

Conference Paper

The Development of a Core Syllabus for Teaching Anatomy of the Respiratory System to Medical Student

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Abstract

Anatomical education is one of critical basic science to support the physician's skill in their clinical practice. However, the change in the medical curriculum caused a reduction in the time given for anatomy learning. One of the systems in anatomical learning that has considerable material is the respiratory system. The purpose of this study is to get a consensus on anatomy respiratory system material that is important for a medical doctor. This study was designed in a qualitative approach with the specified method of two round Delphi Technique. The subjects of the study were the general practitioner in Indonesia selected through purposive sampling. The Delphi questionnaire was arranged based on three anatomy textbooks and the previous research about anatomy core syllabus. The consensus level established by the researchers in this study was at 80% point. In the first round of Delphi, it did not get any additional topic, but 51 items were omitted. The consensus of general physicians after the second round of Delphi got 108 core syllabi of 372 anatomical materials of the respiratory system. Not all materials contained in the textbook are directly related to medical practice, so it is possible for lecturers to select essential teaching materials to reduce the students' learning burden.

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1. Introduction

Anatomy is one of the oldest learning subjects and crucial basic science in medicine [1, 2]. A physician should master anatomy knowledge and best practice at all stages of clinical examination, especially in physical examination, diagnosis, and clinical decision-making [3]. Excellent knowledge and a solid foundation for anatomy will be advantageous to support the physician's performance in conducting clinical practice [2, 4].

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Anatomy is an important basic science, but there are still many medical students who complain about the difficulty level of the material [5]. Even physicians who are prior medical students have stated that their anatomical abilities are inadequate [2]. In fact, they should have good knowledge of anatomy as a provision or basis in carrying out daily tasks [6].

Currently, the medical curriculum has undergone significant changes [2]. One of the factors contributing to changes in the structure of the medical curriculum is the amount of material added, but not matched by the increase in the duration of the educational period. These make basic sciences such as anatomy get less and less learning portion [7].

In the 21st century, there are significant challenges to anatomical learning because the curriculums are changing along with new paradigms of education, technological advancement, and demands from various institutions and societies [1]. Previously, the subject of anatomy was studied based on the organization of the human body region. But today, anatomical learning which was priorly studied based on the body region has been replaced by a system approach, in which every body's system such as musculoskeletal, heart, respiration, digestion, endocrine, urine, reproduction, and nervous system is studied separately. In practice, learning based on the system aspect of the anatomical structure tends to be considered along with the regional or position aspects, thereby making the student's learning burden increasing [8].

The abundance of anatomical material that medical students must learn, make an anatomy professor must be able to determine which content is needed by a physician. Therefore, researchers want to identify the core matter of anatomy that medical students need to master, especially in the respiratory system. The researchers chose the anatomy of the respiratory system because based on the experience and opinions of medical students, respiration is one system with a lot of materials. The broader range of science covered in respirology (the science of respiration), does not allow a physician to master it genuinely. However, a doctor who acts as a general practitioner and as a family doctor is required to remain active following the latest respirology developments. Thus, core knowledge of the respiratory system, especially in the field of anatomy is required [9].

This study uses the Delphi method, a discussion method between experts in a particular field, which is repeatedly done to discuss a problem to get an agreement [10]. This method uses a series of questionnaires that have been structured by researchers. Furthermore, the questionnaires should be filled by experts anonymously, and their responses will be summarized to be re-shared in the next round [2].

Previous research on the core matter of anatomy that has been done is research on the preparation of syllabus core in the field of neuroanatomy for medical students by Moxham *et al.* in 2014 [11]. In the same year, Tubbs *et al.*, also examined the development of head and neck anatomy core materials for medical students [12] and Swamy *et al.* studied the bone anatomy material relevant to clinical cases for medical students [2]. By 2016 Smith *et al.* conducting anatomical syllabus core research for all the body region [13].

In Indonesia, there has been a research on the consensus of anatomical experts on the core matter of anatomy for medical students by Munawaroh *et al.* [14]. The study included all body systems including the respiratory system, but the details of the material have not been specified. Besides, from all the above research, there has been no research on the core matter of particular anatomy of the respiratory system for the study of medical students. So, this research will be focused to know the core matter of anatomy of the respiration system.

2. Methods

This research is qualitative research using the Delphi method. This method is done in two rounds using the questionnaire as the instrument.

The initial questionnaire contains a list of respiratory system anatomy materials made by researchers using three textbooks. There is Gray's anatomy for students by Drake *et al.* [15], Clinically Oriented Anatomy by Moore *et al.* [16] and Sobotta, Atlas of Human Anatomy [17]. The result of the expert consensus on the core matter of medical anatomy in the respiratory system by Munawaroh [14]. Furthermore, the questionnaire is consulted to anatomy experts in the field of respiration who have experienced teaching anatomy for more than ten years and regularly attend the annual scientific meeting PAAI [Perhimpunan Ahli Anatomi Indonesia/Association of Anatomy Experts of Indonesia].

In the first round of Delphi, panels are asked to check the columns provided from whether or not they are to be studied by medical students. At the bottom of the questionnaire was given space for the panel to add anatomical material to other important respiratory systems not yet listed in the questionnaire.

Anatomical material considered significant by more than 50% of Delphi panels and all new elements added by the panel will be incorporated into the Delphi questionnaire for the second round. In the second round, the questionnaire was redistributed to the Delphi panel. The panel is required to check the columns 1-4 depending on the degree of importance of the material. Value 1 means the element is not necessary [not required],

two means acceptable, three means important and four means very important (essential). At the time of filling out the Delphi II questionnaire, the panel was asked to provide a reason for the selected value.

At the time of filling the first and second round questionnaires, it was expected the panel to consider the level of competence of general practitioners which has been set in SKDI 2012. The consensus level set in this study amounted to 80%. So, the anatomical material of the respiration system is considered significant when obtained at least 80% Delphi panel selected on the number 3 (important) and 4 (very important).

The subjects of this study were chosen using purposive sampling technique. The inclusion criteria are general practitioners who have been practicing at least three years and graduated from medical school for no longer than ten years. Ethical approval is issued by the Commission of Health Research Ethics RSUD Dr. Moewardi Surakarta with No. 532 / VI / HREC / 2017. The study was conducted from June to September 2017.

3. Results

In the first Delphi round, the Delphi questionnaire was distributed to 28 general physicians from various cities in Indonesia who met the inclusion criteria. However, of the 28 questionnaires were distributed via email and sent directly through the delivery service, only 20 panels (71.4%) returned the questionnaire to the researcher. While in the second Delphi round, from 20 questionnaires distributed, 19 panels (95%) were returned to the researchers.

The panels involved in this research are from 12 cities in various regions in Indonesia, they are from Tangerang, Yogyakarta, Sukoharjo, Surakarta, Pekalongan, Purbalingga, Surabaya, Malang, Semarang, Balikpapan, Banjarbaru and Banda Aceh. The origin of the university where they study medicine also varies, namely from 4 leading medical faculties in Indonesia.

In the first questionnaire, it consists of eight parts of the respiratory system. Each section includes several topics / anatomy materials. There are nasus with 82 topics, pharynx with 52 topics, larynx with 57 topics, trachea with 7 topics, pulmo with 50 topics, pleura with 13 topics, diaphragm with 18 topics, and thoracic wall 93 with topics, so the total topics in the first questionnaire were 372. In the first round, questionnaires were distributed to these 20 panels, there were no additional topics, but there are 51 topics that were omitted, bringing the total to 321 topics.

In the second Delphi round, a total of 108 core material anatomy of the respiratory system were obtained from 321 topics. Thus, the total topics that were not included in the

core material are 213 topics. Details of the percentage of nasus topic will be described in Table 1.

TABLE 1: List of nasus topics included in the core material.

Topics	\sum The panel chooses as level 3 and 4 (%) (n=19 panels)
The topography of <i>cavum nasi</i>	17(90)
The function of <i>cavum nasi</i>	18(95)
<i>Os nasale</i>	18(95)
<i>Cartilago septi nasi</i>	16(85)
<i>Septum nasi</i>	18(95)
<i>Os ethmoidale</i>	15(80)
<i>Choanae</i>	17(90)
The topography of <i>sinus paranasalis</i>	18(95)
The function of <i>sinus paranasalis</i>	18(95)
<i>Sinus sphenoidalis</i>	17(90)
<i>Sinus frontalis</i>	18(95)
<i>Sinus maxillares</i>	18(95)
<i>Tractus olfactorius</i>	16(85)
<i>Vestibulum nasi</i>	15(80)
<i>Concha nasalis superior</i>	16(85)
<i>Concha nasalis media</i>	17(90)
<i>Concha nasalis inferior</i>	17(90)
<i>Ductus nasolacrimalis</i>	18(95)
<i>Plexus kiesselbach</i>	15(80)
<i>N. olfactorius</i>	15(80)

4. Discussions

The Delphi panel involved in the study is general practitioners who are practicing in hospitals, clinics, or private practice centers throughout Indonesia. The reason for choosing general practitioners as Delphi panels is because they directly handle cases that should be handled by general practitioners according to their competence. It is hoped that Delphi panels can choose materials that are used by general practitioners in clinical practice and do not lean into specialist materials. In contrast to the research of Swamy *et al.* [2] and Smith *et al.* [13] who use specialist physicians as Delphi panels, because according to them, specialist physicians more often deal with patients in handling certain cases so that more deeply anatomy in a system of the body. As for previous studies such as research by Munawaroh [14], Moxham *et al.* [11], and Tubbs *et al.* [12] used anatomy

experts as subjects in their research, because they think the experts understand more about the content of the anatomical material itself.

The Delphi panels in this study should meet the inclusion criteria established by the researcher, who have at least three years of clinical practice experience. The long-term expertise of general practitioner practice will lead to more cases being handled so that the physician knows more about what materials will be used in dealing with cases of general practitioner competence. Besides, other inclusion criteria were general practitioners who graduated from medical school less than ten years earlier. In hope physician's anatomical knowledge is still well attached to the brain to know what material is needed by medical students when it has come down directly in clinical practice.

Clinical introduction to basic science teaching such as anatomy can help to bridge between basic science and clinical practice [18]. Some medical educators argue that the anatomy curriculum should focus on the most clinically relevant core curriculum for general practitioner graduates [6, 11]. The need to teach the clinical anatomy as a whole is applied in the preclinical stage [1] and should refer to SKDI as a reference standard in the development of national physician competence tests [19]. Therefore, in this study, the panel was asked to provide a clinical reason in choosing an anatomy material as an essential material and attention to the level of competence in SKDI. From this research data got some reason and clinical correlation why panel choose the structure as core matter. For example, in the pharynx section, the important topic is the tonsils. The reason for Delphi's panel for selecting tonsillar topics as an important material is because of the clinical correlation of tonsillitis, i.e. inflammation of tonsil. The Delphi panel agreement on the importance of this topic is already in line with SKDI 2012. Because in SKDI 2012, tonsillitis is a competence of 4A general practitioners, which means that general practitioners should be able to control the disease after they have finished medical school.

From all the parts compiled in the list of materials of the respiratory system, there is material that always falls into the important category, it is the topography and function of the anatomical part. For example, cassava topography and rice cavum function. This may be because topography and function are basic anatomy as well as basic physiology to be mastered by general practitioners. Because to be able to know where the abnormalities of an organ, one needs to know the topography or projection of these organs in the body in order to avoid errors in the examination and provision of management. While to know the role of an organ in the body, it needs to know the function of the organ. One of the examples is the larynx function, the larynx is a sphincter for the inferior respiratory system and provides a sound-producing mechanism [15]. Therefore, if a person has a complaint about his voice, by mastering this anatomy, a general practitioner may know

that one of the possible structures that might be problematic with that person is in the larynx section.

All the core materials selected by the panel on the questionnaire are important materials that have clinical correlations and were associated with most diseases in primary health facilities. So, a good anatomical understanding of a physician can help a physician make the diagnosis and provide management and counseling to the patient to improve communication and the relationship between the physician and patient [2].

The panel in this study is a general practitioner who came from various regions in Indonesia so that it can represent the opinions of all general practitioners in Indonesia. Besides, all respondents also come from different universities, thus representing the various learning systems and knowledge levels gained from each university.

Hopefully, the results of this study can be a reference in teaching and learning activities by anatomy lecturers in medical faculties to emphasize learning on core matter. It is also a consideration of the Indonesian Anatomy Experts Association (PAAI) in making an anatomical curriculum for medical students throughout Indonesia to fit clinical cases that are often handled by general practitioners.

On 4-6 May 2018, PAAI held a meeting in Jakarta. In this meeting, PAAI discussed the anatomical curriculum by using the results of this study as a component that must be mastered by students and adds learning objective "Students can apply Anatomy of respiration system and chest wall in system related disorder (according to SKDI)."

With the results of this study, it is expected to be more concise anatomical material but still referring to SKDI and clinical skills that are often encountered in the community so that medical students are not saturated in learning, but still can become physicians who later can practice effectively and safely.

As a conclusion, the general physician's consensus on the core syllabus of the anatomy respiratory system derived from this study was 108 topics from 321 topics arranged in the questionnaire. The core syllabus consists of nasus with 20 topics, pharynx with 13 topics, larynx with 10 topics, trachea with 3 topics, pulmo with 17 topics, pleura with 9 topics, diaphragm with 8 topics, and thoracic wall with 28 topics.

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