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Self-assessment of Family Physicians on Physiology Knowledge and Skills

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Abstract

It is important in clinical practices that physicians can base diagnosis, appropriate treatment planning and follow-up processes upon a physiological ground. The purpose of the study is to examine the self-evaluation results of family physicians working in Konya about their physiology knowledge and skill levels. An online questionnaire consisting of 23 questions was applied to 126 family physicians working in Konya in order to evaluate their physiology knowledge and skill levels and the responses were evaluated. As a conclusion, a significant difference was found among the groups when comparing the tendency of family physicians to voluntarily start medical education based on the range of terms of office (p=0.027). 81% of the respondents stated that they wanted to receive additional training for electrocardiography (ECG), 79.4% for exercise prescription and 65.9% for pulmonary function tests (PFT). The field in which the respondents found themselves most competent in physiology was endocrine system physiology (69.1%) and their least competent field was nervous system physiology (31.6%). It may be beneficial to organize additional reinforcement training to improve physiology knowledge and skills in the clinical decision-making processes of family physicians. It was revealed that they think that they can contribute to the diagnosis, treatment and follow-up processes.

Key words: *Family physicians, Physiology education, Medical education, Family medicine, Postgraduate medical education.*

Introduction

The international standards program in medical education was initiated by the "World Federation for Medical Education" in 1998. The aim of the program is to provide standardization in medical faculties that use different education models, and the curricula, educational tools and materials suitable for these models (1,2). These standards are shaped in three main areas: pre-graduate, post-graduate and continuing medical education. Standards in pre-graduate medical education are basically in nine areas (1.

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Mission and vision, 2. Education programs (curriculum), 3. Evaluation of students, 4. Students, 5. Academic staff, 6. Educational resources, 7. Program evaluation, 8. Administration and management, 9. Continuous improvement) are structured and their subgroups are defined (1,2).

In medical education, the duration of pre-graduate, post-graduate and continuing medical education periods and the total education period vary by countries. The medical education in Belgium, a member of the European Union, is 7.5 years, the first 3.5 years of which are devoted to medical sciences, and the following two years to the preclinical period and the last two years to clinical sciences. In Germany, where three years are devoted to the basic sciences, two years to the clinical sciences, and the last year to practical applications, the duration of medical education is 6 years. In the Netherlands, the medical education is for 6 years, of which 4 years are preclinical, and the last two years are clinical (2,3).

The education period in medical faculties existing in Turkey is 6 years. Three years of this duration is the education of basic sciences (pre-clinical period), including physiology. The remaining 2 years is for training and the last year is called internship period.

In a study conducted in medical faculties operating throughout Turkey, it was observed that theoretical physiology courses were mainly given in the grades 1 and 2 (70.6%) or in the first 3 years (11.8%) in the pre-clinical period. In the same study, it was determined that practical training mostly took place in the grade 2 (4). With an average of 90 (22-198) course hours in a year, Biochemistry ranks 5th after Microbiology, Pathology, Microbiology and Histology (5).

After graduating from medical faculties in Turkey, the graduates can work as family physicians/general practitioners in primary or secondary healthcare institutions as well as they can continue to practice their profession in hospitals, private clinics or universities as academicians by completing their speciality examination or doctoral programs (6).

As of 2020, the total number of physicians in Turkey is 171259. The number of general practitioners in this human resource reaches 49760. Among the current figures, the number of family medicine units is 26594 (7).

Considering the "Health for All" goal of the World Health Organization In the 21st century, Turkey initiated the family medicine pilot application for the first time in 2005, and as of 2010, family medicine has been implemented all over Turkey. Annually, approximately 253,000 patients apply to family physicians (7). In Turkey, family physicians provide their services in the family medicine health unit and carry out primary healthcare services. Their job descriptions include diagnosis, treatment and rehabilitative health services in primary care, especially preventive healthcare. It is very important for family physicians to have knowledge of physiology, which defines the functioning mechanism of the parts in the human body, for both preventive and therapeutical medicine practices in primary care (4). Among the basic sciences that constitute the introduction to medical education, human physiology is important because it is based on the functions of the human body from the molecular level to the organism level and the elucidation of these functions in terms of their mechanisms. In addition, the clarification of the physiopathological processes for the

developmental mechanisms of diseases is also a part of this education period (8). Although the education provided in medical faculties in Turkey is evaluated through the feedback forms filled out by the students, there is no study investigating the contribution and benefit of physiology education in clinical or professional life (4).

The importance of making a correct diagnosis in the clinic is known in the treatment process. While making routine decisions, physicians may not be aware that they are using their knowledge of the mechanism, but it is inevitable that they apply physiological principles as they encounter difficult cases (9). Questioning the physiopathological processes while making a correct diagnosis is extremely critical in excluding other possibilities in the differential diagnosis. The physician's ability to base his/her thoughts on the physiological ground during the diagnosis provides an advantage in achieving the correct diagnosis. In addition to the correct diagnosis, the physician's ability to interpret the process leading to the disease provides an advantage in terms of focusing on the correct treatment targets. The fact that the process of getting the correct diagnosis and making the appropriate treatment decision is realized based on detailed knowledge of physiological mechanism facilitates, supports and accelerates the clinician's process management. Getting the right diagnosis and making the right treatment decision quickly can prevent the development of conditions such as aggravation of the current clinical picture, the appearance of additional clinical findings, and a decrease in the response to treatment (10). In the study of Woods et al., it was shown that physiopathological knowledge about disease mechanisms serves as a theoretical framework for the organization and recall of clinical information, and it stays in memory longer than information without a physiological basis and can increase diagnostic accuracy (11).

The medical knowledge and skills of family physicians in the primary healthcare services, who are the physicians who work in the unit to which a certain patient group first applies, are extremely important in this process since they take the first part in the diagnosis, treatment and follow-up of patient groups such as pregnant women, newborns, people with chronic diseases and the elderly population over 65 years of age (12). The efforts to be carried out to identify and increase the physiological knowledge and skills of family physicians will be beneficial in accelerating referrals from family health centers to secondary or tertiary health care institutions, if necessary, by making the diagnosis process accurate, faster and easier.

The purpose of the study is to evaluate the physiology knowledge and skills of family physicians. Based on the results to be obtained from this study, it can be contributed to make decisions about whether it is necessary to organize scientific activities such as workshops, courses, etc. for the development of physiology knowledge and skills for family physicians. In addition, it can be used in the improvement of pre-graduate education programs.

Material and Method

The study was initiated as a result of the decision of the Necmettin Erbakan University Non-Pharmaceutical and Medical Device Research Ethics Committee with the decision no: 2021/3200. Within the scope of this

descriptive study, a questionnaire designed for the family physicians working in the family health centers affiliated to the 'Konya Provincial Health Directorate, Turkish Ministry of Health and applied online
(google forms).

126 people participated in the research. It was determined that 6 people gave repetitive answers and were therefore excluded during the statistical analysis.

Descriptive statistics were used in statistical analysis. Mean ± standard deviation (S.D.) for numerical variables, frequency (F) and percentage (%) values for categorical variables were calculated. Cronbach's alpha coefficient was evaluated to test the internal consistency of the questionnaire. Chi-square test was used in the analysis of categorical variables. SPSS.25.0 program was used in all statistical analyses. $p < 0.05$ value was considered significant.

Results

74 male (61.7%) and 46 female (38.3%) family physicians participated in the study.

The distribution of the participants according to age ranges was as follows: 15 people (12.5%) between the ages of 25-34, 30 people (25%) between the ages of 35-44, 54 people between the ages of 45-54 (45%), 55 years old and over 21 people (17.5%).

The distrubution of the participants' working years was as follows: 15 people between 0-9 years 12.5%, 35 people between 10-19 years (29.2%), 68 people 20 and over (56.7%). Values for age; mean: 45.80 , median: 48.00 SD: 9.275 , range:42 (min:25- max:67). The values for the working years are mean:20.36 , median: 21.00 , SD:9.288 ,range:37 (min:1-max:38).

Participants answered each questions given by choosing the appropriate option from 1-2-3-4-5 options (1-Strongly disagree / 2-Disagree / 3-Neutral / 4-Agree / 5-Strongly agree). Frequency and percentage values are in Table 1.

The answers given by the participants to the questions according to their own evaluations were examined. Percentage of knowledge on subsystems of physiology are listed as follows (Figure 1):

1. Endocrine system physiology (69.1%).

2. Pregnancy physiology (51.7%).

3. Exercise physiology (47.5%).

4-5. Respiratory Physiology (46.7%) = Fetal and Neonatal Physiology (46.7%).

6. Female Reproductive System Physiology (45.8%).

7. Hematopoietic system physiology (43.3%).

8. Physiology of aging (40.0%).

9. Cardiovascular system physiology (37.5%).

10. Urinary system physiology (36.7%).

11. Male Reproductive System physiology (35.9 %).

12. Nervous System Physiology (31.6%).

Table 1: Percentage and number of respondents (%:percentage and n= number of respondents) regarding knowledge on subsystems within physiology.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Cardiovascular system physiology	%5.8 (n=7)	%12.5 (n=15)	%44.2 (n=53)	%35 (n=42)	%2.5 (n=3)
Respiratory Physiology	%5.8 (n=7)	%20 (n=24)	%27.5 (n=33)	%42.5 (n=51)	%4.2 (n=5)
Endocrine System Physiology	%5.8 (n=7)	%18.3 (n=22)	%25.8 (n=31)	%43.3 (n=52)	%6.7 (n=8)
Nervous System Physiology	%8.3 (n=10)	%20.8 (n=25)	%39.2 (n=47)	%28.3 (n=34)	%3.3 (n=4)
Urinary System Physiology	%7.5 (n=9)	%18.3 (n=22)	%37.5 (n=45)	%34.2 (n=41)	%2.5 (n=25)
Hematopoietic system physiology	%10 (n=12)	%14.2 (n=17)	%32.5 (n=39)	%40 (n=48)	%3.3 (n=4)
Female Reproductive System Physiology	%8.3 (n=10)	%15.8 (n=19)	%30 (n=36)	%40.8 (n=49)	%5 (n=6)
Pregnancy physiology	%5.8 (n=7)	%11.7 (n=14)	%30.8 (n=37)	%49.2 (n=59)	%2.5 (n=3)
Fetal and Neonatal Physiology	%6.7 (n=8)	%15 (n=18)	%31.7 (n=38)	%45 (n=54)	%1.7 (n=2)
Male Reproductive System Physiology	%7.5 (n=9)	%20.8 (n=25)	%35.8 (n=43)	%34.2 (n=41)	%1.7 (n=2)
Physiology of Aging	%6.7 (n=8)	%15 (n=18)	%38.3 (n=46)	%36.7 (n=44)	%3.3 (n=4)
Exercise Physiology	%5.8 (n=7)	%19.2 (n=23)	%27.5 (n=33)	%45 (n=54)	%2.5 (n=3)

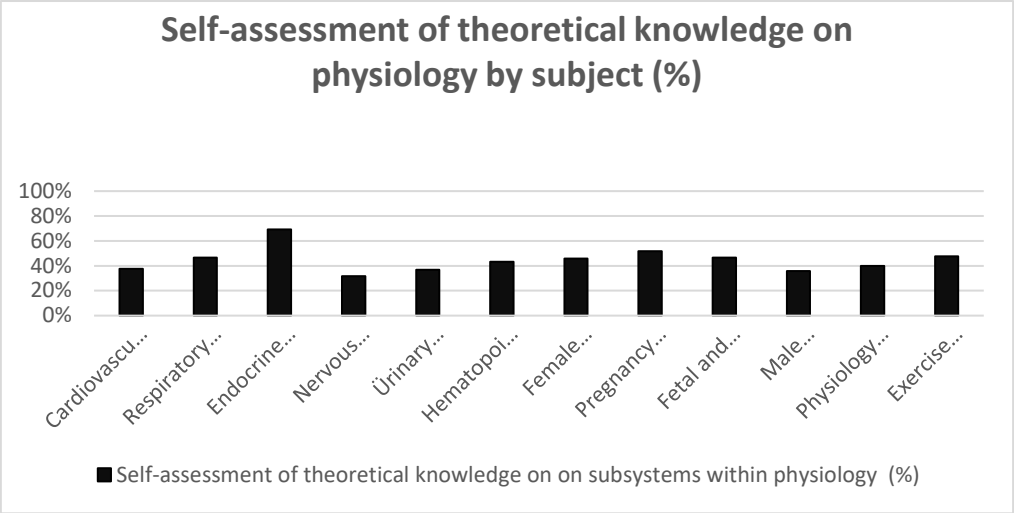

Figure 1: Self-assessment of theoretical knowledge on subsystems within physiology (%).

According to the evaluations made considering the ranges of working years (0-9 years / 10-19 years / 20 years and above), there were no significant difference in the answers given to the questions "I think my knowledge and practical skills in physiology contributed to my ability to take anamnesis, physical examination, laboratory tests and other basic medical practices" (p=0.531), "I think my knowledge and practical skills in physiology contribute to the diagnosis and treatment of diseases and refer patients to appropriate health institutions" (p=0.459) and "I update my informations about physiology periodically by using the ways to access current information " (p= 0.669). A significant difference was found in the answers given to the question "I started my medical education voluntarily" according to the ranges of working years (p=0.027). According to this, it has been observed that the rate of starting medical education voluntarily is higher for those with 20 years or more of ranges of working years than those with 10-19 years and 0-9 years. Similarly, it has been observed that the rate of having started medical education voluntarily is higher for those with 10-19 ranges of working years than those with 0-9 years. There was no significant difference in the answers given to the question, "I am satisfied with being a physician and willing to keep working."

There were no significant differences in the answers given to the questions "Generally, my knowledge and practical skills in physiology is sufficient" (p=0.305), "My theoretical knowledge on physiology that I gained in undergraduate education was sufficient" (p=878), "My knowledge and practical skills in physiology that I gained in my undergraduate education was sufficient." and "I would like to have additional education on physiology" according to the ranges of working years (p=0.822).

According to the evaluations made considering the age ranges (25-34 years / 35-44 years / 45-54 years / 55 and over), there were no significant difference according to age ranges in the answers given to the questions “I think my knowledge and practical skills in physiology contributed to my ability to take anamnesis, physical examination, laboratory tests and other basic medical practices” (p=0.532), "I think that my knowledge and practical skills in physiology contribute to the diagnosis and

treatment of diseases and to refer patients to appropriate health institutions" (p=0.714).), "I update my informations about physiology periodically by using the ways to access current information" (p= 0.648), "I started my medical education voluntarily" (p= 0.062) and "I am satisfied with being a physician and willing to keep working" (p=0.514).

There were also no significant difference according to age ranges in the answers given to the questions "Generally, my knowledge and practical skills in physiology is sufficient" (p=0.610), "My theoretical knowledge on physiology that I gained in undergraduate education was sufficient" (p=0.701), "My knowledge of physiology practical skills that I gained in undergraduate education was sufficient" (p=0.207) and "I would like to have additional education on physiology" (p=0.721).

According to the answers given to the question 'Choose the practical skills course topics within physiology that you want to receive (You can put check marks more than one option): 81% of the participants were electrocardiography (ECG), 79.4% were exercise prescription, 65.9% were pulmonary function tests (PFT), 34.1% were peripheral blood smear and leukocyte counts, 31.7% Bleeding time and clotting time determination, 27.8% hematocrit and erytrocytes sedimentation measurements, 20.6% stated that they wanted to retrain on the practice of determining blood groups (Figure 2).

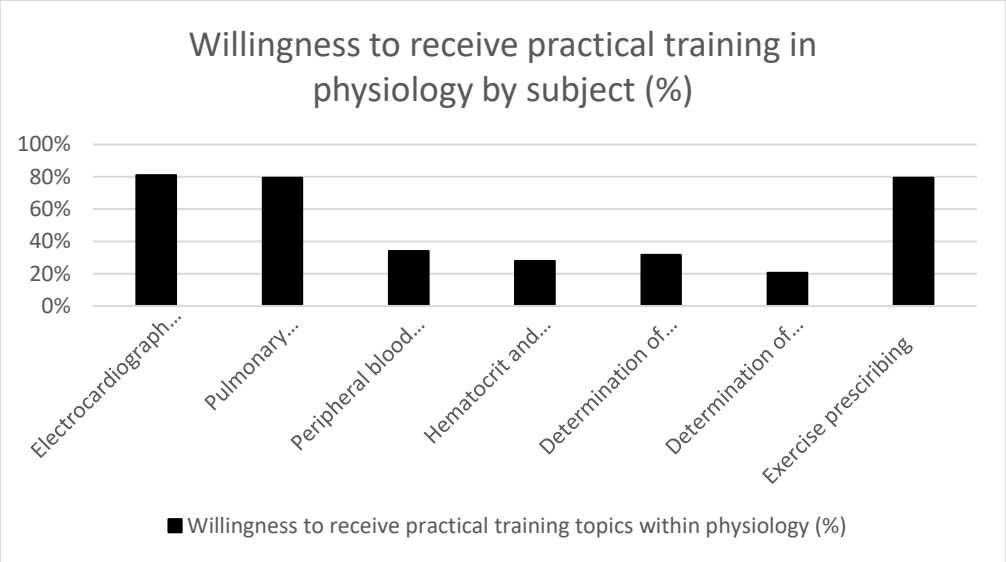

Figure 2: Willingness to receive practical training in topics within physiology (%).

Discussion

The importance of Abraham Flexner's report in the development of today's medical education curriculum, which includes basic and clinical sciences, is well-known. With this report, the concept of "pre-clinical curriculum" emerged. Recently, medical faculties have improved their preclinical curricula and added integrated clinical practices to basic science courses in order to better understand the relationship between basic sciences and clinical sciences and to make knowledge more permanent (13).

In a study investigating the perceptions of medical students and physicians about the role and scope of physiology, approximately 98% of students and 99% of physicians remarked that physiological knowledge is very important in understanding clinical information and approaching patients. Approximately 92% of students and physicians stated that teaching physiology together with clinical topics (integrated education) may be appropriate for a better understanding (14).

It is known that life-long education and life-long learning are important in adult education. In the "World Conference on Adult Education" organized by UNESCO, it was emphasized that adult education should continue throughout life (15). The implementation of qualified practices for adult education in medical education is also important in the process of students becoming physicians with sufficient and advanced clinical skills and continuing their practice (16). Considering the wide scope of family medicine practice and the speed of developments in medicine, it can be said that continuing medical education is an important need for family physicians. Based on a study in which the effectiveness of post-graduate physiology education was evaluated and the trainees' assessments were taken before and after the education, it was revealed that post-graduate reinforcing physiology education contributed to the trainees (17). According to the data we obtained in our studies, it was determined that the respondents desired to receive additional training for practical skills in physiology, especially electrocardiography (ECG) and pulmonary function tests (PFT). In a study conducted with family physicians, when asked which subjects (medical topics, issues related to family medicine practices, issues related to legal responsibilities) they would like to receive training during a family medicine training, it was observed that they primarily wanted to receive training in medical topics (89 out of 104 participants) (18).

In a study on physicians' job satisfaction and burnout levels, it has been shown that physicians find themselves inadequate in terms of professional success in the first years of their employment, and that job satisfaction increases as age progresses, experience increases, and by specialization (19). In a study conducted with senior medical students, it was revealed that the majority of the students (76.8%) started their medical education voluntarily. In addition, among the participants, there were some people (67.8%) who remarked that family orientation, the idea of providing a job guarantee, and the score obtained in the university admission exam were sufficient for choosing a medical school and that the guidance of relatives was effective in starting education (20).

In a study investigating physicians' attitudes and practices about exercises and exercise prescribing, 70% of physicians specified that the exercise prescribing is not a part of their routine practices. It was determined that only 23% of these physicians were familiar with the guidelines on exercising in healthy adults. Again, in this study, the majority of physicians (78%) stated that they needed a course on the medical aspects of exercises in medical school. In the same study, only 4% of patients remarked that they were directed to exercise programs to improve their health (21). In a study on the contribution of a workshop to family physicians' exercise prescribing attitudes, it was revealed that a 3-hour training workshop resulted in a significant increase

in family physicians' prescribing physical activity as medication (22). In our study, the majority of the respondents (79.4%) stated that they wanted to receive exercise prescribing education. The exercise prescribing education can contribute to the continuing education of family physicians, and can contribute to public health by emphasizing the importance of physical activity for patients and by increasing the number of patients exercising.

Conclusion

It is extremely important for family physicians, who have a primary role in the diagnosis and treatment processes of a very large patient population, to have sufficient knowledge of the science of physiology based on the basic functioning of the human body, in terms of the correct and effective implementation of healthcare services. Considering the literature and the data of this study, it was revealed that the physicians requested to update their physiology knowledge after undergraduate education. Since there is no study investigating the contribution and benefit of physiology education in clinical or professional life in Turkey, it is thought that the study may contribute to the literature in this context. It would be appropriate to plan studies to improve the integration of physiology and other basic sciences education into clinics in the future.

Conflict of Interest

No conflicts of interest, financial or otherwise, are declared by the authors.

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