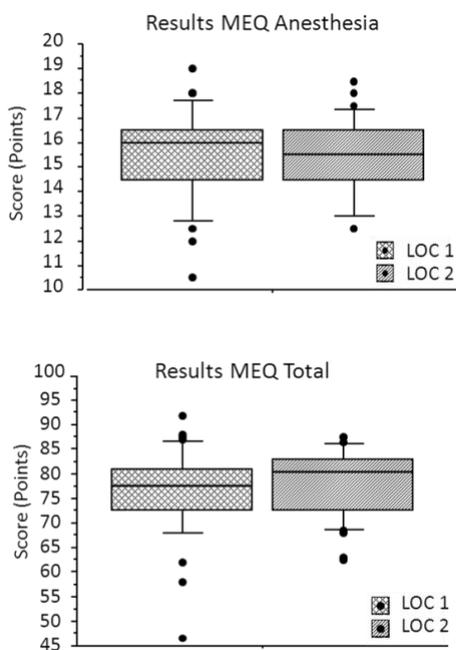


Figure 1 Final exam results of 79 medical students in the Surgical disciplines (Medical training program) first semester 2014. Five multiple essay questions, 20 points each in total. Diagram on top is displaying results from the MEQ oriented towards anesthesia. Students in Location 1 (41 students) and 2 (38 students) are compared. There was no statistically significant difference between groups despite differences in session group size and teaching method. (Plot shows 10th, 25th, median, 75th and 90th percentiles as lines, outliers as dots)

Discussion

In this cross-sectional pilot study of the anesthesia undergraduate course module in the eight semester of the Medical training program in Gothenburg, the participating students and tutors' questionnaire answers indicates that a very small group size during group sessions (2-3 students) in combination with a less problem based learning method resulted in few negative statements regarding small group session as a learning activity, both from students and tutors. This finding was reflected in the course evaluations of last semester, where some of the students participating in small-group sessions with 5-6 students and a problem based learning approach were somewhat less content. However, when comparing results of the final assessments, group size or learning method used during group sessions does not seem to have any influence on the performance of the students. The overall satisfaction with group sessions were high regardless of teaching location.

Group size

Learning in small groups has several educational advantages and the recent trend is an indication of the movement from teacher-centered to student-centered learning (Entwistle, 1992; Plush, 2014; Ramsden, 2003). Small-group teaching at its best facilitates an adult approach to learning and deeper understanding of material. It encourages participation as well as stimulates development of interpersonal, communication, social team-working and presentation skills. (Bullock, Davis, Lockey, & Mackway-Jones, 2009; Crosby, 1996; Dent & Harden, 2009; Visschers-Pleijers, Dolmans, de Grave, et al., 2006). However, the optimal number of students is hard to determine and is often fixed by curriculum demands, although a small group often is defined as ten students or less. The role of a small-group tutor requires training and a skillful tutor can handle larger groups of students. (Dent & Harden, 2009; Kooloos et al., 2011) Furthermore, the learning in small-groups is influenced by the sociocultural structure of the group and the stage of group development. (Das Carlo, Swadi, & Mpofo, 2003; Frambach, Driessen, Chan, & van der Vleuten, 2012; Tuckman, 1965). It is important that tutors participating in these learning activities are mindful of group conditions and stimulate participation of all group members (Fassinger, 1995; Frambach et al., 2014). Consequently, the quality of small-group learning is highly dependent on the expertise of the tutor and/or co-tutor (Kooloos et al., 2011). In this study the small-group size in location 1 was 2-3 students and 5-6 students in location 2. The results of the mid-term-evaluation and course evaluations indicates that a smaller group produces somewhat more satisfied students, which could be related to higher tutorial demands when handling a larger group. This is also

reflected by the answers from the tutors of location 2, expressing more concern regarding the tutorial situation during group sessions. Bear in mind that the differences were very small.

Problem-based and didactic sessions

One way to conduct learning in small groups is to make the tutorials problem-based. Problem based learning originates from McMaster University (Berkson, 1993; Norman & Schmidt, 2000) and is a student-centered approach, characterized by solving case scenarios through discussion and brainstorming, culminating in definition of certain learning outcomes. The students are supposed to actively seek information to cover these learning outcomes. In its' pure form the tutor has a rather reclusive role during sessions, in contrast to didactic sessions. A vast amount of evidence supports that PBL stimulates effective learning, clinical reasoning, critical thinking, team work and use of professional and scientific language (Bligh, 1995; Dochy et al., 2003; Visschers-Pleijers, Dolmans, de Leng, et al., 2006). However, PBL constitutes high demands on teaching resources and tutors, regarding ability to enhance the group process, encourage independent learning and intervene when appropriate (Berkson, 1993; Colliver, 2000; Dent & Harden, 2009; Harden & Crosby, 2000; Schmidt & Moust, 1995). Considering this it is not surprising that the tutors of teaching location 2, who predominantly practiced problem-based approached tutorials, expressed more concern regarding the small-group learning as compared to the tutors in teaching location 1, who was responsible for fewer students and practiced a more didactic strategy during small-group sessions. From the students perspective the results of the mid-term survey indicates that close access to a tutor is more important than actual learning method used during group sessions, didactic or problem-based. However, there was a tendency towards a more critical approach, both in the mid-term survey and the end of term course evaluation, among the students from location 2 where the group activities were predominantly problem-based. One could speculate, considering the evidence presented above, that this partly could be a result of a more effective group process and encouragement of critical thinking. PBL is consequently recognized as a rather time-consuming learning method which demands a period of adapting and a two week curricula is perhaps too short (Berkson, 1993; Kirschner et al., 2006). On the other hand, the group-session learning activities in location 2 is inspired by the PBL concept, more than a "pure" form of the learning method, which gives the students opportunity to an easier adaptation.

Monitoring of curricular activities

Caution should be taken when interpreting the results of conventional course evaluations, especially if the answering frequency is low, as in the case of this study, where the students expressed a lower mean value in course evaluations for location 2 in comparison with location 1 where the answering frequency was considerably higher. It is hard to explain why the answering frequency is lower in location 2. It could be an expression of a less intimate connection to the tutor because of a larger number of students, but this is only speculation. Consequently, it would be desirable to continuously monitor the quality of curricular learning activities as a complement to conventional course evaluations (Bardes & Hayes, 1995). Furthermore, the scores of the MEQ- final exam from location 1 and 2 did not display any large differences between the two groups of students. (Figure 1) This indicates that the small-group sessions relate appropriately to the other curricular activities and that difference in tutorial material and approach during these sessions does not influence the performance of the students in any significant way. The complementing activities of the whole two week curriculum in the anesthesia module provides the medical students with a “smorgasbord” of learning opportunities and the group sessions should be seen as an integral component of the course content. Flexibility considering group size and learning activities when planning the curricula is important. A prerequisite for keeping the educational alignment is that faculties meet regularly to coordinate and monitor both the medical students and their tutors, in order to support, improve and/or maintain a high educational quality (Brooks, Dobbins, Scott, Rawlinson, & Norman, 2014; Harden & Crosby, 2000). This could be considered particularly important when a medical undergraduate curriculum is scattered between several faculties and hospitals, as in the case of this study.

Limits

The number of participating students and teachers is small. This affects the validity of the results, as individual coincidence is more likely to have an influence. It would have been more adequate to analyse the course evaluations and final assessment of the second semester of 2014. The mid-term evaluation questionnaire used in this study is not a validated tool for monitoring of educational activities.

Conclusion

The tentative results of this pilot study suggest that small group sessions as a learning activity are highly appreciated both by medical students in anaesthesiology and their tutors regardless of group size. When a traditional didactic learning method was compared with a problem

based approach in two different teaching locations of the University hospital, it was found that a common syllabus in combination with a coordination of learning outcomes and literature between the faculties of the different teaching locations seem to be more important for the students' satisfaction and performance in the final exam than an exact match of curriculum and tutorial methods during group sessions. Finally, taking into account that this is a small pilot study, it can be dangerous to solely predicate the quality of the education from course evaluations with insufficient answering frequencies. A further analysis, engaging larger groups and use of validated tools, is needed to draw any further conclusions.

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Appendix 1

Questionnaire teachers

Enkät: Tre frågor om undervisningen på delkursen i anestesi –och intensivvård Termin 8 Läkarpogrammet Sahlgrenska Akademin

Poll: Three questions on the teaching on the course of anesthesia and intensive care medicine Sahlgrenska Academy Semester 8

1. Beskriv din upplevelse av den patientorienterade gruppundervisningen av T8 studenterna på delkursen i anestesi –och intensivvård. Positiv? Negativ? Utmanande?

Please describe your experience of the patient-oriented group tutorials of the students on this course in T8 anaesthesia and intensive care. Positive? Negative? Challenging?

2. Tycker du som lärare att det finns svårigheter och/eller fördelar med denna typ av undervisningsform? Beskriv i så fall vilka.

As a teacher, do you think that there are certain difficulties and/or advantages of this kind of teaching? Describe which.

3. Vad är din uppfattning om studentcentrerad undervisning? Vad är det?

What is your opinion of student-centered learning? What is it?

Tack för din medverkan! Svaren kommer att behandlas helt anonymt och i syfte att förbättra vår delkurs. Svaren kommer även att redovisas i samband med en kurs i högskolepedagogik HT14 (HPE103). Med vänlig hälsning Sophie Lindgren

Appendix 2

Questionnaire students

Enkät: Tre frågor om undervisningen på delkursen i anestesi –och intensivvård Termin 8 Läkarpogrammet Sahlgrenska Akademin

Poll: Three questions on the teaching on the course of anesthesia and intensive care medicine Sahlgrenska Academy Semester 8

1. Beskriv din upplevelse av den patientorienterade gruppundervisningen på delkursen i anestesi –och intensivvård. Positiv? Negativ? Utmanande?

Please describe your experience of the patient-oriented group tutorials of the students on this course in T8 anaesthesia and intensive care. Positive? Negative? Challenging?

2. Tycker du som student att det finns svårigheter och/eller fördelar med denna typ av undervisningsform? Beskriv i så fall vilka.

As a student, do you think that there are certain difficulties and/or advantages of this kind of teaching? Describe which.

3. Vad är din uppfattning om studentcentrerad undervisning? Vad är det?

What is your opinion of student-centered learning? What is it?

Tack för din medverkan! Svaren kommer att behandlas helt anonymt och i syfte att förbättra vår delkurs. Svaren kommer även att redovisas i samband med en kurs i högskolepedagogik HT14 (HPE103). Med vänlig hälsning Sophie Lindgren