

Evaluating Knowledge Level about Scabies in Primary Care Physicians during the Scabies Outbreak of Turkey

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Abstract

Background: Scabies is a highly contagious and intensely pruritic disease of the skin. Scabies more commonly affects young children, adolescents, and the elderly. Its prevalence is highest in tropical regions, in low-and-middle-income countries, and in times of war. **Materials and Methods:** The study was conducted among physicians working in primary care health care settings in Ordu, Turkey. We developed a survey of 22 questions. A hard copy of the questionnaire was delivered to the physicians. **Results:** A total of 133 responses were obtained. 71 (53.4%) of the physicians were general practitioners (56.5%) and 62 (46.6%) of them were family physicians. 92 of them were working in clinics and 41 of them were working in emergency departments. The overall knowledge score was 83.2%. 60.2% of the physicians had a total score below median score and 39.8% were above median score. The lowest level of knowledge was associated with pathogen, transmission, and incubation period, and the highest knowledge was about clinical diagnosis. Besides, 86.5% of responders had a knowledge score of $\geq 75\%$. Physicians <30 years old had a better knowledge score. **Conclusion:** In conclusion, in our study the knowledge about scabies among primary care physicians was adequate, but most of the physicians reported they had difficulty in treating scabies. It is recommended to arrange training programs, including diagnosing and managing dermatological conditions including scabies for the physicians working in the primary health care services.

Keywords: Education, general practitioners, outbreak, public health, scabies

BACKGROUND

Scabies is a highly contagious and intensely pruritic disease of the skin which is caused by the obligate human ectoparasitic mite *Sarcoptes scabiei* var. *hominis*.^[1,2] Although there is wide variation in its prevalence among geographic regions, scabies affects about 200–300 million people worldwide.^[2,3] Its prevalence is highest in tropical regions, in low-and-middle-income countries, and in times of war.^[2,4] In high-income countries, outbreaks frequently occur in industrial settings, homeless populations, and in people who live in the crowd (schools, aged care facilities, prisons, and refugee camps), and due to delayed diagnosis.^[1,4-6]

Scabies more commonly affects young children, adolescents, and the elderly.^[1,3,5] Lack of hygiene, malnutrition, poverty, reduced access to health care, indiscriminate sexual contact,

dementia, poor sensory perception, and immunodeficiency are factors that predispose to scabies.^[2] Both males and females are affected by scabies.^[2]

Skin diseases are highly common and cause a great economic burden. Because of the shortage of dermatologists, primary care physicians commonly evaluate and treat patients with skin diseases. The majority of skin-related visits are done to non-dermatologists.^[7] Dermatological problems are the third most common problem among patients admitted to the general practice, and dermatologists are one of the four most commonly referred specialties by general practitioners (GPs).^[8]

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World Health Organization added scabies to the list of Neglected Tropical Diseases in 2017. Huge case numbers, disease complications, and treatment and prevention costs make scabies a public health burden.^[9]

An increase in the prevalence of scabies has been shown in many studies. Also, authors from Turkey declared that there were extremely high numbers of scabies cases in all distinct parts of the country, defined as scabies outbreaks. Wars and migrations, global warming and climate changes, inappropriate treatment, and not whole family treatment could be reasons for this tremendous increase in scabies.^[10,11] Nosocomial outbreaks of scabies were also reported.^[12] The authors declared that although the total number of people visiting dermatology outpatient clinics decreased during the COVID-19 pandemic, the percentage of scabies-related visits kept increasing.^[13]

Because of this huge increase in the prevalence of scabies and most of the cases attended by primary care physicians, we wanted to evaluate the knowledge level of physicians working in primary care.

MATERIALS AND METHODS

The study was conducted among physicians working in primary care healthcare settings in Ordu, Turkey. This was an observational cross-sectional study that was conducted between March 2021 and June 2021. Written informed consent was obtained from the physicians after an explanation of the aims of the study by the Declaration of Helsinki. Ethical approval was taken before the study. Family physicians and general practitioners working in emergency departments (EDs) and clinics in the first, secondary, and tertiary healthcare settings are included in the study.

We developed a survey according to clinical practice, current knowledge, and previous studies. The survey was not validated. The hard copy of the questionnaire was delivered to physicians and fulfilled by them. Demographic information about age, profession (family physicians and general practitioners), and information about the workplace (primary, secondary, tertiary, clinics, or EDs) were recorded. In the second part of the questionnaire, knowledge questions including questions about the pathogen, incubation period, way of transmission, clinical presentation, diagnosis, treatment, and management of scabies were included.

The questionnaire was evaluated by two expert dermatologists and necessary changes were made in line with their suggestions. A pilot study was conducted on a sample of 20 physicians. The questionnaire consisted of 13 knowledge questions. Four of the questions were multiple-choice questions with only one correct answer, a total of four points. The rest of the knowledge questions have more than one possible correct answer, including the mode of transmission, clinical presentation, diagnosis, and treatment

and one point is given for every correct answer, a total of 21 points. The total test score was 25. The score was then transformed into a 100-point scale for easy interpretation. Additionally, sub-scores were created for different aspects of scabies knowledge: including pathogen, transmission and incubation period (four questions, six points), clinical presentation and diagnosis (five questions, 10 points), and treatment and management (four questions, nine points). Out of 136 physicians who filled out the questionnaire, three physicians were excluded from the study.

The participants were included in the study if they were family physicians and general practitioners and if they voluntarily accepted to join the study. Responders who were not working in primary care and who did not want to join the survey were excluded from the study. The responses were anonymous.

At the time of the study, 450 primary care physicians were working in Ordu. The sample size was calculated using the EPI Info™ 7.2.4.0 software and found 109 for the 95% confidence interval. 136 physicians completed the survey. The response rate was 2.2%. A simple sampling method was used to determine the study population.

Statistical analysis was performed using IBM® SPSS® 25 (SPSS Inc., Chicago, IL) software. Categorical parameters are expressed as numbers and percentages, and continuous parameters are expressed as mean and standard deviation. Data distribution was assessed using the Kolmogorov–Smirnov/Shapiro–Wilk tests. For continuous variables, the Mann–Whitney *U* test was used. Pearson's χ^2 or Fisher's Exact χ^2 test was used in the analysis of categorical variables. The Pearson correlation test was used to examine the relationship between scale scores. A *P*-value of <0.05 was accepted as statistically significant, and the confidence interval was 95%.

Sociodemographic and professional characteristics were compared between physicians with low and high knowledge levels (\leq median and $>$ median overall knowledge score, respectively). To detect factors independently associated with high knowledge level, multivariate logistic regression analysis models were done after adjusting for the variables that were significantly associated (*P*-value up to 0.010) with knowledge level in univariate analysis.

RESULTS

A total of 133 responses were obtained. Characteristics of the study population are shown in Table 1. 12 (9%) of the responders were residents in either ED or family medicine departments. The majority of responders (82.7%) faced more than 10 scabies cases in 1 year. The ratio of physicians who had reported difficulty with the diagnosis and treatment of scabies was 16.5% and 27.8%, respectively. According to the majority of the responders,

the prevalence of scabies was increased, and it was more commonly resistant to current treatments.

Answers to the questions were summarized in Table 2. The questions including scabies transmission via close contact and contaminated clothes were correctly answered by all the responders. Only one responder did not know the tunnels were the specific lesion of scabies. All but two of the participants knew that scabies is characterized by intense itching that is worse at night. 61.7% declared that the back is one of the typical areas of scabies infestation. Only 27.8% of the responders knew all the drugs used for the treatment. Antibacterials and antifungals were the wrong choices selected by the responders.

The least commonly truly answered question was about treatment. Although the participants knew the agents used in the treatment of scabies, they thought antimicrobials were also used in the treatment of scabies. Another issue that is not well known about scabies is the body area

that scabies mites preferentially infest. Although the participants answered correctly that scabies affects the genital area, breast, and plantar area, they thought that the back area is also among the most frequently affected areas. More than two-thirds of physicians did not know the incubation period of scabies mites correctly.

The question that was left the most blank was the one about Norwegian scabies. One-third of physicians did not answer this question. Two-thirds of the rest had answered this question incorrectly.

As shown in Figure 1, the overall knowledge score was 83.2%. 60.2% of physicians had a total score below the median score and 39.8% were above the median score. The lowest level of knowledge was associated with the pathogen, transmission and incubation period and the highest knowledge was about the clinical diagnosis. Besides, 86.5% of responders had a knowledge score of $\geq 75\%$.

Univariate and multivariate logistic regression analysis factors affecting better knowledge level were shown in Table 3. In a univariate logistic regression analysis, physicians less than 30 years old and physicians working as residents had better knowledge scores ($P = 0.010$ and $P = 0.042$, respectively). Working as a family doctor or general practitioner and working in the polyclinic or

Table 1: Demographics and professional characteristics of the study physicians by knowledge group

Variables	Subgroups	Median score		P
		≤ 84 (n = 80)	> 84 (n = 53)	
Age	<30	27	30	0,023
	30–50	44	17	
	>50	9	6	
Profession	General practitioner	42	28	0,105
	Family medicine	34	17	
	Resident	4	8	
Department	Polyclinic	57	35	0,524
	Emergency	23	18	
Number of Skabies cases	Number of cases <10	15	8	0,585
	Number of cases ≥ 10	65	45	
Difficulty in diagnosis	Yes	13	9	0,912
	No	67	44	
Treatment resistant scabies	Yes	22	15	0,967
	No	17	12	
	Sometimes	41	26	
Increase in the prevalence of scabies	Yes	66	42	0,638
	No	14	11	
Treatment resistant scabies	Yes	58	43	0,254
	Sometimes	22	10	
Source of information about scabies	Journals	11	5	0,439
	Web sites	7	8	
	Medical education	62	40	

Pearson's χ^2 test was used and $P < 0.05$ was considered significant

Table 2: Ratio of information answers given by the responders

	Number (%)
Pathogenic cause of scabies	128 (96.2)
Mode of transmission	
Direct contact	133 (100)
Contaminated clothes	133 (100)
Sexual contact	90 (67.7)
Scabies from animals	
Yes	96 (72.2)
No	37 (27.8)
Incubation period	39 (29.3)
Pruritus at night as classical symptom	131 (98.5)
Tunnels as specific lesion	132 (99.2)
Norwegian scabies	
Correct	28 (21.1)
False	62 (46.6)
Don't know	43 (32.3)
Typical body area	48 (36.1)
Diagnosis	104 (78.2)
Treatment	
Permetrin (topical)	122 (91.7)
Topical sulphure	123 (92.5)
Topical benzyl benzoat	111 (83.5)
Oral ivermectin	68 (51.1)
Treatment of asymptomatic close contact	112 (84.2)
Whole body treatment	110 (82.7)
Repetition of treatment in 7–10 days	126 (94.7)
Washing at 60°C	127 (95.5)
Keeping in a plastic bag for 3 days	118 (88.7)

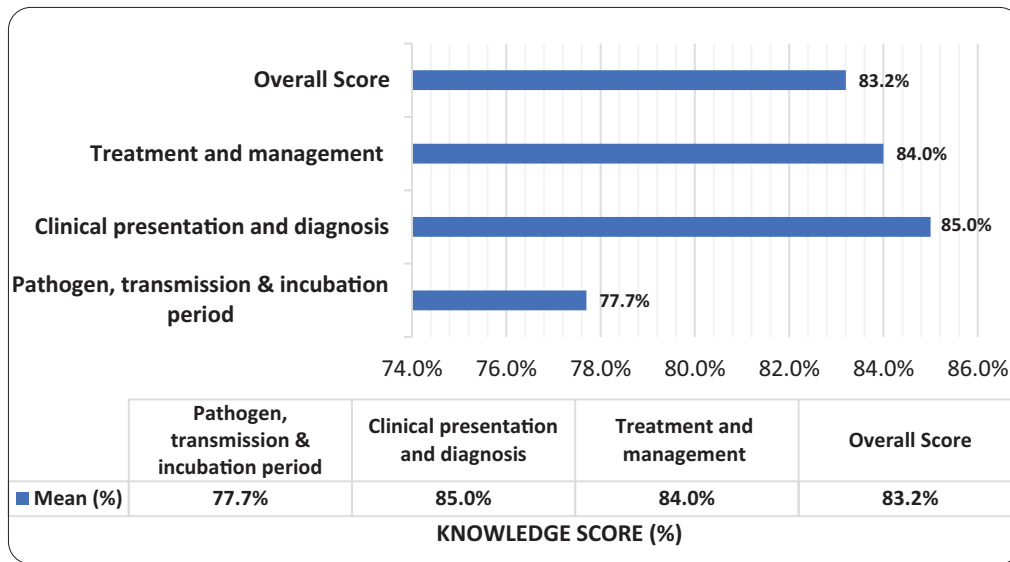


Figure 1: Mean knowledge scores of total and subgroups

Table 3: Univariate and multivariate logistic regression analysis of potential predictors for better knowledge

Variables	Knowledge score median (>84)			
	Univariate		Multivariate	
	P value	Odds ratio [95% min-max]	P value	Odds ratio [95% min-max]
Age (<30)	0.010	2.6 [1.25–5.24]	0.029	0.4 [0.20–0.80]
Profession (resident)	0.042	4 [1.1–15.2]	0.098	–
Clinical department (polyclinic vs. ED)	0.524	0.78 [0.37–1.91]	1.000	–
Number of cases (≥10)	0.586	1.3 [0.51–3.3]	0.197	–
Difficulty in diagnosis (No)	0.912	0.95 [0.37–2.40]	0.757	–
Difficulty in treatment (No)	0.862	0.93 [0.41–2.11]	0.819	–
Increased prevalence (Yes)	0.638	1.24 [0.5–3.0]	0.189	–
Treatment-resistant scabies (Yes)	0.257	0.61 [0.26–1.43]	0.046	2.60 [6.60–1.02]
Source of 15 information (medical education vs. others)	0.787	0.93 [0.4–2.0]	0.356	–

It was analyzed enter methods by using logistic regression and $P < 0.05$ was considered significant

GP: General Practitioner
 ED: Emergency Department
 SD: Standard Deviation

EDs, physicians who encountered <10 or more cases of scabies did not make a statistically significant difference in the total knowledge score and all subgroup scores ($P > 0.05$). In multivariate models adjusted for age, profession, working area, the number of scabies cases per year, difficulty in diagnosis or treatment, increased scabies and increased treatment-resistant scabies, and sources of information about scabies were reviewed and younger physicians dealing with treatment-resistant scabies were found to be associated with better knowledge level.

DISCUSSION

Patients with dermatological diseases account for nearly 5–8% of patients admitted to the ED. In a study conducted in Taiwan, 82% of the inward patients who were diagnosed with scabies visited ED, of which 65% were misdiagnosed.

Overcrowding in the ED and scabies in atypical forms were one of the reasons for missed diagnoses.^[14] In this current study, the total scores of 43.9% of the physicians working in the ED were above the median score, which is slightly higher than physicians working in the clinics (38.0%) ($P < 0.05$). In another study from the United States, authors analyzed ED visits due to scabies. The average annual expenditure on scabies ED visits was high.^[15] In another study from Germany, researchers found that scabies was among the most common dermatological conditions presented to the emergency dermatological unit.^[16]

Scabies has an incubation period of 2–6 weeks. In the case of reinfestation within 6 months of the first infection, symptoms may develop in hours to days due to immune memory.^[1–5] In our study, less than one-third of physicians

correctly answered the question about the incubation period. In another study, the rate of those who answered this question correctly was 44.5%.^[17]

Whether scabies is transmitted from animals is a controversial issue. Scabies can affect over 104 mammal species, including some domestic and wild animals, but these species of mites are different from mites infesting humans. These mites may result in temporary eruptions in humans other than scabies.^[3,18] On the contrary, it has also been argued that scabies can also be transferred from animals.^[5] In our study, 72.7% of the physicians reported that scabies can transmit from animals, and the ratio was 47.7% in another study.^[17]

The main method of transmission is via close skin-to-skin contact. Mites transmission can also occur from textiles or clothing.^[1-5] In our study, all the physicians correctly answered questions about transmission via close contact and from infected clothes. In the study from Riyadh, the ratio of correct answers about transmission via close contact and transmission from clothes and linens were 96.8% and 82.4%, respectively.^[17] Sexual transmission is another important mode of transmission, so scabies affected as a sexually transmitted disease.^[2,4,5] In our study, nearly one-third, and in another study, 44.0% of the responders did not accept scabies as a sexually transmitted disease.^[17]

Characteristic history (severe pruritus which increases at night), and typical lesions (burrows, serpiginous tunnels that are formed in the epidermis by the movement of the female mite) on the predilection site aid in the diagnosis.^[1-5] In this current study, it was found that nearly all the physicians answered correctly to the questions about the characteristic history and typical lesions of scabies, similar to the previously studied.^[17] Pruritus in the family, and friends help in the diagnosis.^[3] In the study from Pakistan, 39% of the physicians correctly answered the question regarding itch and the involvement of other family members in the diagnosis of scabies.^[19] Although no laboratory test can be used to diagnose scabies, in our study one-fifth of the responders thought that blood tests may aid in the diagnosis of scabies.^[3,5]

Pruritus is not mediated by histaminergic mechanisms.^[6] Sometimes pruritus may become chronic despite treatment.^[1] Severe itching may result in insomnia and affect the quality of life adversely, besides resulting in decreased concentration and nonattendance to school and work.^[1-5] Scabies can also cause a feeling of shame, stigmatization, social exclusion, embarrassment, and depression.^[2,5] Patients who are taking immunosuppressive and anti-inflammatory agents, individuals treated with topical corticosteroid drugs, and in the infant sense of pruritus may be absent.^[6]

Body parts with higher temperatures and a thin stratum corneum are preferred by the scabies mite that include interdigital webs and lateral aspects of the fingers (hands and feet), the volar surface of the forearm, axillary and periumbilical areas, penis and perianal skin, extensor surfaces of elbows and knees, lateral and posterior parts of the feet, buttocks, groin, thighs, penis in men, and areola in women.^[1,2,6] In our study, only 36.1% of the responders correctly answered the question about predilection sites of scabies. On the contrary, 61.7% of the responders thought that classical scabies commonly affects the back region.

Crusted (Norwegian) Scabies are characterized by generalized hyperkeratotic lesions. The head, neck, and extremities are mostly located in the body parts. Sometimes it presents as erythroderma. Itching is usually absent or minimal. Crusted scabies is generally seen in immunodeficient individuals. It should be differentiated from psoriasis, eczema, and seborrheic dermatitis.^[2,4,6] In our study, only one-fifth of the physicians responded correctly to the question about Norwegian scabies in this current study. In another study, Norwegian scabies was confused with other dermatological diseases.^[20]

Permethrin, benzyl benzoate, sulfur-containing compounds, and crotamiton are the topical agents, and ivermectin as a systemic agent is used to treat scabies.^[1,2,5] In our study, the majority of physicians correctly knew the agents used in the treatment of scabies. In their study, the authors found that 95.8% of physicians knew that permethrin cream (5%) was used for the treatment of uncomplicated cases.^[17] To successfully treat scabies, all household members and close contacts, even asymptomatic, should be treated at the same time. If the household is left untreated, reinfestations may occur.^[4,5] In this study, the majority of the responders knew that asymptomatic individuals should also be treated similarly to previous studies.^[17] In a study from France, 77% of GPs reported that they treated all household members and any sexual contacts.^[21]

In our study, 86.5% of physicians had a knowledge score of $\geq 75\%$, which is quite more than the previous studies conducted in Riyadh and Pakistan, 17.1% and 36%, respectively.^[17,19]

In a study in Pakistan, it was shown that most of the physicians did not have adequate knowledge about the causative agent, diagnosis, and health education for patients and family members. Fortunately, they were familiar with the transmission, clinical findings, and treatment of scabies.^[19]

Outside the human body, at room temperature, mites can survive up to 24–36 h. In colder conditions, this duration increases.^[2-4] In our study, 95.5% of the responders knew that clothes should be washed above 60°C, and 88.7% correctly knew that stuff that cannot be washed at the

proper temperature should be kept in plastic bags for at least 3 days, similar to previous studies.^[17]

Signs and symptoms may last up to 6 weeks. Pruritus that persists after successful treatment can be managed with emollient antihistamines and topical steroids. Appropriate application of drugs should be encouraged. Face and scalp should not be forgotten in children, the elderly, and in treatment-resistant cases.^[4] 82.7% of the responders correctly knew that topical agents should be applied to the whole body instead of applying only the itchy body area.

In our study, younger age and working as a resident were found to be associated with better knowledge scores. In contrast to our findings, authors reported better knowledge scores in older age physicians, physicians with higher education, and physicians who had less time since the last information about scabies was reviewed.^[17] In another study from Pakistan, the authors failed to show an association between better knowledge level and increased age or increased experience. Resultantly, they underlined the necessity of continuous medical education for physicians working in primary care.^[19]

Skin conditions accounted for 8%–10% of all visits to family physicians in 2002–2005.^[21,22] In a study from Australia, authors aimed to assess the differences in diagnostic accuracy between dermatologists and GPs, and they found out that GPs were weak in the diagnosis of scabies, urticaria, pityriasis Versicolor, pityriasis rosea, granuloma annulare, and skin tumors.^[23]

Previous data indicate that the majority of patients with skin disease are diagnosed by physicians other than a dermatologist. While preparing a dermatology curriculum for non-dermatologists, it is logical to give importance to the dermatological diseases that are most probably encountered by them and also should include serious skin diseases.^[7] Primary care physicians should be trained to focus on the most common dermatological conditions seen in that area.^[24]

Since physicians working in the ED and family medicine clinics face a huge number of scabies cases, continuous medical education programs should be encouraged to improve knowledge about scabies. Also, the education of these physicians will result in a reduction in scabies-related healthcare burden.

The first limitation of this study was that its cross-sectional design did not enable us to create a cause-effect relationship. The second limitation was the small sample size. Although primary care physicians from different parts of the health care centers were included in the study, a third limitation can be considered, as the results cannot be generalized to all primary care physicians because of the simple sampling method. We do not know the physicians

who did not respond to the survey. They may have a low level of knowledge about scabies. This fact can be added to the limitations of the study.

In this study, the physicians were questioned about transmission incubation period, clinical presentation and diagnosis (specific lesions and symptoms of scabies, mostly affected body parts), drugs used to treat scabies, and procedures that should be done during the treatment. But the factors causing difficulties in diagnosis and treatment were not further questioned. Physicians should be further questioned about if they were able to use any instrument for the diagnosis of scabies, whether they have enough time to examine the patient, difficulty in treatment was patient-related or physician-based, for instance, due to the ineffectiveness of the prescribed drug or the improper use of the drug. Further studies should be done to investigate factors regarding the difficulty in the treatment of scabies.

To our best knowledge, this is the first study evaluating scabies knowledge among primary care physicians in Turkey. In conclusion, in our study, the knowledge about scabies among primary care physicians was adequate, but most of the physicians reported they had difficulty with treating scabies. It is recommended to arrange training programs including diagnosing and managing dermatological conditions, including scabies, for physicians working in primary health care services.

CONCLUSION

Skin diseases are commonly evaluated and treated by primary care physicians because of a shortage of dermatologists. With huge case numbers, scabies is one of the most commonly encountered dermatological diseases in primary care settings, including the ED. For this reason, continuous medical education programs should be encouraged for physicians working in the ED and family medicine clinics, to better management of scabies cases and reduce scabies-related healthcare burden.

Author's contribution

Concept: FE, Design: FE, SÖ, Definition of intellectual content: FE, SÖ, literature search FE, SÖ, clinical studies:FE, SÖ, experimental studies: FE, SÖ, data acquisition FE,, data analysis: FE,, statistical analysis FE, manuscript preparation FE, manuscript editing: FE, SÖ, and manuscript review: FE, SÖ. All authors contributed to the development of the research protocol, reviewed the manuscript and approved the final version. All authors have seen and approved the manuscript, contributed significantly to the work. The manuscript has not been previously published nor is not being considered for publication elsewhere.

Ethical approval and consent to participate

Written informed consent was obtained from the physicians after explanation of the aims of the study in accordance with the Declaration of Helsinki. Ethical approval was taken prior to the study.

Ethics committee approval

The study was approved by the Ordu University Ethics Committee Chair (approval number: 41).

Availability of data and materials

The data used in this study are available, if necessary, please contact corresponding author (FE).

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Conflicts of interest

There are no conflicts of interest.

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