

The revival of anatomy in gynaecology

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Summary

In **chapter 1** we discuss the development in anatomy teaching over the past century. Traditionally, anatomy served as a leading science in the founding of medical schools mainly from a deontological stance. This stance implies that an action is considered morally good because of some characteristics of the action itself, not because the product of the action is good. During the century a more utilitarian stance got the upper hand, meaning that right and wrong are determined by focusing on outcomes and usefulness, and problem-based learning (PBL) was introduced.

PBL is a process that uses identified issues within a scenario to increase knowledge and understanding. It follows a constructivist approach to learning where students activate prior knowledge and build upon existing conceptual knowledge frameworks. The idea is that concepts or information from basic sciences are recognized by students and studied as learning objectives. Though, critics question the ability of students to ask the right questions to uncover the scientific basis of the problems. Critics' concerns regarding PBL and basic sciences were supported by feedback from the field. Program directors, medical doctors and trainees claim to be worried that medical students and trainees are ill-prepared in anatomy when entering the clinical part of their education. Medical students and trainees themselves feel insecure and concerned that their anatomical knowledge is not sufficient for clinical practice since PBL was introduced. In addition, around the year 2000 a 7-fold increase is reported in claims related to anatomical errors submitted to the Medical Defence Union of the United Kingdom.

The question arises as to whether the changes in medical education over the past century may have gone too far when it comes to basic sciences such as anatomy. Should we overthink our medical education to find the right balance between theory and practice? The overall objective of this thesis is to provide insight in the different aspects of anatomy knowledge and acquisition of anatomy knowledge. Part I of this thesis aimed to determine how medical students learn anatomy and what is known about the level of anatomy knowledge in general. Part II focusses on anatomy in the speciality obstetrics and gynaecology. We aimed to define what is need-to-know knowledge for a general gynaecologist, the level of anatomical knowledge and the use and acquisition of this knowledge in the daily practice. We approach the role of anatomy from the principle of utility.

Anatomy is seen as one of the basic pillars of medical education and gaining sufficient anatomical knowledge seems indispensable for a medical doctor. Factors that can influence how well students learn anatomical structures include available sources, learning time and study assistance. In **chapter 2** we explore the attitude and appreciation of medical students for studying anatomy at different phases of their training. A focus group was used to develop a questionnaire. Five principal themes were featured in the questionnaire: 1) importance of studying anatomy, 2) appreciation for studying anatomy, 3) assessment of the student's own

knowledge, 4) learning tools that could be used to improve anatomical knowledge, and 5) attitude about studying anatomy in the bachelor phase compared to that in the master phase. The study showed that 78,7% of the students considered it very or extremely important to have a solid knowledge of anatomy. Of the master students, 68,8% found anatomy education more important in their current training phase compared to their bachelor phase of the curriculum. Although they consider it important, the majority do not find anatomy attractive to study and students spent a relatively little time on studying anatomy. Almost all students (92,7%) use anatomical textbooks as a learning source. Ideally, they would like to use more three-dimensional tools related to a clinical scenario to make studying anatomy more attractive.

Chapter 3 describes what is known about measured anatomical knowledge. As the ongoing debate about the level of anatomical knowledge seems to be mainly based on opinion, a literature review was conducted to gain more insight into the level of anatomical knowledge based on published measurements among medical students, trainees, fellows and specialists. Thirty relevant studies were found. In these studies participants took a variety of anatomy tests, varying from identification of labelling structures, multiple choice formats and open-ended questions. The scores ranged from 22,5% to 82,4%. The main conclusion after critically reviewing the literature is that the level of anatomical knowledge is hard to establish, mainly due to the lack of standardization in the way anatomy is tested. In addition, it's unknown how much anatomy is actually required for safe clinical practice.

Obstetrics and gynaecology (O&G) is a broad and diverse branch of medicine, including surgery and diagnostic imaging. Therefore, an adequate understanding of anatomy can be considered to be particularly important in the field of O&G. In **chapter 4** we aimed to define the anatomical structures that should be taught to ensure safe and competent practice among general gynaecologists. The Delphi method was used to answer the research question. At the start of the Delphi process a list of 123 items, conducted through focus groups and interviews, was sent to 60 gynaecologists and O&G trainees in the Netherlands. The panellists scored the items on a Likert scale between 1 (not relevant) and 5 (highly relevant). Consensus was defined when $\geq 70\%$ of the panellists scored the item as relevant or very relevant and the average rating was ≥ 4 . After two rounds 86 structures were identified as relevant to the safe and competent practice of a general gynaecologist. Those structures can be used to guide gynaecology postgraduate training.

Chapter 5 presents the international validation of the above described Dutch Delphi study. Worldwide trainees are educated to become skilled, competent gynaecologists. Every country has its own curriculum, which not only differs in length but also in structure and content. It is known that the difference in length does not influence the surgical skills or cognitive knowledge, but that difference in content can influence the quality of care.

Therefore, it seems reasonable to aim for an international speciality-specific standard to guarantee a high quality of care and patient safety worldwide.

A total of 192 surveys were filled out with panellists from seven countries (Belgium, Germany, Norway, Oceania, Sweden, United Kingdom and United states). Out of the 123 initial structures, a total of 72 (58,54%) were internationally found to be relevant. When the 86 relevant structures derived from the Dutch Delphi study were compared to the 72 relevant structures from the international Delphi, 70 structures (81,4%) matched. With diminishing time and resources devoted to anatomical education, defining what is essential knowledge helps to provide a sufficient knowledge base. The results of this study can be used to standardize and guide gynaecology postgraduate training worldwide.

After we defined what essential knowledge is for the safe and competent practice of a gynaecologist, we assessed the anatomical knowledge level of Dutch trainees in O&G in **chapter 6**. We hypothesised that trainees possess a good knowledge of anatomy and would correctly answer at least 80% of the questions on the previously defined essential structures in an annual progress test. The anatomy questions from the annual progress test from 2010 to 2019 were analysed. Over a 10-year study period, there were 54 anatomy-related questions out of a total of 1637 questions (3,3%). Of these 54 questions, 38 (70%) were concerned with essential structures that are included in the Delphi list. The overall correct response rate of the year 4-6 trainees was 64,5%. This correct response rate was lower than we expected. These results increase awareness of the importance of testing and improving anatomy knowledge of postgraduate O&G trainees.

In **Chapter 7** we present an explorative qualitative study to analyse the role and significance of anatomy in the daily practice of O&G, and the relationship between the importance of anatomy and the acquisition of anatomical knowledge. Semi-structured interviews with gynaecologists and O&G trainees from Belgium and the Netherlands were used to answer the research question. After 12 interviews we concluded that anatomical knowledge plays a role in O&G practise: 1) during daily activities, 2) in the feeling of self-efficacy, 3) in gaining a respected name as a doctor. This realization seems to come quite late during postgraduate training or even while being already a gynaecologist. Motivation plays a central role to which extent anatomical knowledge is obtained. In addition to motivation, we also found facilitating factors such as supervisors, patient problems, exams and hampering factors, such as feeling of insecurity and lack of a reference about essential knowledge. This information can be used to optimise anatomy education with the overarching goal to educate future gynaecologists who work safely and with a high degree of self-efficacy.

In **Chapter 8** we discuss how to dwindle the gap between the importance of and the investment in anatomical knowledge.

We recommend to optimise the process of gaining anatomical knowledge by creating a learning climate in which the internal motivation of the student and trainee are maximally supported and where anatomy is taught more explicit.

Future research should focus on how this essential knowledge can best be addressed to the O&G trainees and investigate the consequences of the anatomical level of knowledge for practice in order to answer the question how much anatomy is enough.