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ORIGINAL ARTICLE

Pharmacoeconomics Education in Pharmacy Faculties: Status in Türkiye and Other Countries

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ABSTRACT

Objectives: Pharmacoeconomics is an important branch of science that should be taken into account by countries' social security institutions in order to rationally manage drug expenditures within healthcare budgets for the aging population. Pharmacists trained in pharmacoeconomics make a great contribution to this field. This study aims to draw attention to the inclusion of pharmacoeconomics education as a compulsory course in the curricula of pharmacy faculties in Türkiye.

Materials and Methods: Fifty-one pharmacy faculties in Türkiye were analysed. The pharmacoeconomics courses and their contents in the curriculum of these faculties were evaluated. The course contents, European Credit Transfer System and credits, weekly and meeting hours of the faculties offering pharmacoeconomics courses were analyzed.

Results: There are 51 pharmacy faculties in Türkiye. Of these pharmacy faculties, 33 are operating under state universities and 18 under foundation universities. There is no pharmacoeconomics course in the curriculum of 82.35% of the pharmacy faculties (n=42). In the other 17.65% (n=9) of the faculties, there is a pharmacoeconomics course in the curriculum. The course contents of the faculties are similar, and basic pharmacoeconomics information is generally given. There are no faculty members who have completed their PhDs in this field.

Conclusion: This study, the first to systematically evaluate the situation in all pharmacy faculties in Türkiye, has revealed that pharmacoeconomics education is limited. Making pharmacoeconomics courses mandatory in the curriculum of pharmacy faculties is necessary to comply with international standards and enable pharmacists to contribute more effectively to rational drug use and the sustainability of healthcare systems.

Keywords: Pharmacoeconomics, pharmacy education, pharmacy curriculum, health expenditures, Türkiye

INTRODUCTION

In our age of increasing life expectancy, the potential increase in pharmaceutical expenditures due to an ageing population and changing treatment options makes the forecasting of health expenditures even more important.[1] Developing technology and medical innovations have led to major advances in the treatment of chronic diseases and new drug discoveries. However, this situation challenges countries in the provision of health services, social security, and welfare.[2]

Non-communicable diseases have become a major health problem worldwide,[3] accounting for 63% of all deaths. The high costs of newly discovered drugs prevent the widespread use of these treatments, leading to an increase in unmet medical needs.[4] In particular, developments in gene therapies offer important options for rare diseases and intensify scientific studies in this field.[5]

As the average life expectancy increases, health expenditures also increase. Consequently, the high treatment costs of the elderly population cause major debates in social security systems.[6] Pharmaceutical expenditures constitute a significant component of health expenditures. In 2022, approximately 1.48 trillion in pharmaceutical expenditure was spent globally. This figure is estimated to reach 1.9 trillion dollars by 2027.[7]

Increasing health expenditures force countries to make more rational and systematic plans for financial sustainability. Pharmaceutical expenditures, which constitute a large portion

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of health expenditures, are increasing, especially with the introduction of next-generation drugs. In Organisation for Economic Co-operation and Development (OECD) countries, pharmaceutical expenditures reached 20 percent of total health expenditures in 2013.[8] This situation has intensified even more with the introduction of new drug treatments to the market. The Coronavirus Disease 2019 (COVID-19) pandemic has also caused these expenditures to rise.[9]

It has led to the systematic development of pharmacoeconomic evaluations in health economics to answer the question of how financial resources should be allocated to different drugs.[10,11] Pharmacoeconomic studies propose the most appropriate alternative by addressing the healthcare expenditures. By making detailed analyses, it ensures rational drug use. Pharmacoeconomics is necessary for industry, national regulatory authorities, and health financiers to make rational decisions.[12] Additionally, it establishes a framework for making economic decisions by evaluating all stages from the drug's pharmacological effects to its pricing. Cost analyses allow pharmacists and reimbursement institutions to make better and more informed decisions.[11]

Pharmacists can contribute to the rational management of drug expenditures with knowledge of pharmacoeconomics. For this, they should receive pharmacoeconomics education in pharmacy faculties. However, pharmacoeconomics education is not provided in most pharmacy faculties in Türkiye.[13] Pharmacoeconomics education improves students' decision-making and skills in the critical analysis of evidence by enabling them to make more informed decisions.[14]

This study aims to evaluate the current status of pharmacoeconomics education in pharmacy faculties in Türkiye and to emphasise the importance of including this education in the curriculum.

MATERIALS AND METHODS

This study was designed as a descriptive, cross-sectional analysis. All 51 pharmacy faculties in Türkiye that were actively providing education during the 2023–2024 academic year were included. Data were obtained from the official websites of the faculties and the Yükseköğretim Kurulu Atlas (Higher Education Council Atlas) database.[15,16]

The curricula of each faculty were examined for the presence of a pharmacoeconomics course. When available, the following parameters were recorded: course title, whether the course was compulsory or elective, the semester in which it was offered, European Credit Transfer System credits, and weekly course hours. In addition, the detailed content of the pharmacoeconomics courses and the reference books used was reviewed.

Statistical analysis

Categorical variables such as the presence (yes/no) and status (mandatory/elective), of pharmacoeconomics courses in public versus foundation faculties were compared using chi-square or Fisher's exact test, with a significance level set at $p<0.05$. Results were presented as numbers (n) and percentages (%).

Data organization and tabulation were performed in Microsoft Excel for Microsoft 365, and statistical analyses were carried out using Social Sciences for Windows, (version 22.0; IBM Corp., Armonk, IBM Corp., USA).

The study is based on publicly available open-source data from university websites. No live material or human participant data were used. Therefore, ethical approval and patient consent were not required.

RESULTS

There are 208 universities in Türkiye, 133 of which are state universities and 75 are foundation universities. Among these universities, 55 pharmacy faculties (37 state and 18 foundation) have been established under the relevant rectorates. Among these faculties, 51 pharmacy faculties have started education. Thirty-three of these pharmacy faculties operate within state universities, and eighteen operate within foundation universities (Figure 1).

There is no pharmacoeconomics course in the curriculum at 82.35% (n=42) of the pharmacy faculties. In the other 17.65% (n=9) of the faculties, there is a pharmacoeconomics course in the curriculum.

Among 33 state faculties, 7 (21.2%) offered a pharmacoeconomics course, while 2 of 18 foundation faculties (11.1%) included such a course. The difference was not statistically significant ($\chi^2=0.27$, $p=0.603$) (Table 1).

Among the nine faculties offering pharmacoeconomics courses, three state and two foundation faculties provided the course as mandatory, while four state faculties offered it as an elective. No significant difference was observed (Fisher's exact test, $p=0.444$) (Table 2).

When the course contents of the faculty offering pharmacoeconomics courses were examined, it was observed that the scope and depth of the courses were heterogeneous across institutions. The most frequently included topics were basic economic concepts, pharmacoeconomic evaluation, and cost-effectiveness analysis, while advanced methods such as Markov modelling were not included (Table 3).

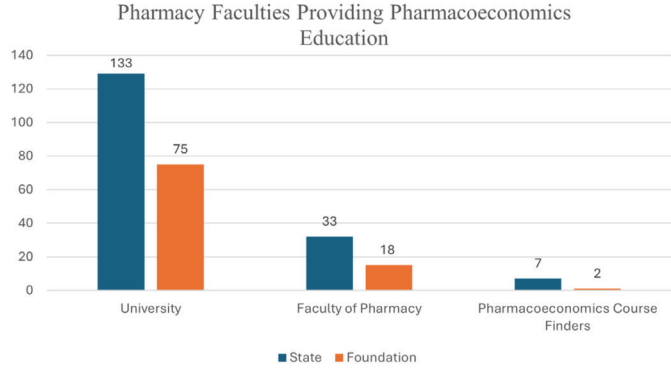

Figure 1. Universities, pharmacy faculties and pharmacoeconomics courses in Türkiye[15,16]

Table 1. Availability of pharmacoeconomics courses in pharmacy faculties in Türkiye

Faculty type	Pharmacoeconomics course available	No course	Total
State (n=33)	7 (21.2%)	26	33
Foundation (n=18)	2 (11.1%)	16	18
Total (n=51)	9 (17.6%)	42	51

χ^2=0.27, *p*=0.603

Table 2. Status of pharmacoeconomics courses as mandatory or elective

Faculty type	Mandatory	Elective	Total
State (n=33)	3	4	7
Foundation (n=18)	2	0	2
Total (n=51)	5	4	9

Fisher's exact test, *p*=0.444

Table 3. Content of pharmacoeconomics courses across faculties

Content area	Faculties covering topic (n, %)
Basic economic concepts & health economics	9 (100%)
Pharmacoeconomics & economic evaluation	8 (88.9%)
Cost-effectiveness analysis	8 (88.9%)
Cost-utility analysis (QALY)	7 (77.8%)
Cost-benefit/cost of illness analysis	6 (66.7%)
Case studies	6 (66.7%)
Decision analysis	4 (44.4%)
Economic modelling	3 (33.3%)
Retrospective databases	1 (11.1%)
Markov modelling	0 (0%)

QALY: Quality-adjusted life year

Findings indicate that there is not enough awareness in Türkiye about pharmacoeconomics education. Stakeholders managing health economics should pay more attention to this issue.

DISCUSSION

Health expenditures are increasing annually worldwide. According to the Fiscal Sustainability of Health Systems report published by the OECD, the share of health expenditures in the Gross Domestic Product (GDP) of OECD member countries has been increasing since the COVID-19 pandemic. This share will reach 11.2% of GDP in 2040. In Türkiye, the ratio of health expenditures to GDP was 5.8% in 2009 and 4% in 2022.[17]

Considering the increasing pharmaceutical expenditures, pharmacists trained in pharmacoeconomics will significantly contribute to managing public spending in this area. However, while there is a need for experts in the field of pharmacoeconomics, which is critical for rational drug expenditures, it is paradoxical that pharmacists are not trained in pharmacoeconomics. The fact that only eight pharmacy faculties in Türkiye provide basic pharmacoeconomics education may delay access to medicines in the future, due to financial reasons. In Türkiye, the Social Security Institution, which finances health expenditures, has legislated that pharmacoeconomic evaluation recommended by companies will be taken into consideration in drug reimbursement, but it does not specify how this will be done.[18]

The rationalization of health expenditures is possible through smarter management of health care economics. To manage pharmaceutical expenditures, there is a great need for specialized pharmacists who know pharmacoeconomics. Current knowledge suggests that pharmacists, who have a critical role in drug counseling, clinical pharmacy, and drug supply, will not only ensure rational drug use but also reduce drug expenditures for social security systems and save money with the pharmacoeconomics training they will receive.[19] Therefore, it is important to include a pharmacoeconomics course in the curriculum of pharmacy faculties. With the savings to be achieved, these institutions will be able to better address unmet medical needs for patients. It is therefore important to include a pharmacoeconomics course in the curriculum of pharmacy faculties.

However, pharmacoeconomics should not be limited to cost containment or drug expenditure reduction. It also encompasses broader domains such as cost-effectiveness, cost-utility analyses including quality-adjusted life years, budget impact evaluations, and health technology assessment (HTA).[20] Training pharmacists in these areas would enable them not only to contribute to rational drug spending but also to improve clinical outcomes and strengthen evidence-based decision making.

Previous studies on pharmacoeconomics education in Türkiye were limited to a small number of faculties. Our study provides an original contribution by systematically evaluating the curricula of all pharmacy faculties in Türkiye for the first time.

Pharmacoeconomics influences not only the decisions of drug reimbursement agencies but also the cost savings for hospitals in procuring medicines. In the study conducted by Javor et al.,[21] the study stated that the inclusion of pharmacists in pharmaceutical procurement in hospitals will provide significant savings for health expenditures.

Pharmacoeconomics education is widely included in the curricula of pharmacy faculties in many countries, especially in the United States of America (USA).[13] Makhinova and Rascati[22] conducted a study on pharmacy faculties in the USA and reported that in 2011, 87 pharmacy faculties included pharmacoeconomics courses in their curricula and 90% of these faculties required pharmacoeconomics courses. According to a study conducted by Adunlin et al.[23] in accredited pharmacy faculties in the USA, 111 of 141 pharmacy faculties had pharmacoeconomics courses. The study emphasized the importance of pharmacoeconomics education for improving

clinical outcomes and reducing health expenditures. In our study, it was determined that pharmacoeconomics courses are offered in only one-fifth of pharmacy faculties in Türkiye.

The status of pharmacoeconomics education in pharmacy faculties in 22 countries in the Middle East and North Africa region was analysed in a study. According to a study by Farid and Baines,[24] 80 of 176 pharmacy faculties in 14 countries included pharmacoeconomics courses in their curricula. However, in this training, the basics of pharmacoeconomics draw attention. Similarly, when the course contents are analysed in our study, we understand that basic pharmacoeconomics information is given.

In a study on pharmacoeconomics education in pharmacy faculties in Bosnia and Herzegovina, it was reported that only one faculty offers a pharmacoeconomics course in the curriculum.[25] According to another study conducted by Freitas and Balbinotto,[26] there is a pharmacoeconomics course in 4 out of 55 pharmacy faculties in Brazil. It was emphasized that the pharmacoeconomics course is important for the Brazilian Health System. In a study conducted on the pharmacy faculties in Egypt, it was emphasised that pharmacoeconomics courses are given in 7 out of 20 pharmacy faculties, highlighting a need for faculty members in this field. Additionally, education in this area is still at the initial level.[27] In Türkiye, there is a similar situation in terms of faculty members, since doctoral programmes in pharmacoeconomics have yet to be established in pharmacy faculties. According to a study, there are no specialised pharmacoeconomics pharmacists in Türkiye.[28] This deficiency stands as a significant challenge to the provision of pharmacoeconomics education in pharmacy faculties in Türkiye.

According to the standards of organizations such as the International Society for Pharmacoeconomics and Outcomes Research and Accreditation Council for Pharmacy Education, pharmacoeconomics education should go beyond basic concepts and include topics such as cost minimization, cost-effectiveness, cost-benefit analyses, economic modeling (e.g., Markov models); HTA, and budget impact analysis.[29-31] Furthermore, teaching methods should include case-based learning and practical projects to ensure that graduates are competent not only in theory but also in practice.

In a study conducted by Şencan et al.[28] among students in five pharmacy faculties in Türkiye, it was stated that the science of pharmacoeconomics is not well understood by students and that a course should be added to the curriculum on this subject. In this study conducted with students, it was concluded that they were aware of the necessity of pharmacoeconomics education and that the course should be given in the fourth year. In our study, it was observed that education occurred mostly in the fourth and fifth grades.

Pharmacy faculties in the USA are ahead of other countries in pharmacoeconomics education.[23] The situation in the countries mentioned in the literature is similar to Türkiye.[25,26]

The findings of this study may accelerate the decisions of policymakers concerning social security expenditures to employ more pharmacists, who have knowledge in pharmacoeconomics, in the public sector. In this study, it evaluated whether the pharmacoeconomics course was included in the education curriculum of pharmacy faculties in Türkiye, and a comparison was made with the situation in some countries, especially in the USA, where data are available in the literature.[22,23,32,33] More academic research is needed to reinforce the importance of education in this field.

Study limitations

The main limitation of this study is that it relies solely on course content information available on pharmacy faculty websites. The knowledge and competency levels of students taking the pharmacoeconomics course could not be assessed. Furthermore, no data could be obtained regarding the educational outcomes of the faculties or the effectiveness of the courses. Future studies should examine the impact of pharmacoeconomics education on post-graduation contributions and employment opportunities for students.

CONCLUSION

This study is one of the first comprehensive investigations examining the inclusion of pharmacoeconomics courses in the curricula of all pharmacy faculties in Türkiye. The findings indicate that the course is only offered in a limited number of faculties. Making pharmacoeconomics education mandatory in all faculties will enable pharmacists to play a more effective role in health policies and drug expenditures. This will strengthen both rational drug use and the economic contribution to the health system.

Ethics

Ethics Committee Approval: Not required.

Informed Consent: Not required.

Footnotes

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