

EXAMINATION OF THE AWARENESS AND ATTITUDES OF PRE-CLINICAL MEDICAL STUDENTS TOWARD QUATERNARY PREVENTION

Tıp Fakültesi Pre-Klinik Dönem Öğrencilerinin Dördüncül Korumaya İlişkin Farkındalık ve Tutumlarının İncelenmesi

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ABSTRACT

Objective: With advancing technology, individuals are increasingly exposed to unnecessary medical interventions. Quaternary prevention aims to identify individuals at excessive risk and protect them from unnecessary interventions. This study examined the awareness and attitudes of preclinical medical students regarding quaternary prevention.

Material and Methods: This descriptive and cross-sectional study was conducted with the participation of pre-clinical students from Yozgat Bozok University Faculty of Medicine. A 29-item questionnaire, developed by the researcher based on literature data, was administered to the participants.

Results: A total of 310 preclinical students participated in the study. The mean age of the participants was 20.83±1.80 (min: 18- max: 36). Of the participants, 26.1% (n=81) were first-year students, 31.9% (n=99) were second-year students, and 41.9% (n=130) were third-year students. Among the participants, 68.4% (n=212) stated that not every patient complaint necessarily has a diagnosis, while 86.8% (n=269) indicated that not every complaint requires a prescription. Students who believed that increased professional experience would make it easier to protect patients from overdiagnosis and overtreatment, had significantly higher quaternary prevention attitude scores (p=0.006). Similarly, students who thought that not every complaint requires a prescription, had significantly higher quaternary prevention attitude scores (p=0.025).

Conclusion: While pre-clinical medical students demonstrate some awareness and positive attitudes toward quaternary prevention, further emphasis is needed to integrate these attitudes into clinical decision-making.

Keywords: Quaternary Prevention; Overdiagnosis; Overtreatment; Medical Student, Preventive Medicine

ÖZET

Amaç: Gelişen teknolojiyle birlikte bireyler gereğinden fazla tıbbi müdahaleye maruz kalmaktadır. Dördüncül koruma aşırı risk altındaki bireyleri tanıyarak, bu bireyleri gereksiz müdahalelerden korumayı hedeflemektedir. Bu çalışmada tıp fakültesi pre-klinik dönem öğrencilerinin dördüncül korumaya ilişkin farkındalık ve tutumları incelenmiştir.

Gereç ve Yöntemler: Araştırma tanımlayıcı ve kesitsel tipte olup, Yozgat Bozok Üniversitesi Tıp Fakültesi pre-klinik dönem öğrencilerinin katılımıyla gerçekleştirilmiştir. Katılımcılara literatür verileri doğrultusunda araştırmacı tarafından hazırlanan 29 sorudan oluşan anket formu uygulanmıştır.

Bulgular: Araştırmaya toplam 310 pre-klinik dönem öğrencisi katılmıştır. Katılımcıların yaş ortalaması 20,83±1,80 (min:18- max:36) bulunmuştur. Katılımcıların %26,1'i (n=81) dönem I, %31,9'u (n=99) dönem II, %41,9'u (n=130) dönem III öğrencisidir. Katılımcıların %68,4'ü (n=212) hastanın her rahatsızlığının bir tanısını olmayabileceğini belirtirken, %86,8'i (n=269) hastanın her rahatsızlığına yönelik reçete düzenlenmesi gerektiğini belirtmiştir. Mesleki tecrübenin artmasıyla aşırı tanı ve tedavi yaklaşımlarından hastaları daha kolay koruyacağını düşünenlerin, dördüncül koruma tutum puanları daha yüksek olup istatistik olarak anlamlıdır (p=0,006). Hastanın her şikayetine yönelik reçete düzenlenmemesi gerektiğini düşünenlerin, dördüncül koruma tutum puanları daha yüksek olup istatistik olarak anlamlıdır (p=0,025).

Sonuç: Pre-klinik dönem tıp fakültesi öğrencileri, dördüncül korumaya yönelik belirli bir düzeyde farkındalık ve olumlu tutum sergilese de, bu tutumların klinik karar alma süreçlerine entegre edilmesi için daha fazla vurgu yapılması gerekmektedir.

Anahtar Kelimeler: Dördüncül Koruma; Aşırı Tanı; Aşırı Tedavi; Tıp Fakültesi Öğrencisi; Koruyucu Hekimlik

INTRODUCTION

The rapid advancement of healthcare technologies globally and the increasing pursuit of health among individuals have subjected people and communities to excessive diagnostic tests, treatments, and interventional procedures. While these interventions aim to protect and enhance health, any unnecessary or excessive medical procedure contradicts the fundamental principle of medicine, "first, do not harm" creating an undue burden on both healthcare providers and the healthcare system. Moreover, the increasing burden of overdiagnosis and overtreatment highlights the importance of evidence-based strategies in healthcare systems worldwide (1,2).

Most countries implement national health policies aiming to prevent potential diseases in the population, maintain individual health, and support early diagnosis and rehabilitation for patients. However, these policies often expose individuals to unnecessary medical procedures. As a result, the need has arisen for protective approaches to identify those at risk of over-medicalization and shield them from unnecessary interventions (3).

In line with these requirements, the concept of "quaternary prevention" was introduced, first mentioned by family physician Marc Jamouille in 1986 and later defined in the WONCA (World Organization of Family Doctors) Dictionary of General/Family Medicine in 1995. The dictionary describes quaternary prevention as actions aimed at protecting individuals and communities at risk of overdiagnosis and overtreatment from unnecessary medical interventions while providing healthcare ethically (2,4).

Over time, this concept has been criticized by various researchers for its limitations. They argue that quaternary prevention should focus not only on excessive medicalization but also on interventions likely to harm patients rather than benefit them. Additionally, it emphasizes the importance of evidence-based medicine in all interventions administered to patients (5,6).

Non-evidence-based and uncontrolled interventions often lead to unnecessary diagnoses and treatments, causing financial, human resource, and time losses in the healthcare system. Diagnosing a condition that would never manifest symptoms during an individual's

lifetime or performing excessive diagnostic tests for a patient without specific symptoms can increase patient anxiety. Such anxiety may prompt the patient to seek additional tests and treatments from different physicians, further burdening the healthcare system financially (7-9).

Many factors contribute to physicians' tendency to perform excessive diagnostic testing for non-specific symptoms. From the physicians' perspective, factors include lack of experience or inadequate knowledge leading to the fear of making medical errors, poor ability to evaluate scientific evidence, ineffective communication with patients, and over-reliance on test results. From the patients' perspective, factors such as seeking definitive diagnoses for every symptom, avoiding uncertainty, mistrust in physicians, and underlying psychological disorders are significant. Meanwhile, from the healthcare system's perspective, increased testing for screening purposes, reliance on advanced technological equipment, and the perception that technological use equates to high-quality care contribute to this issue (7-12).

Considering all these results, it is important for physicians, who are the cornerstone of the healthcare system, to be aware of the concept of quaternary prevention and to act with this awareness when providing healthcare services. For physicians to act with awareness of quaternary prevention, they need to learn approaches to quaternary prevention from the early years of medical education and adopt the correct attitudes.

According to literature data, no study has been found evaluating the awareness and attitudes of medical students toward quaternary prevention. For this purpose, this study examined the awareness and attitudes of pre-clinical medical students toward quaternary prevention.

MATERIAL AND METHODS

This study is a descriptive and cross-sectional research that evaluates the awareness and attitudes of medical students in the pre-clinical period regarding quaternary prevention. The research was conducted at Yozgat Bozok University Faculty of Medicine, and the study population consists of pre-clinical medical students enrolled in the 2024-2025 academic year.

There are a total of 437 pre-clinical medical students in the 2024-2025 academic year. Since the aim was to reach all students, no sampling method was used. The students were asked to answer the survey questions online during their available time. Before starting the research, informed consent was obtained from the students indicating that they voluntarily agreed to participate in the study.

In line with the literature data, the researchers prepared a data collection form consisting of 29 questions. The form includes 12 questions assessing the students' sociodemographic information and their awareness of quaternary prevention, while 17 items evaluate their attitudes towards quaternary prevention. The attitude items include both positive and negative statements related to quaternary prevention, and are designed in a 5-point Likert scale format. The positive items are scored as follows: 1 = strongly disagree, 5 = strongly agree. The negative items are reverse-coded, with 1 = strongly agree and 5 = strongly disagree. The minimum score that can be obtained from the attitude items is 17, and the maximum score is 85. The attitude items' validity and reliability were evaluated through a pilot study conducted with 30 medical students who were not included in the main study. Cronbach's alpha was calculated to ensure internal consistency, yielding a value of 0.719.

The data analysis was performed using IBM SPSS Statistics for Windows, Version 20.0 (Armonk, NY: IBM Corp.). The normality distribution of the attitude data was assessed using skewness and kurtosis coefficients. Descriptive information about the participants was presented as percentages and frequencies. For evaluating continuous variables with two-level variables, the independent samples t-test and Mann-Whitney U test were used. For evaluating the relationship between categorical variables with more than two levels, the Chi-square test was applied. P value of <0.05 was considered statistically significant. Before starting the study, ethical approval was obtained from the Non-Interventional Clinical Research Ethics Committee of Yozgat Bozok University (protocol no:2024-GOAK-2414_2024.12.04_195) and institutional approval was obtained from the Faculty of Medicine, Bozok University.

RESULTS

A total of 310 pre-clinical students participated in the study, representing 70.93% of the target population. The participants' mean age was 20.83 ± 1.80 (min: 18–max:36). Of the participants, 43.5% (n = 135) were between the ages of 18–20, 51.3% (n = 159) were between the ages of 21–23 and 5.2% (n = 16) were aged 24 years or older. Of the participants 61% (n = 189) were female and 39% (n = 121) were male.

Regarding academic levels, 26.1% (n = 81) were first grade students, 31.9% (n = 99) were second grade students, and 41.9% (n = 130) were third grade students. Socioeconomic data revealed that 19.7% (n = 61) reported income exceeding expenses, 56.8% (n = 176) reported income equal to expenses, and 23.5% (n = 73) reported expenses exceeding income. Additionally, of the participants 24.2% (n = 75) stated that they had healthcare professional in their nuclear families, while 75.8% (n = 235) did not (Table 1).

Of the participants, 25.8% (n = 80) stated that they had knowledge about quaternary prevention, while 74.2% (n = 230) stated that they did not. Of those aware, the primary sources of information were lessons (56.3%, n=45), the internet (32.5%, n=26), congresses/symposia (6.3%, n=5), and TV/radio (5%, n=4). When asked to define quaternary prevention, 70.64% (n = 219) described it as "protecting patients from unnecessary/excessive treatment."

Participants' mean attitude score for quaternary prevention was 56.57 ± 6.49 (min: 39–max:77). There wasn't statistically significant difference between attitude scores and awareness of quaternary prevention ($p>0.05$). There was not statistically significant difference between attitude scores and variables of age, gender, academic level, monthly income, having healthcare professional in the family ($p> 0.05$).

"I save my routine examinations in a template and conduct them in bulk" and "The prolonged recovery time of a patient prompts me to request repeated examinations" are the two items with the highest negative attitude towards quaternary prevention across all grade levels.

The item 'Concerns about incorrect or incomplete diagnosis lead me to request more tests than necessary' has been the one with the lowest level of awareness regarding quaternary prevention across all grade levels.

Table 1. Distribution of participants according to sociodemographic characteristics

		n	%
Age	18-20	135	43.5
	21-23	159	51.3
	24 and over	16	5.2
Gender	Female	189	61
	Male	121	39
Grade	Grade I	81	26.1
	Grade II	99	31.9
	Grade III	130	41.9
Monthly income	Income exceeds expenses	61	19.7
	Income equals expenses	176	56.8
	Expenses exceed income	73	23.5
Having healthcare professional in the nuclear family	Yes	75	24.2
	No	235	75.8
Having knowledge about quaternary prevention	Yes	80	25.8
	No	230	74.2

The items 'I take evidence-based medical data into account during the patient's diagnosis and treatment processes' and 'I involve the patient in the treatment process I will implement to develop a shared understanding' are the two with the highest positive attitude towards quaternary prevention across all class levels.

There was a statistically significant relationship between grade levels and the quaternary prevention attitude items, including: 'The patient's knowledge about their health causes me to conduct more tests and prescribe medication,' 'I adopt a persuasive attitude to protect the patient from unnecessary testing,' 'I utilize past health records to prevent unnecessary medication use by patients,' 'The prolonged recovery time of a patient sometimes influences my decision to prescribe additional medication,' 'The prolonged recovery time of a patient prompts me to request repeated examinations,' and 'I take evidence-based medical data into account during the patient's diagnosis and treatment processes' ($p < 0.05$) (Table 2).

When evaluating the relationship between participants' awareness of quaternary prevention and their attitudes towards it, it was observed that those who believed that not all approaches to quaternary prevention are the responsibility of family physicians and that not every patient ailment should lead to a

disease diagnosis, had higher quaternary prevention attitude scores, although this was not statistically significant ($p > 0.05$).

Participants who believed that increasing professional experience enables them to protect patients more easily from overdiagnosis and overtreatment, had significantly higher quaternary prevention attitude scores ($p = 0.006$).

Participants who agreed that not every patient complaint necessitates a prescription scored significantly higher on quaternary prevention attitudes ($p = 0.025$) (Table 3).

DISCUSSION

This study examined the awareness and attitudes of pre-clinical medical students regarding quaternary prevention. When reviewing the literature on quaternary prevention, it was observed that national and international research has primarily contributed to the literature in the form of review articles on the topic rather than original research studies. This situation has resulted in the inability to compare the research findings with those of other studies. The research findings have been discussed in line with the existing literature.

Quaternary prevention aims to provide ethical and acceptable care while also preventing individuals

Table 2. Evaluation of participants' attitudes towards quaternary prevention based on grade levels

		Grade I		Grade II		Grade III		p
		n	%	n	%	n	%	
The patients' knowledge about their health causes me to conduct more tests and prescribe medication	Strongly agree	1	1.2	1	1	13	10	0.042
	Agree	11	13.6	14	14.1	17	13.1	
	Neutral	26	32.1	27	27.3	29	22.3	
	Disagree	22	27.2	33	33.3	45	34.6	
	Strongly disagree	21	25.9	24	24.2	26	20	
I adopt a persuasive attitude to protect the patient from unnecessary testing	Strongly agree	25	30.9	19	19.2	35	26.9	0.042
	Agree	24	29.6	49	49.5	61	46.9	
	Neutral	27	33.3	19	19.2	24	18.5	
	Disagree	3	3.7	6	6.1	7	5.4	
	Strongly disagree	2	2.5	6	6.1	3	2.3	
I utilize past health records to prevent unnecessary medication use by patients	Strongly agree	21	25.9	32	32.3	43	33.1	0.013
	Agree	35	43.2	49	49.5	65	50	
	Neutral	23	28.4	10	10.1	13	10	
	Disagree	0	0	4	4	6	4.6	
	Strongly disagree	2	2.5	4	4	3	2.3	
The prolonged recovery time of a patient sometimes influences my decision to prescribe additional medication.	Strongly agree	3	3.7	0	0	8	6.2	0.010
	Agree	8	9.9	15	15.2	23	17.7	
	Neutral	40	49.4	30	30.3	54	41.5	
	Disagree	19	23.5	34	34.3	34	26.2	
	Strongly disagree	11	13.6	20	20.2	11	8.5	
The prolonged recovery time of a patient prompts me to request repeated examinations	Strongly agree	9	11.1	11	11.1	15	11.5	0.024
	Agree	32	39.5	43	43.4	60	46.2	
	Neutral	30	37	18	18.2	41	31.5	
	Disagree	8	9.9	22	22.2	10	7.7	
	Strongly disagree	2	2.5	5	5.1	4	3.1	
I take evidence-based medical data into account during the patient's diagnosis and treatment processes	Strongly agree	28	34.6	30	30.3	31	23.8	0.014
	Agree	29	35.8	48	48.5	74	56.9	
	Neutral	22	27.2	12	12.1	17	13.1	
	Disagree	2	2.5	5	5.1	6	4.6	
	Strongly disagree	0	0	4	4	2	1.5	

P: p value

Table 3. Evaluation of the relationship between participants' awareness of quaternary prevention and their attitudes

		n	Mean±sd	Min-max	p
All approaches to quaternary prevention are the responsibility of family physicians	Yes	99	56±6.77	39-77	0.290
	No	211	56.84±6.35	39-77	
As my professional experience increases, I can more easily protect my patients from excessive diagnosis and treatment approaches	Yes	296	56.79±6.48	39-77	0.006
	No	14	51.93±4.73	44-61	
Every ailment of the patient should have a diagnosis of a disease	Yes	98	55.67±5.94	39-74	0.098
	No	212	56.99±6.70	41-77	
A prescription should be arranged for every complaint of the patient	Yes	41	54.46±7.74	39-77	0.025
	No	269	56.89±6.23	39-77	

Sd: standart deviation p: p value

from being exposed to unnecessary diagnoses and treatments. Newly graduated physicians from medical school, due to their limited professional experience, may be inclined to diagnose and initiate treatment for symptoms that do not require diagnosis or treatment. This tendency often arises from the desire to avoid missing a diagnosis and to start treatment as soon as possible when encountering a patient (11,12). In this study, although most students indicated that they had no knowledge of quaternary prevention, when asked to define it, they described quaternary prevention as protecting the patient from excessive/unnecessary diagnosis and treatment. Furthermore, in contrast to the literature, a high proportion of students stated that not all patient complaints warrant a medical diagnosis, and that prescriptions should not be arranged for every ailment.

In healthcare delivery, there are various health practices related to primary, secondary, tertiary and quaternary prevention, ranging from immunization services, health screenings, counseling services, rehabilitative programs, to the evidence-based and ethical application of healthcare services. While these practices are carried out by all healthcare institutions that form the levels of the healthcare system, the concepts of "prevention" and "preventive health practices" often bring to mind primary healthcare services (13).

Quaternary prevention is applicable not only to primary healthcare services but also to all levels of healthcare services, advocating for an ethical approach that avoids inappropriate and excessive interventions while considering evidence-based scientific data. In this

study, a high proportion of medical students indicated that all approaches related to quaternary prevention are not the responsibility of family physicians. These findings are consistent with the recommendations in the literature (3,14,15).

When students were asked about the sources of information regarding the concept of quaternary prevention, the vast majority indicated that their knowledge and awareness of quaternary prevention were developed through their lessons. Upon examining the National Core Curriculum, competencies related to the concept of "prevention" under the "healthcare provider" competency include qualifications related to quaternary prevention. In lesson content, quaternary prevention competencies are generally defined at the knowledge level. To ensure that medical students develop attitudes and behaviors that do not overlook quaternary prevention, medical school curricula should include professional practice-based courses that define learning quaternary prevention at the affective and psychomotor levels as a primary goal.

As a result of this study, although a high proportion of students indicated that they would consider evidence-based medical data during the diagnosis and treatment processes of patients, they also stated that the prolonged recovery time of a patient or concerns about incorrect/incomplete diagnoses could lead them to request more tests than necessary. Based on these findings, it has been concluded that although students are familiar with the concept of evidence-based medicine, they may face challenges in applying evidence-based data to clinical decision-making processes when encountering patients. Due to

a lack of confidence in themselves as physicians and in their diagnoses, they may also struggle to integrate evidence-based approaches into their clinical decision-making processes.

With the advancement of technology, medical knowledge and treatment approaches are being updated much more rapidly than before. It is essential for medical students to learn the concept of evidence-based medicine to keep up with recent developments, access new information, and critically evaluate this knowledge (16, 17). Future physicians should be equipped with skills to critically evaluate the reliability of medical evidence and consider patient-specific factors. This can be achieved by integrating evidence-based medicine training into pre-clinical and clinical years of medical education. This training should aim to enable students to integrate evidence-based practices into their clinical decision-making by the end of their medical education.

One of the primary objectives of quaternary prevention is to protect individuals from excessive or unnecessary diagnoses and treatments while establishing an ethical relationship with the patient. During the communication process, it is crucial to discuss the patient's experience of their condition, show empathy, and provide clear explanations regarding symptoms that do not require diagnosis or treatment, ensuring appropriate follow-up. For conditions that do require treatment, building a trust-based relationship within a shared understanding, protects the patient from excessive medical interventions.

The establishment of mutual trust between the patient and physician not only prevents unnecessary medical interventions for the patient but also contributes to the effective utilization of healthcare resources. In this study, medical students showed a high level of agreement with involving patients in the treatment process to develop a shared understanding. This positive attitude aligns with findings in the literature (4,11,18).

CONCLUSION

Of the participants, 25.8% stated that they had knowledge about quaternary prevention. In this context, it is crucial to include approaches to quaternary prevention in medical education curricula

throughout all training periods. This inclusion would help foster attitudes that prioritize evidence-based medical data and avoid excessive or unnecessary medical interventions.

Although pre-clinical medical students demonstrate awareness and largely positive attitudes toward quaternary prevention, it is essential for them to integrate these attitudes into clinical decision-making processes related to quaternary prevention.

Limitations of the Study

The levels of awareness and attitudes of students toward quaternary prevention, are limited to the questionnaire items prepared by the researcher.

The voluntary participation of students who are interested in quaternary prevention and the possibility that they provided socially desirable responses can be considered as limitations of the study.

While the lack of studies involving medical students on quaternary prevention makes this research unique, the inability to compare its findings with those of other studies can be considered as a limitation of the study.

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