Case-based learning in nursing education

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ABSTRACT
Aim: The aim of this study was to describe students’ experiences with case-based learning as a pedagogical method in nursing education. Background: Nursing education falls short when it comes to preparing nurses for the various roles in their practice, including critical thinking. Methods: The study has a cross-sectional design. Results: Students perceived case-based learning as an approach to combine theory with practice. This pedagogical method offers nursing students an opportunity to enhance their judgment and critical thinking skills by applying theory in practice. The teachers’ engagement was important, and both students and teacher had knowledge to solve the problem. Conclusions: Case-based learning is a recommended method in combination with other pedagogical methods for nursing education. It allows the students the opportunity to use their knowledge and critical thinking during problem-solving practice.

Keywords
Case, pedagogical methods, critical thinking, nursing students, clinical practice

SAMMENDRAG

Nøkkelord
Case, pedagogiske metoder, kritisk tenking, sykepleierstudenter, praksisstudier
BACKGROUND

Nurses meet numerous clinical problems in practice, and their ability to competently deal with such problems is decisive for safe treatment of patients (1,2). In the Norwegian Curriculum Regulations for Nursing Education, it is claimed that the ability to make professional observations shall be based on theoretical knowledge, clinical experience and perceptions (3). Given the fact that hospitalised patients over the age of 75 have on average three simultaneous diagnoses and 25% have six diagnoses (4), it is easy to understand that nurses require a high level of practical expertise. “If we are to successfully realise the goals of our healthcare policies, we need to be sure of the following: – that the correct scope of the different types of health personnel receive education and that this education provides expertise that is customised to the requirements of the healthcare service. The goal of the healthcare policies must include educating the correct range of health personnel and that their education includes expertise in line with the requirements of the health service (4).

Nursing education in Norway provides 180 credits, including clinical practice with 90 credits. During a three-year nursing education, the students shall learn how to integrate knowledge from the professional, medical, natural science and social science aspects of nursing. This implies that the students shall accumulate the expertise and motivation to adapt their nursing to different patients and patient scenarios. The students are expected to be able to observe and implement measures that are preventive, palliative, provide treatment and rehabilitation (3).

Studies show that recently graduated nurses lack the ability of critical thinking when it comes to exercising their skills and integrating theoretical knowledge when nursing critically ill patients (5,6). A high level of critical thinking is required, making use of diverse knowledge in order to assess patient scenarios and make well-founded clinical decisions (7).

Studies also show a lack of knowledge on how to act among recently graduated nurses, and that the ability to act is related to having a clinical gaze. The ability to develop a clinical gaze requires an inner motivation, setting personal targets, meeting requirements, seeking training and the ability for critical thinking (8,9).

Recently graduated nurses display a positive attitude towards research but make little use of research. They are more concerned with being informed of correlations than experienced nurses. One central factor for the ability to identify correlations is critical thinking. The ability of critical thinking should receive more emphasis in education and clinical practice (9). By helping students develop such skills, different types of educational tools are utilised throughout nursing education. Case-based learning may be a method by which to increase the students’ ability to act. Case-based assignments have been utilised in order to integrate theory and practice by constructing cases from specific situations in practice. The students can see that concepts have a context and they are able to recognise the structure (10).

One of the educational methods utilised is the case method. The case method was in principal developed for law and economy students, and open, authentic scenario descriptions are utilised to inspire students to actively seek knowledge (11).

The main subject in the case method is what the students should do and how they should act in a situation that is perceived as more or less critical. Case-based learning takes place in sequential order with three phases. Firstly, the students work individually on the case. The students are then put into groups to discuss their own conclusions. The aim of
the group discussion is to provide the students with different approaches and new ideas on how to solve the problems in the case. The seminar is the third and final phase and the main arena in the case method. The teacher chairs the seminar and the purpose is to train the students in how to identify, analyse, organise and assess professional perspectives (12). A comprehensive introduction for students is required throughout nursing education so that the students learn how to make use of the different areas of knowledge when nursing critically sick patients (13,14,15).

Several studies show that the case method promotes learning a profession as it unites different aspects of the elements that characterise education for a specific profession. Studies also claim that both students and teachers choose to make use of case-based teaching as it requires a commitment and is motivational. Case-based learning can help students understand random problems that occur and can help the students to reflect over problems and decision-making, promoting even more commitment to nursing. Case-based learning shall in principal form a bridge between learning that takes place in more academic environments and the practical day to day activities required for nursing as a profession (15,16,17,18).

The cases in this study originated from practice, by interviewing seven nurses who described acute situations they had experienced in their clinical practice. We received 17 cases that were processed by stating the results of blood tests and the National Early Warning Score (NEWS) (19). NEWS comprises clinical observations such as blood pressure, pulse, respiration rate, temperature and level of consciousness. The names of patients, nurses and places were made anonymous. The cases were utilised for teaching and there was no solution to the cases. Instead, the cases provided the students with the opportunity to analyse, discuss, make judgements and take a critical approach to relevant action.

AIM
The purpose of this study was to describe nursing students’ experiences of case-based learning.

METHOD
Research design
The study had a quantitative design and was a cross-sectional study targeting the students’ experiences during the use of case-based learning.

Participants
Students in their second and third years of nursing education were selected as they were at somatic hospitals during their clinical training. In total, the questionnaire was distributed to 180 students. 160 students responded to the questionnaire, giving a response rate of 88.9%. The questionnaire was distributed and collected while the students were at college and taking part in class.
Questionnaire
The questions were developed after reading through relevant research and thinking through our own experiences of teaching. The questionnaire was divided into five areas involving whether the cases were too simple or too complex (9 items), how prepared the students were for case-based learning (3 items), the function of the group work (4 items), execution of seminars and whether the students felt that case-based learning made them more prepared for practical training (6 items). The questionnaire was a list of statements to which the students had to respond to the following five-point scale ranging from 1 (Completely disagree), 2 (Partly disagree), 3 (Unsure), 4 (Partly agree) and to 5 (Completely agree). The questionnaire was subject to a pilot test and validated via a focus group interview. Six students took part in the focus group interview. No changes were made to the questionnaire after the interview.

Analysis
Data from the questionnaire was analysed using the statistics program IBM SPSS 22.0. Descriptive statistics in the form of frequency, percentage and average were utilised. In this study, the terms “completely agree” and “partly agree” and the terms “completely disagree” and “partly disagree” were merged to form two categories, respectively “completely agree” and “completely disagree”. The categories “completely agree” and “partly agree” were merged because most students answered “completely agree”. Similarly, the categories partly disagree and “completely disagree” were also merged into one category. The category for “unsure” was retained.

Ethical reflections
Norwegian Social Science Data Services was contacted. They informed us that it was not necessary to apply for a permit. The project execution was approved by the university college. The questionnaire was distributed at the end of the college day. The students were informed in advance that participation in the questionnaire was voluntary. The students were kept anonymous as the questionnaire did not contain any information on name or class. The students were also informed that the forms would be shredded once the article had been written; a requirement laid down in the general guidelines for research ethics.

Results
The results are presented in relation to case, preparedness among students, group cooperation and seminar. The age of the students varied from 29 to 40, with an average age of 34.

Students’ understanding of cases
There is a high level of discrepancy as to whether the cases are too simple or too complex. It also emerged that the cases were relevant in relation to the students’ experiences of clinical practice. The students felt that they also had knowledge that was relevant in order to
solve the cases. Furthermore, results show that the students felt that all patient data should be stated in a case but were less sure whether patient data should also be provided as the case progressed. Case-based learning, according to the students, provided an increased understanding of complex diseases. See Table 1.

**Table 1** Case (N = 160)

<table>
<thead>
<tr>
<th></th>
<th>Completely disagree n (%)</th>
<th>Unsure n (%)</th>
<th>Completely agree n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The cases are too simple (n = 159)</td>
<td>94 (59.1)</td>
<td>49 (30.8)</td>
<td>16 (10.1)</td>
</tr>
<tr>
<td>The cases are too complex (n = 159)</td>
<td>65 (40.6)</td>
<td>68 (42.5)</td>
<td>26 (16.3)</td>
</tr>
<tr>
<td>The cases were relevant to practice (n = 160)</td>
<td>12 (7.5)</td>
<td>27 (16.9)</td>
<td>121 (75.6)</td>
</tr>
<tr>
<td>I have knowledge of diseases and treatment that is relevant to solve the cases (n = 158)</td>
<td>8 (5.0)</td>
<td>48 (30)</td>
<td>102 (63.7)</td>
</tr>
<tr>
<td>All patient data should be provided in the cases (n = 157)</td>
<td>14 (8.8)</td>
<td>31 (19.4)</td>
<td>112 (70.0)</td>
</tr>
<tr>
<td>It is acceptable to receive patient data also throughout the seminar (n = 157)</td>
<td>65 (40.6)</td>
<td>34 (21.3)</td>
<td>58 (36.3)</td>
</tr>
<tr>
<td>Case-based learning provides an increased understanding in relation to the complex diseases of a patient (n = 156)</td>
<td>9 (5.6)</td>
<td>27 (16.9)</td>
<td>120 (75)</td>
</tr>
</tbody>
</table>

Level of preparedness for practical training

In response to the question of whether case-based learning made the students more prepared for practical training, 44.6% of the participants completely agreed, 34.4% were unsure and 20% completely disagreed.

**Group work**

A total of 75% of the participants responded that the teacher should not divide the students into groups, but that the students should be allowed to make up the groups. Results also show that the students felt that all members of the group contributed towards finding solutions to the cases, and that the discussions were relevant to solving the cases.

**Table 2** Group work (N = 160)

<table>
<thead>
<tr>
<th></th>
<th>Completely disagree n (%)</th>
<th>Unsure n (%)</th>
<th>Completely agree n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The teacher should divide the students into groups (n = 157)</td>
<td>120 (75)</td>
<td>14 (8.8)</td>
<td>23 (14.4)</td>
</tr>
<tr>
<td>The students should divide themselves into groups (n = 157)</td>
<td>14 (8.8)</td>
<td>15 (9.4)</td>
<td>128 (80.0)</td>
</tr>
<tr>
<td>All members of the group contribute towards finding a solution to the cases (n = 157)</td>
<td>10 (6.3)</td>
<td>17 (10.6)</td>
<td>130 (81.3)</td>
</tr>
<tr>
<td>The discussions in the group are relevant to solving the cases (n = 157)</td>
<td>7 (4.4)</td>
<td>18 (11.3)</td>
<td>132 (82.5)</td>
</tr>
</tbody>
</table>
Seminar
The involvement of the teacher was an important aspect during the seminar. The majority felt that it was difficult to take an active role in the discussion when there were too many students participating. The results suggested that 50% of the students preferred that all the smaller groups to give their input during the seminar.

Table 3 Seminar (N = 160)

<table>
<thead>
<tr>
<th></th>
<th>Completely disagree n (%)</th>
<th>Unsure n (%)</th>
<th>Completely agree n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>The teacher’s involvement is important (n = 156)</td>
<td>4 (2.5)</td>
<td>7 (4.4)</td>
<td>145 (90.6)</td>
</tr>
<tr>
<td>It is difficult to take an active part during the teaching as there are so many students (n = 156)</td>
<td>35 (21.9)</td>
<td>40 (25.6)</td>
<td>81 (50.6)</td>
</tr>
<tr>
<td>All groups should provide input during the seminar (n = 157)</td>
<td>39 (24.4)</td>
<td>44 (27.5)</td>
<td>73 (45.6)</td>
</tr>
</tbody>
</table>

DISCUSSION
During this study, we have focused on describing the students’ experiences of case-based learning. When we started this study, we were unsure of the preparedness of the students, if the cases were too complex and whether the groups were too large. Previous teaching experience suggested to us that even though the case was made available to the students two weeks prior to the seminar, a substantial number of the students would not prepare in advance.

Case
The results from our study show that 40% disagree that the cases were too complex, 42.5% were unsure and 16% completely agreed. Despite this, 76% responded that the cases were relevant and realistic in relation to the students’ experiences from clinical practice.

One central aspect in the use of the case method is that it targets action (12). Munford (20) claims that the most important advantage gained by using the case method is that the students can gather, integrate and interpret different factors involved in a certain problem, and that this will result in a critical process. Certain diagnoses are better suited to case-based learning than others. Four criteria are required for a case to be categorised for teaching purposes. The case should be written from one person’s perspective, it should be written in a narrative format, the case should be open-ended and based on real events, i.e. be authentic (15). The case method places a focus on the knowledge-based correlation between “knowing that” and “knowing how” (12).

Results from our studies show that 75% of the students felt that case provided them with an increased understanding of the patient’s complex diseases. The nursing students involved in the Forsgren, Christensen & Hedemalm (21) study stated that they had the opportunity when working on cases to test their knowledge, and that they had learned how to think and act in specific patient situations. The case made the students theoretical knowledge more
realistic. With the use of the case, the students gained a more holistic perspective of the patient's situation; the situation became clearer to them, demanded more knowledge from them and made it simpler for them to use their knowledge. The case method also generates a more in-depth knowledge of medical diagnoses and nursing (22,18,23).

Case may help promote individual reflection and group reflection. Both types of reflection result in a deeper understanding, knowledge of different diseases and an approach that will result in an increased understanding and learning. Both group work and seminars in combination allow the students to identify solutions to cases from a range of perspectives (21). The risk involved in using the case during teaching over time – proven in certain studies – is that the students start to lose commitment and motivation. One study of medical students showed that they required more variation and a clearer progress in their studies. They also requested an increase in the complexity of their work on cases, so that they not only worked on clarifying diagnoses and making suggestions for treatment but were also allowed to have a focus on personal knowledge, ethical dilemmas and attitudes (12). Half of the students involved in this study were unsure whether the cases were too complex.

Group size
In this study, each group had six to eight students, and results show that 80% of the students felt that it would be better if they could make up the groups themselves. A majority of the students, in total 81%, felt that all members of the group contributed towards finding a solution to the cases. In order for all group members to contribute and be a part of the group discussion, work experience has shown us that a group size of six to eight students is ideal. Shanley et al. (24) claim that group size may determine whether the students will be able to dispute their proposals. The facilitation of teaching must be organised so that it helps the students take an active role in their own learning and participate in the learning of other students (26). In order to establish a good collaboration that is learning-productive, inter-human relationships such as security, trust, openness, honesty, enjoyment and curbing personal prominence within the student group will be essential (27).

In this study, many of the students felt that it was relevant to have groups of six to eight students, but that the group size during the seminar – of 65 students – was too large and they did not have the opportunity to have their say. Pastirik (28) claims that both small and large group processes are of value for learning, and that large groups would be appropriate. Nordquist et al. (15) suggests a group size of four students, on the grounds that this would allow all students to have their say.

Preparedness
The results from our study show that 44.6% felt that they were more prepared to meet patients with complex diseases after having solved cases. The results also showed that 34.4% were unsure and 20% disagreed that they were more prepared for practice. In order to meet patients with complex diseases, the students require knowledge of diagnoses and treatment as well as having greater confidence in their own decisions, which involve critical thinking. Chan (29) carried out a study among nursing students that involved critical
thinking in nursing education. The students in the study felt that it was correct to take a critical approach because when they assembled their total experience, they gained greater confidence in their own decisions than if they had to blindly follow instructions. The students in the study described nursing as involving critical thinking (29). Pastirik (28) claims that the critical thinking and controlled knowledge accumulated by the students themselves are skills they need in order to master the complexity of professional nursing.

Preparedness is particularly important for case-based learning, as the teaching is based on discussions and an interaction regarding the actual case and between the participants and the teacher. In order to learn from the case, the students should have read and stated the reasons for the case. The students start to learn as soon as they are asked to prepare for the teaching (15).

The students received the cases one week prior to the seminar and therefore should have had the time to prepare for the problems before they had to solve the cases and discuss their finds in groups; so-called peer learning. The accumulation of new knowledge on subjects and the use of own experience from practice will be essential for learning, and will thereby make the students more prepared for practice. In the Løviknes and Struksnes (8) study, it emerged that the students felt uncertain about exercising nursing in a proper manner and that this uncertainty could be linked to how the colleges prepared the students before they started in clinical practice.

Harman et al. (30) wrote in his study that the intention of using case in higher education includes experiences or clinic simulation in order to promote learning and development. The results indicate that learning by using case, combined with problem-solving in groups, generates professional development (30).

The results also show that 90.6% of the students felt that the teacher’s involvement was important. When using case, teachers who communicate knowledge will be of no value, according to Nordquist et al. (15). Teachers who discuss different solutions to problems will achieve much more success in relation to learning by using case. Using case requires a lot of preparation for both students and teachers in finding knowledge about anatomy, physiology, pathology and pharmacology. According to Alvsvåg and Førland (31), it is possible that the most significant role of the teacher is a question of encouraging the students to identify the relevance between theory and the actual task of nursing. The students are required to request knowledge and ask for reasons. Discussions will not succeed unless the students and teacher have fundamental knowledge of diagnoses and treatment, allowing them to suggest and apply action.

Seminar
The seminar group comprised 65 students. Approximately 50% of the students felt that it was difficult to take an active role in the seminar, while 25% were unsure.

In their study, Forsgren, Christensen and Hedeman (21) made reference to the fact that some of the students stated that the structure of the seminar caused uncertainty and a lack of knowledge, resulting in lack of participation in the discussions during the seminar. It is possible during a seminar that no students will respond, or only one of the students responds, resulting in a consensus and not a difference of opinion. There is therefore the
risk that the seminar is not dynamic. The authors also point out that those students who had not prepared sufficiently may affect the quality of discussions among the entire group. Individual preparation is essential so that the participants are able to discuss learning situations in groups then subsequently during the seminar. In most instances, it is recommended that the seminar only comprises three main issues (15).

The study shows that the students felt that the cases were relevant to clinical practice, and that all members of the group contributed towards finding solutions. All input at the seminar was repeated orally by the teachers and written on the board. We repeated what was said by the students in order to make sure all students and teachers heard the information. This gave students the opportunity to acknowledge or correct the information. It also gave the teachers a chance to ask follow-up questions. Acquiring knowledge happens through the use of both visual and auditory means (32).

Critical questions may be made of whether the students had prepared sufficiently for the case seminar. The cases were presented one week prior to the seminar, but all the students were on clinical practice during this time, and not at college. In the Holmsen (33) study, the students expressed that the clinical practice was too work-intensive and they were tired. As a result, the students found it difficult to read the required course material while they were in practice (32).

Critical questions can also be made about whether the students were directed to an excessive extent during the seminar, and that they did not have the opportunity to participate due to lack of time.

CONCLUSION
The results of this study show that the degree of the teacher’s involvement is of importance during the seminar. Using a case provided an increased understanding of patients’ complex diseases and made them more prepared for practical training.

It should be possible to make use of case- as a method within nursing education and as a supplement to traditional lectures, guidance and simulation. Using case may help provide a deeper understanding of nursing, provided that both teachers and students have fundamental knowledge, are well-prepared and can take a critical approach to the observations to be made and action to be taken. By working with cases, nursing can be taught by motivating the students to demand knowledge, ask for reasons, make use of experience from clinical practice, discuss in groups and make arguments for their own reasons.

Using case- is an exciting and challenging method, and it is recommended that more teachers could make use of the case method and document its results within nursing education.

REFERENCES


