REVIEW

Duygu Ayhan Baser[1]
Raziye Sule Gumustakim[2]

[1] Department of Family Medicine, Faculty of Medicine, Hacettepe University, Ankara, Türkiye
[2] Department of Family Medicine, Faculty of Medicine, Sütcü Imam University Maraş, Türkiye

Corresponding Author:
Duygu Ayhan Baser
mail: duyguayhan@outlook.com

Received: 05.02.2024
Acceptance: 22.06.2024
DOI: 10.18521/ktd.1432169

Konuralp Medical Journal
e-ISSN1309–3878
konuralptipdergi@duzce.edu.tr
konuralptipdergisi@gmail.com
www.konuralptipdergi.duzce.edu.tr

Family Physicians' Knowledge, Attitudes, and Practices Regarding Adult Immunization in Turkey: A Systematic Review

ABSTRACT

Objective: This systematic review aims to investigate the knowledge, attitudes, thoughts, and behaviors of family physicians (family medicine specialists, family doctors, family medicine assistants) in Türkiye regarding adult vaccinations.

Methods: In this systematic review, data were obtained through a retrospective search of descriptive studies published in Turkish and English between 2013-2023 in the databases of " PubMed, Google Scholar, National thesis center." The PICOS method was used to determine the eligibility of included studies, and the methodological quality of the studies within the systematic review was assessed using the The Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols Checklist (PRISMA) checklist flow diagram.

Results: 177 selected by title for abstract analysis; among which 55 articles and theses were considered to be examined for the full-text review. As a result of the detailed examination of them, a total of 23 articles and theses were selected to be included in the study. Influenza vaccine and HPV vaccine knowledge of family doctors were higher and followed by hepatitis B. COVID-19, hepatitis B, tetanus, influenza were the mostly recommended vaccines by family doctors to adults.

Conclusions: In conclusion, this systematic review emphasizes the critical role of family physicians in promoting vaccination among adult populations. By addressing knowledge gaps, addressing concerns of family doctors, promoting a culture of vaccination within the healthcare community, we can enhance vaccine uptake and ultimately contribute to improved public health outcomes and disease prevention efforts.

Keywords: Family Physician, Family Medicine, Adult Immunization, Systematic Review

Türkiye'deki Aile Hekimlerinin Erişkin Aşılaması Hakkındaki Bilgi, Tutum ve Uygulamalarının Değerlendirilmesi: Sistematik Derleme

ÖZET

Amaç: Bu sistematik derleme, Türkiye'deki aile hekimlerinin (aile hekimliği uzmanları, aile hekimleri, aile hekimliği asistanları) erişkin aşılarına ilişkin bilgi, tutum, düşünce ve davranışlarını araştırmayı amaçlamaktadır.

Yöntem: Bu sistematik derlemede, "PubMed, Google Scholar, Ulusal tez merkezi" veritabanlarında 2013-2023 yılları arasında Türkçe ve İngilizce olarak yayımlanan tanımlayıcı çalışmaların retrospektif bir araştırması yoluyla veri toplanmıştır. Dahil edilen çalışmaların uygunluğunu belirlemek için PICOS yöntemi kullanılmış ve sistematik inceleme içindeki çalışmaların metodolojik kalitesi, The Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols Checklist (PRISMA) kontrol listesi akış diyagramı kullanılarak değerlendirilmiştir.

Bulgular: Başlık olarak seçilen 177 makale, özet analizi için incelendi; bunların arasından 55 makale ve tez, tam metin değerlendirmesi için incelemeye uygun bulundu. Bunların detaylı bir şekilde incelenmesi sonucunda, toplamda 23 makale ve tez çalışmaya dahil edilmek üzere seçildi. Aile hekimlerinin influenza aşısı ve HPV aşısı bilgisi diğer aşılardan daha yüksekti ve bunu hepatit B izledi. COVID-19, hepatit B, tetanoz, influenza aşılarının aile hekimleri tarafından erişkinlere en sık önerilen aşılar olduğu görüldü.

Sonuç: Sonuç olarak, bu sistematik derleme, aile hekimlerinin erişkinler arasında aşılama konusunda önemli bir rol oynadığını vurgulamaktadır. Bu çalışma sonuçlarına göre aile hekimlerinin bilgi eksikliklerini, uygulamalarını ele alarak, sağlık profesyonelleri içinde aşılama kültürünü teşvik edip, aşılanma oranlarını artırabilir ve nihayetinde daha iyi halk sağlığı sonuçlarına katkıda bulunabiliriz.

Anahtar Kelimeler: Aile Hekimi, Aile Hekimliği, Erişkin Bağışıklama, Sistematik Derleme.

INTRODUCTION

In the dynamic field of healthcare, the pivotal role of family physicians in safeguarding public health is indisputable. As gatekeepers of preventive medicine, their understanding, perspectives, and actions significantly influence the landscape of adult vaccination-a cornerstone of proactive healthcare (1,2).

Adult vaccination necessitates a nuanced examination of the factors shaping its implementation within the Turkish healthcare context. The importance of adult immunization has also been emphasized with The Expanded Programme on Immunization (EPI) in Türkiye (3). Also the United States Centers for Disease Control and Prevention (CDC) has established vaccination schedules within their "proposed adult immunization program" each year (4). Family physicians, who are the cornerstone of preventive medicine, are expected to be the leading healthcare professionals in adult immunization. They are expected to have up-to-date knowledge on this subject and to make recommendations regarding adult immunization in practice. Knowing the knowledge, attitudes and behaviors of family physicians on this issue is important in adult immunization strategies. There are many cross-sectional studies internationally and nationally. Systematic reviews have been found that provide an overview of these studies internationally (5-8); however, a systematic review at the national level has not been encountered. By delving into the intricacies of knowledge dissemination, individual attitudes, professional thoughts, and behavioral patterns, we effort to provide a foundation for targeted interventions that can fortify and optimize adult vaccination strategies among family physicians in Türkiye. Through this exploration, we anticipate contributing valuable insights that not only enrich the existing literature but also serve as a catalyst for enhancing preventive healthcare practices within the Turkish medical landscape. This systematic review was conducted to examine the knowledge, attitudes, thoughts and behaviors of family physicians (family medicine specialists, family physicians, family medicine assistants) in Türkiye regarding adult vaccines.

MATERIAL AND METHODS

The Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols Checklist (PRISMA) was used to prepare this systematic review (9). In order to reduce the risk of bias in the study, literature search, article selection, data extraction and quality assessment were performed independently by two researchers, and consensus was reached by discussing any differences of opinion. In addition, before starting the study, a pilot study was conducted in a session attended by both researchers on all stages and a common road map was determined.

Eligibility Criteria: Articles to be included in the study were screened according to the following inclusion criteria/PICOS:

Patient/participants (P): Family Physicians in Türkiye

Intervention (I): Adult vaccinations

Comparison (C): None

Outcomes (O): Knowledge, attitudes, thoughts and behaviors towards adult vaccines

Study Design (S): Descriptive, quantitative studies published in Turkish and English between 2013 and 2023.

The criteria for exclusion in this systematic review included reviews, case reports, experimental studies, letters to the editor and congress proceedings. In addition, studies that were not of a survey nature and included only those using methods, adult vaccine refusal studies were also excluded.

Screening Strategy: The literature screenings were conducted between June 2023 and September 2023. A retrospective review of cross-sectional and qualitative studies published in Turkish and English in "PubMed, Google Scholar, National thesis center" databases between 2013-2023 was performed. The keywords ((family physician) OR (family doctor) OR (general practitioner)) AND ((vaccine*) OR (adult vaccine*)) were searched in accordance with MeSH in Turkish and in English. The references list of the included studies was reviewed to access additional studies.

Selection Criteria for Research: The identification and selection of articles to be included in this systematic review were made independently by the first and second researchers based on the inclusion criteria. Microsoft Excel program was used by the researchers for storing and sorting the articles. After removing the duplicates from the articles included in the systematic review and re-examining the articles according to the title and abstract, respectively, the articles to be included in the study were determined. At any stage of the research, when there was a difference of opinion between the researchers, a consensus was reached by discussing in an online session. The PRISMA flow diagram for the selection process of articles is given in Figure 1.

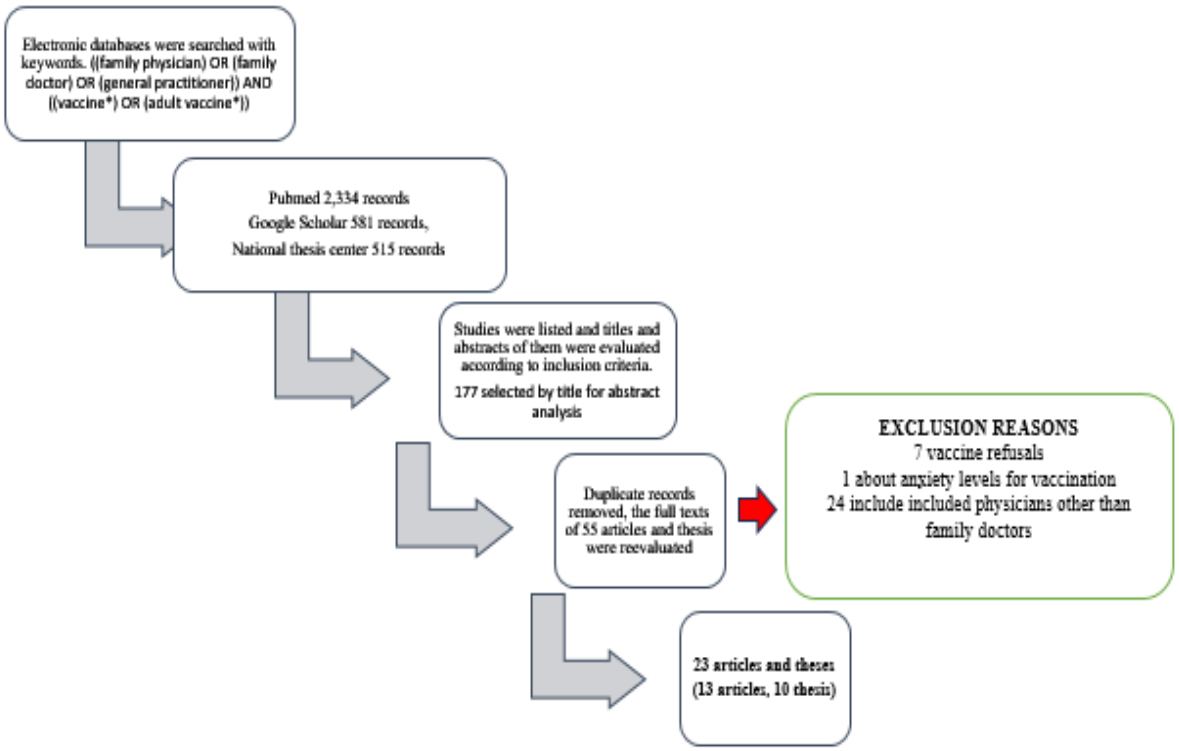

Figure 1. The PRISMA flow diagram for the selection process of articles

Obtaining Data: Studies included in the systematic review; "author and year of publication, objective, pattern/type, sample volume, year, form of publication, data on family physicians' knowledge, attitudes, thoughts and behaviors regarding adult vaccines and quality score" were collected.

RESULTS

Study Selection: As a result of the search, 2,334 records on Pubmed, 515 records on National Thesis Center and 581 records on Google Scholar were identified through data base searching, 177 selected by title for abstract analysis. As a result of the removal of repetitive records and examination according to the abstract, 55 articles and theses were considered to be examined for the full-text review. As a result of the detailed examination of the full text and theses, a total of 23 articles and theses were selected to be included in the study.

Study Characteristics: The total sample size of the articles included in the systematic review was 4996 (family doctors, family medicine specialist or family medicine residents), and it was determined that the number of samples in the studies varied between 48-606. Of the studies; 43.4% (n=10) were thesis, 65.2% (n=15) of them were in Turkish language; 30.4% (n=7) were conducted online survey; 21.7% (n=5) of them were published in SCI-Expanded journal. The type of paper; the type of survey and the language of study were shown in Figure-2 and the descriptive features of the studies were presented at Table 1.

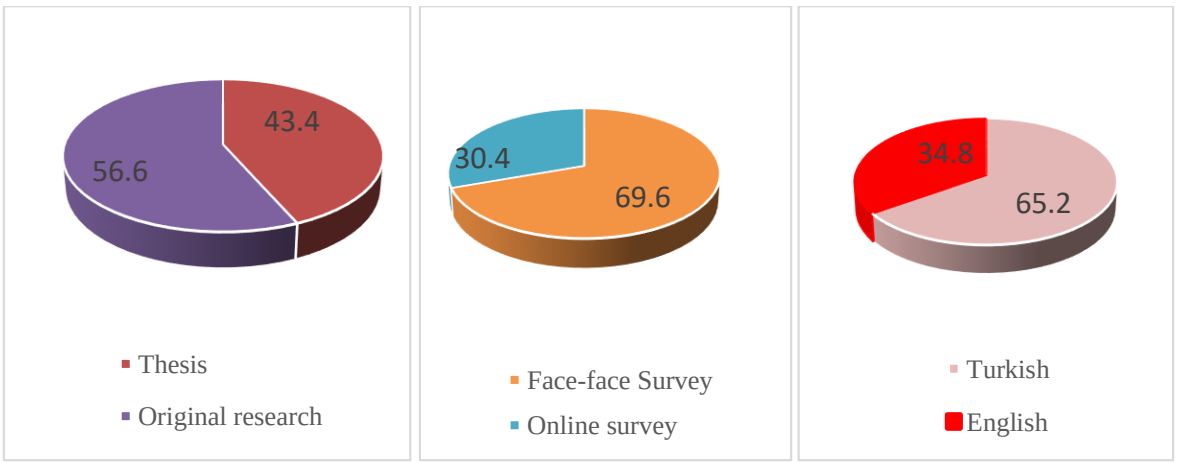

Figure 2. The type of paper; the type of survey and the language of study graphics

Table 1. The descriptive features of the studies (N=23)

Author/Year	Journal İndex	Study type	Sample size	Survey method
Akan 2016 (10)	SCI-E	Cross-sectional	606 FD	E-Survey
Akgül 2021 (11)	Ulakbim	Cross-sectional	48 FD	Survey (self-administered)
Aslan 2016 (12)	Thesis	Cross-sectional	107 FD	Survey (self-administered)
Ateş Bulut 2021 (13)	SCI-E	Cross-sectional	435 Physicians/191 FD	E-Survey
Aydemir 2023 (14)	Thesis	Cross-sectional	136 FD 22 FMS 58 FMS residents	Survey (self-administered)
Aysu Revanlı 2016 (15)	Other index	Cross-sectional	263 FD	Survey (self-administered)
Bulca Acar 2021 (17)	Ulakbim	Cross-sectional	494 FD	E-Survey
Celep 2020 (18)	SCI-E	Cross-sectional	97 FD	Survey (self-administered)
Demir 2021 (19)	Thesis	Cross-sectional	475 HP/108 FD	Survey (self-administered)
Deveci 2020 (20)	Thesis	Cross-sectional	310 FMS residents 208 FMS	Survey (self-administered)
Engin 2021 (21)	Other index	Cross-sectional	259 FD	Survey (self-administered)
Gümüstakim 2019 (22)	Other index	Descriptive	264 FD	E-Survey
Ketenci 2023 (23)	Other index	Cross-sectional	57 FD	Survey (self-administered)
Köksoy 2021 (24)	Thesis	Cross-sectional	159 FD	E-Survey
Köse 2022 (25)	Thesis	Descriptive	101 FD	Survey
Oğuzöncül 2021 (26)	Ulakbim	Descriptive	165 FD	Survey
Özbakır Acar 2019 (27)	Other index	Descriptive	154 FD	Survey
Pekgenç 2017 (28)	Thesis	Descriptive	253 FD	Survey
Us 2020 (29)	Thesis	Cross-sectional	202 FMS	Survey
Yağız 2019 (30)	Thesis	Cross-sectional	137 FD	Survey
Yağmur 2021 (31)	Thesis	Cross-sectional	343 FMS	Survey
Yetik 2023 (32)	SCI-E	Cross-sectional	113 FD	E-Survey
Yılmaz Karadağ 2019 (33)	SCI-E	Cross-sectional	221 FD	E-Survey

SCI-E: Science Citation Index-Expanded; FD: Family Doctor; FMS: Family Medicine Specialist; HP: Health Personnel; E-survey: online survey

In the articles included in our study, the knowledge, attitudes and behaviors of family physicians on influenza vaccination (4 studies), pneumococcal vaccination (1 study), both influenza and pneumococcal vaccination (1 study); human papillomavirus (HPV) vaccination (6 studies), elderly immunization (2 studies), COVID-19 vaccination (3 studies), pregnant vaccination (1 study), health worker vaccination (2 studies) and general adult immunization (5 studies) were evaluated. The objective of studies and adult vaccination types were presented in Table 2.

Seventeen of the studies (70.8%) evaluated the level of knowledge of family physicians. When evaluated according to their own opinions of family physicians, influenza vaccine (61.7%-69.3%) and HPV vaccine (50.5%-89.3%) knowledge were higher and followed by hepatitis B (45.5%), tetanus-diphteria (Td) (41.3%), COVID-19 (29.7%), pneumococcus (19.5%-58.1%) and zona zoster (13%-59.7%). Six of them evaluate attitudes and twenty two of them evaluated behaviors. When the studies were evaluated, the frequency of recommending influenza vaccination were changed between 34.6%-89.8%; pneumococcal vaccination recommendation frequencies were between 14.3%-65.2%; HPV vaccination recommendation frequencies were between 36.2%-83%; COVID-19 vaccine recommendation frequencies were between 98.5%-99.1%; hepatitis B (HBV) vaccination recommendation frequencies were between 19.3%-94.7%; tetanus vaccine recommendation frequencies were between 22.8%-90.9%. Of the family physicians, 18.7%-79.4% had influenza vaccination in the previous year; 19.5% had their children vaccinated against HPV.

Table 2. The objective of studies and adult vaccination types (N=23)

Author/Year	Objective of the study	Type of the adult vaccination
Akan 2016 (10)	To determine the factors that influenced the decisions of family physicians working in primary care health services to receive influenza vaccines	Influenza vaccination
Akgül 2021 (11)	To evaluate the level of knowledge of primary care physicians participating in the symposium on vaccination practices	General adult vaccination
Aslan 2016 (12)	To determine the vaccination rate of family physicians regarding influenza and pneumococcal vaccines, their knowledge, attitudes and behaviors about vaccines	Influenza and pneumococcal vaccination
Ateş Bulut 2021 (13)	To show the knowledge and attitudes of the physicians to older adults' vaccination schemes.	Older adults' vaccination
Aydemir 2023 (14)	To evaluate knowledge, attitudes and behaviors of family physicians about HPV infection and vaccine	HPV vaccination
Aysu Revanlı 2016 (15)	To investigate the level of knowledge and attitudes of family physicians about HPV and zona vaccines	HPV and zona vaccination
Bulca Acar 2021 (17)	To reveal the opinions of family physicians on the COVID-19 vaccine	COVID-19 vaccination
Celep 2020 (18)	To determine the knowledge and attitude of pregnant women and their primary healthcare providers towards immunization during pregnancy	Pregnant vaccination
Demir 2021 (19)	To determine the level of knowledge of health workers (including family doctors) about immunization services for health workers, to evaluate their attitudes and behaviors and raising awareness	Health worker vaccination
Deveci 2020 (20)	To determine the level of knowledge about HPV infections and HPV vaccine in family medicine residents by filling out a questionnaire and to examine the deficiencies	HPV vaccination
Engin 2021 (21)	To determine the knowledge, attitudes and behaviors of family physicians working to provide primary health care services about influenza vaccination	Influenza vaccination
Gümüstakim 2019 (22)	To identify the shortcomings in this area and draw a roadmap for what arrangements should be made in terms of physicians and patients in order to increase adult immunization rates in primary care	General adult vaccination
Ketenci 2023 (23)	To evaluate the knowledge, attitudes and behaviors of family physicians, on the implementation of vaccine pharmacovigilance and post-vaccine adverse effect signaling system in COVID-19 vaccination programs	COVID-19 vaccination
Köksoy 2021 (24)	To investigate the knowledge, attitudes and behaviors of physicians who are receiving specialty training in the field of family medicine about streptococcus pneumonia vaccine	Pneumococcal vaccination
Köse 2022 (25)	To assess knowledge, attitudes and behaviors of physicians working in relevant clinics about HPV vaccines	HPV vaccination
Oğuzöncül 2021 (26)	To investigate the knowledge, attitudes and behaviors of family physicians working in primary care about health worker vaccination	Health worker vaccination
Özbakır Acar 2019 (27)	To assess FDs' and primary health care personnels' (nurses and midwifes) knowledge and attitudes about cervical cancer (risk factors, screening, prevention) and the HPV vaccine	HPV vaccination
Pekgenç 2017 (28)	To reveal the attitudes of physicians (including family physicians) about immunization of the elderly, to raise awareness about immunization of the elderly and to increase vaccination rates which are below the targeted levels	Older adults' vaccination
Us 2020 (29)	To evaluate the knowledge of family medicine residents working in Ankara about upper respiratory tract infections, use of antiviral drugs in upper respiratory tract infections and influenza vaccine	Influenza vaccination
Yağız 2019 (30)	To determine the rate at which physicians administer seasonal influenza vaccine to themselves, to determine which patients they recommend it to, and to identify prejudices of physicians	Influenza vaccination
Yağmur 2021 (31)	To evaluate the knowledge, attitudes and behaviors of family medicine residents about influenza, pneumococcal and COVID-19 vaccines during the COVID-19 pandemic period	COVID-19 vaccination
Yetik 2023 (32)	To evaluate the level of knowledge, compliance with the screening program, and tendency to inform patients of the doctors working in family health centers where HPV testing is performed within the scope of the cervical cancer screening program in our country	HPV vaccination
Yılmaz Karadağ 2019 (33)	To assess the factors influencing primary care physicians' approach to adult vaccination in specific risk groups and evaluate the compliance to adult immunization guidelines	General adult vaccination

FD: Family Doctor; HBV: Hepatitis B; HPV: Human Papillomavirus

Table 3. The Knowledge, Attitude and Behaviours of family physicians in studies (N=23)

Author/Year	Knowledge	Attitude	Behaviour
Akan 2016 (10)		-The factors that led to increased vaccination compliance: working duration, age, chronic disease history and living with a person over 65 years. -Vaccine compliance is associated with higher odds ratio of 10.93 compared to vaccine non-compliance about "flu vaccine should be mandatory for health care workers" comment; 3.06 about "flu vaccine should be mandatory for family physicians" comment.	Vaccine compliancy among the physicians was 27.3%
Akgül 2021 (11)	64.6% of the participants answered 23 or more questions correctly out of 34 questions asked in the knowledge assessment.		81.3% of FD stated that they recommend influenza vaccination.
Aslan 2016 (12)	The average correct answer for 10 information questions about influenza vaccine was 5.9±2.1, and the average correct answer for 9 information questions about pneumococcal vaccine was 4.1±2.1.	23.4% of FD do not believe in the protection of the influenza vaccine.	-18.7% of FD get own regular influenza vaccination every year. -34.6% of FD stated that they recommend influenza vaccination. -20.6% of FD stated that they recommend pneumoccus vaccination.
Ateş Bulut 2021 (13)			-80.1% of FD had questioned the vaccination history of the patients. -Predicting four or five of the suggested vaccinations in older adults was 1,66 fold higher in FD than other specialists.
Aydemir 2023 (14)	50.5% of FD thought that they have knowledge about the HPV vaccine.	87% of FD thought that HPV vaccination should be on the national vaccination calendar.	-6% of FD stated that they had vaccinated against HPV. -19.5% stated that they had their children vaccinated against HPV. -65.7% stated that they recommended HPV vaccination to their patients.
Aysu Revanlı 2016 (15)	-89.3% of FD stated that they had knowledge about HPV vaccine. -59.7% of FD stated that they had knowledge about Herpes Zoster vaccine.	65.7% of FD stated that they were positive about recommending Herpes Zoster vaccine.	59.5% of FD stated that they recommend HPV vaccination to their patients.
Bulca Acar 2021 (17)			-6.3% had no intention of getting vaccinated against the COVID-19. -79.4% of FD get own regular influenza vaccination every year.
Celep 2020 (18)			The rate of Td vaccination was 98% for pregnants, 85.5% of pregnants' source of influenza recommendation was primary health-care services.
Demir 2021 (19)	32.5% of them have 12-13 correct answers, 19.6% have 14-15 correct answers in 15 questions.		40.2% of FD stated that they received regular influenza vaccine, 87.2% stated that they received HBV Vaccine, 39.3% stated that they received Measles, mumps, rubella (MMR) vaccine, 90.9% stated that they received Tetanus Vaccine, and 11.4% stated that they received Chickenpox Vaccine.

Deveci 2020 (20)	The rate of "I don't know" answers to questions containing general information about HPV was between 0.3-5.8%.		67.4% of FD stated that they recommend HPV vaccination.
Engin 2021 (21)			47.6% of FD get own influenza vaccination.
Gümüstakim 2019 (22)	34.4% thought they have enough information about adult vaccination.		82.2% of FD get own vaccination.
Ketenci 2023 (23)	29.7% of FD thought they had sufficient knowledge about the COVID-19 vaccination program.		
Köksoy 2021 (24)	19.5% of FD thought they had sufficient knowledge about pneumococcal vaccine.		-22.6% of FD recommended pneumococcal vaccine to everyone. -78.6% of FD informed their patients with an indication about pneumococcal vaccine.
Köse 2022 (25)	The average number of correct answers of FDs was 12.40±2.95 in 18 questions.		17.1% of FD stated that they vaccinated against HPV, 71% of them recommend it.
Oğuzöncül 2021 (26)	The average number of correct answers of FD was 7.59±2.17 in 13 questions.	-The average attitude score of FD was 10.74±1.54. -The flu vaccine, of which, 15.8% of the participants had the most hesitation in administration.	-43.6% of the study participants had their relatives vaccinated. -33.3% had themselves vaccinated outside the vaccination schedule. -52.6% were administered influenza, 19.3% HBV, 22.8% tetanus, 1.8% MMR, 1.8% meningococcus vaccine. -34.7% were administered influenza, 27.8% rota, 16.7% HBV, 11.7% tetanus, 5.6% pneumococcus, 2.8% MMR and 1.4% meningococcus vaccine to their relatives.
Özbakır Acar 2019 (27)	-56.7% of FD stated that they have knowledge about the HPV vaccine. -18% of the physicians knew that the HPV vaccine is suitable for both girls and boys. -84% of the physicians were aware of the protective role of the HPV vaccine.		-83% of them stated to recommend their patients HPV vaccination. -64.9% of them reported that they suggest HPV vaccination to their own daughters.
Pekgenç 2017 (28)	61.7% stated that they had adequate knowledge about influenza vaccine, 58.1% about pneumococcal vaccine, 41.3% about tetanus, 13% about zona zoster, and 45.5% about HBV vaccine.		40.3% of physicians recommended influenza vaccine, 32% pneumococcal vaccine, 47.8% recommended tetanus vaccine if there was an injury, and 50.2% recommended zona zoster vaccine for patients over 65 years of age.
Us 2020 (29)	"The flu vaccine is recommended only for patients at risk." 59.9% of physicians FD and "Pregnant women can be vaccinated with the flu vaccine." 83.1% of the physicians answered the proposition correctly.		
Yağız 2019 (30)	69.3% of FD reported having sufficient knowledge about influenza vaccine.		48.2% of FD get own regular influenza vaccination every year, 89.8% of them recommend it to all patients.

Yağmur 2021 (31)	The average number of correct answers of FDs was 81.8±12.1 in 7 questions.	While 36.7% of FDs reported that they had the influenza vaccine in the past year, 90.4% reported that they had the COVID-19 vaccine and 14.3% reported that they had the pneumococcal vaccine.
Yetik 2023 (32)		53.1% of FD reported that they recommend HPV vaccination.
Yılmaz Karadağ 2019 (33)		-72.4% of FD reported they follow the Adult Immunization Algorithm. -65.6% of them stated that they recommend tetanus, 71.2% influenza and 62.5% HBV to their over 65 years of aged patients.

FD: Family Doctor; HBV: Hepatitis B; HPV: Human Papillomavirus; MMR: Measles, Mumps, Rubella; Td: Tetanus-Diphteria

DISCUSSION

In recent years, adult immunization has become as important as child immunization worldwide. Family physicians can play a decisive role in promoting adult immunization. As a result of the this systematic review, it was observed that the level of knowledge of family physicians in Türkiye about adult immunization, vaccination and vaccine recommendation rates were generally lower than international studies.

In the international literature, it was observed that no systematic review was conducted on theses and usually they were conducted on original researchs (5-8). When the general contents of systematic reviews were evaluated; in the systematic review by Prieto-Campo et al. on adult immunization related to family physicians, it was seen that all of them were cross-sectional, in English language and a total of 41 studies were evaluated (5). In the systematic review by Pavlovic et al. on adult immunization related to all health workers including family physicians, it was seen that all of them were in English language and there were cross sectional and qualitative type studies a total of 98 studies were evaluated (6). In the systematic review by Collange et al. on adult immunization related to family physicians, it was seen that all of them were cross-sectional, in English language and a total of 11 studies were evaluated (8). Another prominent feature of international studies was the biggest part of them were face-to-face method (6,8).

The systematic review examined a diverse array of articles focusing on the knowledge, attitudes, and behaviors of family physicians regarding various vaccination types. The included studies covered a wide spectrum of vaccination topics, including influenza, pneumococcal, HPV, elderly immunization, COVID-19, pregnant vaccination, health worker vaccination, and general adult immunization (10-33). The distribution of studies across different vaccination types reflects the breadth of interest and concern regarding vaccination practices among family physicians. Notably, the review identified a relatively higher number of studies evaluating HPV vaccination (6 studies) (14,15,20,25,27,32) and general adult immunization (11,1,22,33), indicating a significant research focus on these areas within the context of family physician practices. In the systematic review by Collange et al, all studies included seasonal influenza vaccination, three of them also considered other vaccines (8).

The systematic review findings shed light on the varying levels of knowledge among family physicians regarding different vaccines. Notably, the majority of studies (70.8%) focused on assessing the knowledge levels of family physicians, highlighting the significance of this aspect in vaccine recommendation and administration (11,12,14-16,19,20,22-31). When examining the results in detail, it becomes evident that influenza and HPV vaccines were among the vaccines with the highest knowledge levels, as reported by family physicians themselves (14,15,26,29,30). However, the results also reveal disparities in knowledge levels across different vaccines. While influenza and HPV vaccines demonstrated relatively higher knowledge levels ranging from 61.7% to 89.3%, other vaccines such as HBV, tetanus, COVID-19, pneumococcus, and zona zoster exhibited lower levels of knowledge, with percentages ranging from 13% to 58.1%. This discrepancy underscores the need for targeted educational interventions and training programs to address gaps in knowledge among family physicians, particularly concerning vaccines with lower awareness levels. Accessing data sources grounded in scientific evidence or official resources (such as EMA, CDC, FDA or national sources) is crucial for acquiring accurate knowledge, which correlates with increased personal vaccination and recommendations to patients (3,4).

The systematic review included studies that assessed both attitudes and behaviors, revealing varying frequencies of recommending and receiving vaccinations among family physicians across different vaccine types. Firstly, the review identified disparities in the frequency of recommending various vaccines among family physicians. For instance, while the frequency of recommending the influenza vaccine ranged from 34.6% to 89.8%, suggesting variations in practice among healthcare providers, the recommendation frequencies for other

vaccines such as pneumococcal, HPV, COVID-19, HBV, and tetanus vaccines also exhibited considerable variability. These findings highlight the need for standardized guidelines and continuous education to ensure consistent and evidence-based vaccine recommendations among family physicians. Escriva-Boulley et al. conducted a systematic review about cognitions and behaviours of general practitioners in France regarding HPV vaccination and they mentioned about up to 50% of general practitioners do not recommend HPV vaccination because of concerns, including changes in patients' health behaviours and doubts about safety and/or efficacy (7).

Moreover, the review highlighted variations in the personal vaccination practices of family physicians. The percentage of family physicians who received the influenza vaccine in the previous year ranged from 18.7% to 79.4% (11,12,16-19,21,26,28,30,31,33), indicating differences in adherence to vaccination recommendations within this professional group. Similarly, the percentage of family physicians who had their children vaccinated against HPV was relatively low at 19.5% (14,15,26,29,30), suggesting potential gaps in knowledge or attitudes towards specific vaccines even among healthcare providers. These findings underscore the importance of addressing barriers to vaccination uptake among family physicians, including concerns about vaccine safety and efficacy, lack of awareness or training, and personal beliefs. Strategies aimed at promoting vaccination among healthcare providers should focus on addressing these barriers and providing tailored educational interventions to improve vaccine acceptance and uptake. Furthermore, the high recommendation frequencies for COVID-19 vaccination (ranging from 98.5% to 99.1%) among family physicians reflect the importance of prioritizing vaccination against emerging infectious diseases (17,23,31). The widespread acceptance and recommendation of COVID-19 vaccination among healthcare providers underscore their role as vaccine advocates and influencers in public health efforts.

The systematic review comprehensively examined the knowledge, attitudes, and behaviors of family physicians regarding various vaccination types, including influenza, pneumococcal, HPV, COVID-19, and others. This comprehensive coverage provides a holistic understanding of family physicians' perspectives on adult immunization in national level.

Limitations of study: Our research faces common limitations associated with synthesizing data from retrospective surveys reliant on self-reporting. The review may be subject to publication bias, as it only included published studies and may have missed unpublished or gray literature. This could affect the comprehensiveness and representativeness of the synthesized evidence. The review focused on studies conducted in Türkiye, which may limit the applicability of the findings to other geographical regions with different healthcare systems, cultural contexts, and vaccination policies. The review did not provide detailed information on the quality assessment of the included studies, such as the risk of bias assessment or the use of standardized quality appraisal tools. The included studies varied in terms of study design, methodology, and outcome measures, contributing to heterogeneity across the synthesized evidence. This heterogeneity may limit the comparability and synthesis of findings across studies.

Conclusion

The findings of this systematic review provide valuable insights into the knowledge, attitudes, and behaviors of family physicians regarding vaccination across diverse patient populations and vaccine types. The review identified disparities in the frequency of recommending various vaccines among family physicians, highlighting the need for standardized guidelines and continuous education to ensure consistent and evidence-based vaccine recommendations.

In conclusion, this systematic review emphasizes the critical role of family physicians in promoting vaccination among adult populations. By addressing knowledge gaps, addressing concerns, and promoting a culture of vaccination within the healthcare community, we can enhance vaccine uptake and ultimately contribute to improved public health outcomes and disease prevention efforts.

Declaration of Competing Interest

None to declare.

Funding Statement

This research received no external funding.

Informed Consent Statement

Not applicable.

REFERENCES

1. World Organization of Family Doctors (WONCA). The new definition of general practice/family medicine [Internet]. 2023 Edition. [cited 2024 Jan 10]. Available from: https://www.woncaeurope.org/page/definition-of-general-practice-family-medicine.
2. Toprak D, Köksal İ, Sargın M, Akan H. Adult vaccination, problems in practice and solution proposals, role of family physicians in adult vaccination. Türk Aile Hek Derg. 2018;22(3):166-74.
3. Republic of Turkey Ministry of Health, General Directorate of Primary Health Care. Circular letter on Expanded Program on Immunization. Ankara: Republic of Turkey Ministry of Health; 2009.
4. Centers for Disease Control and Prevention. Adult immunization schedule [Internet] Atlanta (GA): Centers for Disease Control and Prevention; 2023. [cited 2024 Jan 10]. Available from: https://www.cdc.gov/vaccines/schedules/hcp/imz/adult.html.

5. Prieto-Campo Á, García-Álvarez RM, López-Durán A, Roque F, Herdeiro MT, Figueiras A, et al. Understanding primary care physician vaccination behaviour: A systematic review. Int J Environ Res Public Health. 2022;25;19(21):13872.
6. Pavlovic D, Sahoo P, Larson HJ, Karafillakis E. Factors influencing healthcare professionals' confidence in vaccination in Europe: A literature review. Hum Vaccin Immunother. 2022;31;18(1):2041360.
7. Escriva-Boulley G, Mandrik O, Préau M, Herrero R, Villain P. Cognitions and behaviours of general practitioners in France regarding HPV vaccination: A theory-based systematic review. Prev Med. 2021;143:106323.
8. Collange F, Verger P, Launay O, Pulcini C. Knowledge, attitudes, beliefs and behaviors of general practitioners/family physicians toward their own vaccination: A systematic review. Hum Vaccin Immunother. 2016;3;12(5):1282-92.
9. Moher D, Liberati A, Tetzlaff J, Altman DG, PRISMA Group. Reprintpreferred reporting items for sytematic reviews and meta-analyses: The PRISMA statement. Phys Ther. 2009;89(9):873-80.
10. Akan H, Yavuz E, Yayla ME, Külbay H, Kaspar EÇ, Zahmacıoğlu O, et al. Factors affecting uptake of influenza vaccination among family physicians. Vaccine. 2016;29;34(14):1712-8.
11. Fethiye Akgül, Merve Ören, İrem Akdemir Kalkan, Yeşim Yıldız, Ömer Karaşahin, Fesih Aktar, et al. Assessment of knowledge about vaccination practices of family physicians participating in a symposium. Kocaeli Med J. 2021;10(2): 56-62.
12. Aslan Ş. Aile hekimlerinin mevsimsel influenza ve pnömokok aşıları hakkında bilgi, tutum ve davranışlarını belirleme [master's thesis]. [Kahramanmaraş (TR)];Sütcü İmam University;2016.
13. Ates Bulut E, Badak SO, Aksoy H, Fadiloglu A, Isik AT. The awareness and attitude of physicians to older adult routine vaccination scheme. Clin Interv Aging. 2022;31;17:1581-8.
14. Aydemir A. Eskişehirde görev yapan aile hekimleri ve aile hekimliği uzmanlık öğrencilerinin human papillomavirus (HPV) ve HPV aşısı hakkında bilgi, tutum ve davranışlarının değerlendirilmesi. [master's thesis]. [Eskişehir (TR)];Osmangazi University;2023.
15. Revanlı A, Yüceer C, Şenol E, Azap A, Erbay A, Alp-Çavuş S, et al. Awareness and attitude of family physicians about human papilloma virus and herpes zoster vaccines. Klimik Dergisi. 2016;29(1):15-20.
16. Z Baykan, M Naçar, S Özdemir, S Poyrazoğlu, F Çetinkaya. Knowledge and attitude of family physicians regarding adult vaccination. World Journal of Vaccines. 2011;1(3):92-7.
17. Bulca Acar A, Nur Eke R, Özen M. An analysis of the attitudes of family physicians towards the COVID-19 Vaccine. Konuralp Medical Journal.2021;13(S1):429-37.
18. Celep G, Duyan Çamurdan A, Baran Aksakal FN, Kara OF. Different perspectives of immunizations during pregnancy. Turk J Med Sci. 2020;9;50(2):316-23.
19. Demir E. Sağlık çalışanlarının, sağlık çalışanlarına yönelik bağışıklama hizmetleri hakkındaki bilgi düzeyleri, tutum ve davranışlarının değerlendirilmesi. [master's thesis]. [İstanbul (TR)];2021.
20. Deveci A. Aile hekimliği asistanlarının HPV ve korunma yöntemleri farkındalık düzeyinin araştırılması. [master's thesis]. [İstanbul (TR)]; 2020.
21. Engin E, Sarı O. Birinci basamakta sağlık hizmeti veren aile hekimlerinin influenza aşısı hakkındaki bilgi, tutum ve davranışlarının saptanması. J Mol Virol Immunol;2021;2(2):29-38.
22. Gümüştakım RŞ, Bilgili P, Çevik M, Ayhan Başer D, Doğaner A, Karahan Saper SH, et al. A double-sided view to adult vaccination: The opinions and attitudes of patients and health workers. Health. 2018;10,1697-713.
23. Ketenci S, Akpınar NG, Çakır Çobanoğlu R. COVID-19 aşı programının farmakovijilansı hakkında hekim bilgi, tutum ve davranışlarının değerlendirilmesi. ETD. 2023;62(1):103-11.
24. Köksoy Y. İzmir'de görev yapan aile hekimliği asistanlarının pnömokok aşısı konusunda bilgi tutum ve davranışlarının değerlendirilmesi. [master's thesis]. [İzmir (TR)];2021.
25. Köse F. Ankara Şehir Hastanesi'nde farklı kliniklerde çalışan doktorların HPV aşıları hakkında bilgi düzeyleri, tutum ve davranışlarının değerlendirilmesi. Ankara, 2022. uzmanlık tezi
26. Oğuzöncül AF, Tuncer-Kara K, Deveci SE. Knowledge, attitudes and behaviors of primary healthcare physicians about vaccines. Klimik Derg. 2021;34(2):123-8.
27. Özbakır Acar N, Özşahin A, Edirne T. Knowledge and attitudes of primary health care workers about cervical cancer and HPV vaccine. Pam Med J. 2019;12:457-66.
28. Pekgenç M. Ankara Atatürk Eğitim ve Araştırma Hastanesi'nde çalışan hekimlerin 65 yaş ve üstü hastalarda aşı uygulamaları konusundaki bilgi düzeyleri ile bu konudaki tutum ve davranışlarının değerlendirilmesi. [master's thesis]. [Ankara (TR)] ;2017.
29. Us M. Ankara ilinde görev yapan aile hekimliği asistanlarının üst solunum yolu enfeksiyonları, üst solunum yolu enfeksiyonlarında antiviral ilaçların kullanımı ve influenza aşısı konusunda bilgi düzeylerinin değerlenderlendirilmesi. [master's thesis]. [Ankara (TR)] ;2020.
30. Yağız M. Erzurum il merkezindeki aile sağlığı merkezinde çalışan hekimlerin mevsimsel grip aşısına bakış açısı, kendilerine uygulamaları ve hastalarına önerme durumlarının karşılaştırılması. [master's thesis]. [Erzurum (TR)] ;2019.

31. Yağmur H. Aile hekimliği asistanlarının COVID-19 pandemisi döneminde influenza, pnömokok ve COVID-19 aşıları hakkında bilgi, tutum ve davranışlarının değerlendirilmesi. [master's thesis]. [Ankara (TR)] ;2021.
32. Yetik I, Tanoglu FB, Pasin O, Cetin C, Ozcan P. Knowledge levels and community guidance of doctors working in family health centers on HPV screening and HPV vaccination. J Obstet Gynaecol Res. 2023;49(10):2519-27.
33. Yılmaz Karadağ F, Sağlam ZA. Assessment of the factors influencing primary care physicians' approach to vaccination of adult risk groups in Istanbul, Turkey. PeerJ. 2019;7:e7516.