

Underlying Factors of Childhood Vaccine Refusal and Hesitancy: A Population Based Study

Çocuklarda Aşı Reddi ve Tereddütü ile İlişkili Faktörler: Toplum Temelli Bir Çalışma

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Abstract

Introduction: Vaccination of children is one of the most cost-effective methods in preventing infant and child diseases and deaths. The aim of this study was to determine the underlying factors of parents' decisions on childhood vaccine refusal.

Materials and Methods: The population of this descriptive study consisted of 180 families that officially rejected the childhood vaccination of their children. The data was collected by face-to-face interview technique.

Results: Vaccine refusal was more common in parents with higher socioeconomic and sociocultural levels and who have better access to health services. The most important reasons for vaccine refusal were, regarding vaccine production as a commercial market and believing that vaccines had more side effects than their benefits.

Conclusion: The most important factor in vaccine refusal was the negative propaganda of the media. Therefore, the propaganda in the media against vaccination should be limited at both international and national level.

Öz

Giriş: Bebek ve çocuk hastalıklarını ve ölümlerini önlemede en uygun maliyetli yöntemlerden biri çocukların aşılanmasıdır. Bu çalışmanın amacı, ebeveynlerin çocukluk çağı aşılarını reddetme kararlarının altında yatan faktörleri belirlemektir.

Gereç ve Yöntem: Tanımlayıcı nitelikteki bu çalışmanın evrenini, çocuklarının çocukluk çağı aşılarını resmi olarak reddeden 180 aile oluşturmuştur. Veriler yüz yüze görüşme tekniği ile toplanmıştır.

Bulgular: Sosyoekonomik ve sosyokültürel düzeyi yüksek olan ve sağlık hizmetlerine erişen ebeveynlerde aşı reddi daha yaygındı. Aşı reddinin en önemli nedenleri, aşı üretimini ticari bir pazar olarak görmek ve aşıların yararlarından çok yan etkilerinin olduğuna inanmaktır.

Sonuç: Aşı reddinde en önemli etken medyanın olumsuz propagandasıydı. Bu nedenle medyada aşıya karşı yapılan propaganda hem uluslararası hem de ulusal düzeyde sınırlandırılmalıdır.

Keywords

Vaccine, childhood vaccine, vaccine rejection, Turkey

Anahtar kelimeler

Aşı, çocukluk aşısı, aşı reddi, Türkiye

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Introduction

In the 20th century, the most important reason for the prolongation of expected life from birth is the decrease in deaths from infectious diseases along with immunization in childhood. From this point of view, the return on investment of childhood vaccination programs is very high. However, infectious diseases remain one of the main causes of illness, disability, and death in children (1).

According to the World Health Organization (WHO) data, in 2018, approximately 86.0% of babies worldwide were vaccinated with diphtheria-tetanus-pertussis- (DTP), which should be routinely performed to protect children from serious illness, disability, or potentially fatal infectious diseases. This shows that in the same period, 19.4 million babies either did not have access to DTP or were not vaccinated due to the vaccine refusal of their parents (2).

The first vaccination against smallpox was started in Turkey in 1930. Vaccination was expanded in 1970 to include seven diseases [smallpox, diphtheria, whooping cough, Bacillus Calmette Guerin (BCG), oral polio, and measles]. Multiple vaccination campaigns were organized in the process, and deficiencies were tried to be eliminated. The last of these campaigns was held in 2017 for immigrant Syrian children under five years of age. Currently, vaccination is provided free of charge against 13 diseases in Turkey (3).

On the one hand, the government is trying to complete deficient vaccines through campaigns, but on the other hand vaccine refusal and/or hesitancy started to increase among parents. For instance, in Turkey, only 183 people rejected childhood vaccination in 2013 while this number dramatically increased over years, reaching more than 10,000 in 2016 (4).

The aim of the study was to determine factors underlying the vaccine refusal, and parents' profile.

Materials and Methods

General Information About Study Place

Geographical structure: There are 81 provinces and 12 health regions in Turkey. Health regions have been further divided into sub-groups. The Northeast Anatolia Region, where the research was carried out, consists of two parts as TRA1 (Erzurum, Erzincan and Bayburt provinces) and TRA2 (Ağrı, Kars, Iğdır and

Ardahan provinces). The research was conducted in the TRA2 region covering an area of 30,193 km² with an altitude of 805 m (Dilucu Plain) to 5,137 m (Mount Ararat). Furthermore, the study area is a neighbor to Georgia, Armenia, Nakhchivan (Azerbaijan), and Iran (5).

Social structure: In the study area, it's the basic livelihood is agriculture and animal husbandry. According to the 2011 data on the socioeconomic development ranking of provinces, the area is below average in Turkey in terms of education and health indicators. Concerning educational level, among 81 provinces, Kars ranks 59th, Ardahan 63rd, Iğdır 68th, and Ağrı 79th. The overall rate of illiteracy in the area is 11.7% and 20.3% in the female population, and the rate of those who have not received any formal education is 13.5%. In terms of health status, Kars has the 68th place, Ağrı 79th, Iğdır 69th, Ağrı 79th, and Ardahan 71st in 81 provinces. The national income per capita is 3,489 dollars for Ağrı, 5,558 dollars for Kars, 6,098 dollars for Iğdır, and 6,384 dollars for Ardahan (Turkey average: 10,602 dollars) (5). In brief, the study area is considered as the least developed region of Turkey.

Health structure: All the provinces in the study area are below the Turkish average in terms of health personnel per 1,000 people. For instance, the average number of expert physicians for per 1,000 people is 0.38 for Ağrı while it is 1.15 for the whole country (5). Both infant mortality (11.2 per 1,000) and maternal mortality (24.5 per 100,000) are above the average in Turkey (6.8 and 14.6 per 100,000, respectively). In terms of vaccination, the TRA2 region has the lowest vaccine rate among all regions of Turkey (2017 data) with the full vaccination rate being approximately 90.1% and the rate of those who have never been vaccinated being 5-9% (6).

Study Design

The population of this descriptive study was 180 families living in the TRA2 region and officially signing a "vaccine refusal form". In order to reach the whole target population, sample selection was not performed. The vaccine refusal forms were collected from the provincial health directorates after obtaining the approval of the local ethics committee (80576354-050-99/116, 26.06.2018) and the necessary permission from the relevant public institutions. These forms included contact number and address, mother's name,

and the assigned family physician providing health care for the family. The data collection form was prepared by the researchers by screening the literature. The data were collected by the researchers using the face-to-face interview technique with the exception of 41 women with transportation difficulties due to geographical reasons who were interviewed over the phone.

Statistical Analysis

The collected data were analyzed by Statistical Package for the Social Sciences v 22 (SPSS, IL, USA). Frequency and percentages were used in the analyses.

Definitions of the Terms Used in Study

Vaccine refusal/rejection: Parents' rejection of all vaccines from the birth of their children despite their availability in the study area.

Age: The age of the baby and/or child in months at the time when the interview was conducted.

Infant and child vaccinations: Free primary health services provided by two public health institutions in Turkey: Family Health Centers (FHCs) and Community Health Centers (CHCs). Vaccination services up to the age of two years are basically provided by FHCs, while booster vaccines, which are known as school vaccines in Turkey, are applied by CHCs.

Vaccine pseudo rejection: Before the administration of booster vaccines, the students are given an informed consent form by the health personnel. This form consists of two parts, vaccine acceptance and vaccine refusal, either of which must be signed by the parents of the students. The health personnel do not vaccinate students, for whom the parents refuse vaccination, as well as those that sign the vaccine refusal part themselves without delivering the form to their parents. The latter case, in which vaccination is not performed despite the lack of parents' actual refusal, is referred to as "Vaccine pseudo rejection" in this paper.

Results

Figure 1 presents the sample (vaccine-related situations of 180 people constituting the population of the study). According to figure, 65.6% of vaccine refusal (118 families) was totally against vaccination and had never had their children vaccinated while 17.8% consisted of vaccine pseudo rejection. All

pseudo rejection cases were students in primary school. When their parents were interviewed, it was determined that they were not actually against vaccination but their children had signed the form themselves. They stated that if they had received the form, they would have given consent to their child receiving the booster vaccine.

Table 1 shows the biodemographic and sociodemographic characteristics of the parents that refused to childhood vaccination. According to this, more than half of the babies (55.1%) were 24-49 months and male (54.2%), 72.9% of the mothers were 20-29 years old, 56.8% had two or more pregnancies, 33.9% of the mothers had three or more children, all pregnancies were intended, and only 3.4% of the mothers underwent assisted reproductive therapy. In addition, 82.3% of the families lived in urban areas, 6.8% were extended families, and 39.8% consisted of five or more members. Approximately one out of every 10 women (11.0%) had cross-cousin marriage, 3.4% were not officially married, and 75.4% of mothers and 78.0% of father had received formal education for nine years or more. While 77.1% of fathers had regular income from their jobs, this rate decreased to 20.3% for mothers, and the total income was sufficient for 80.5% of the families to live comfortably.

Discussion

In this study, 65.6% of the families (n=118) were totally against vaccination and had never had their children vaccinated. These families were typologically composed of mothers who had given birth in the most healthy period of fertility, had one to two children, intended pregnancy, had conceived in the normal way, lived in urban areas, had more than nine years of formal education, were housewives, had health insurance. In the families of these mothers, the education level of the fathers was also nine years or more, 77% of the fathers had regular income, and 83% of these families had sufficient income. The social and economic characteristics of the families refusing vaccination were much higher than the average of the study area (5,7). In studies related to vaccination conducted in Turkey and in the world in the last decade suggest as the reasons for low vaccination rates as the low level of education of the mother, presence of multiple children in the family, living in the countryside, and living in areas with transportation difficulties (8,9). In a study

conducted in schools exempted from compulsory vaccination in the state of California in the United States, it was shown that most of the non-vaccinated students were from families with better social and economic status while the families of the vaccinated children had lower economic and social status (10). In a fact-check study related to 33 cases of vaccine rejection in a different province (Adıyaman) in Turkey, it was reported that families had lower levels in terms of both economic and other social components (11). On the other hand, in a study carried out in Australia, it was found that the vaccination rates of children whose parents had a higher level of management and income levels had lower vaccination rates (12).

Mothers mostly received both prenatal and postnatal care services from primary health care institutions (57.6% and 43.2%, respectively). More than half of the childbirths (52.5%) were performed in secondary health institutions. The mothers were informed about the vaccination of their infants mostly by primary care health institutions (89.0%). However, this information only affected the decision of 34.7% mothers to have their infants vaccinated (Table 2).

Table 3 presents the factors affecting the parents' decision to vaccination refusal. According to this, the most effective factor was the idea that there were harmful chemicals in the vaccines (78.0%) while the least effective was non-conformity to religious beliefs. The characteristics of the information sources that are effective in vaccine refusal are given in Table 4. While social media/internet had a greater effect (61.0%), the effect of opinion leaders or religion authorities/works was less.

When vaccination rejections were evaluated in terms of the type of institutions providing healthcare for the mothers, it was determined that a higher percentage of mothers who rejected vaccination had taken postnatal care at these centers and had fewer unplanned homebirths (Table 3). According to the Demographic and Health Survey of Turkey, 11.9% of the mothers living in the region did not take prenatal care services; 19.3% did not take postnatal care services, and 10.2% had unplanned home births (5). Another interesting finding was that 38.1% of mothers who rejected vaccination had given birth in a private hospital/clinic (Table 3) compared to the 7.4% average

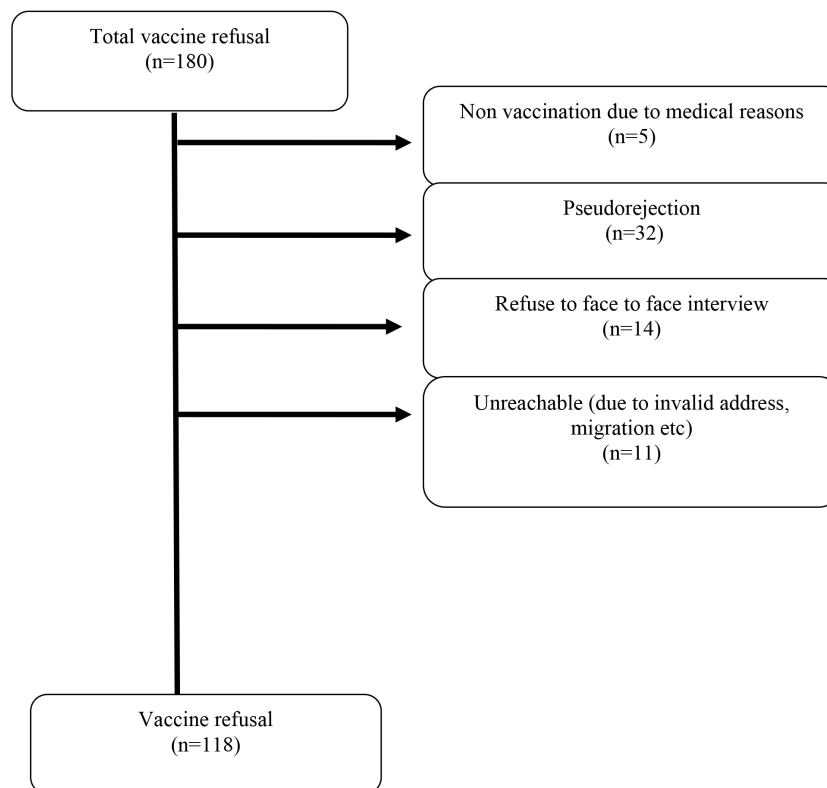


Figure 1. Flowchart of the study population.

of the study area in terms of giving birth in a private hospital/clinic (5).

It was found that 11 out of 100 women who rejected vaccination received no information from the health personnel about the vaccines. On the other hand, one out of four women reported to have been informed about the vaccines from people other than

the healthcare staff, and nine out of 10 women were informed about the positive effects and side effects of the vaccines at a primary health institution. However, the interesting point was that although information was provided for a high percent age of mothers, this affected the decision of only 34.7% of the parents, and even more importantly, this effect was not positive but negative.

When the reasons for vaccine rejection were explored, one of the important findings was that the least effective factor in vaccine rejection was religious beliefs (Table 4). In the global literature, the most important factors affecting vaccine decision are stated as follows:

- Vaccines contain toxic-harmful chemicals and are not compatible with natural and non-chemical philosophy of life (13,14),
- Vaccines are less effective than natural or alternative medicine methods (15),
- Vaccines are the creation of a commercial market as a result of capitalism (13-15),
- The content of the vaccines (eg, aluminum and mercury) can cause serious health problems, such as permanent brain damage, autism, and behavioral disorders (16,17),
- The risks involved in vaccination outweigh its benefits, and religious beliefs and cultural traditions also affect this decision, albeit to a much lesser extent (17,18).

The factors that affected vaccine rejection of parents had certain similarities and differences to the data obtained from the global literature. In the current study, the dominant view of the participants was, “I can’t trust the vaccines because they come from abroad”, and they believe that vaccines are a part of capitalist system commercialized nature of healthcare system.

When the parents were directed the question, “Which sources affected your decision to accept or reject vaccination?”, the majority stated that they followed social media and considered that the information posted on this platform related to the topic was reliable (Table 4). In a study carried out in Italy, 42.8% of the people reported that they obtained information about vaccines from the internet. According to their results of that study, there were 560 anti-vaccine videos (side effects, vaccine-autism relationship, etc.) posted between 2007 and 2017 while a further 224 videos

Demographic and social features		n (%)
Age of infant (month)	≤24	52 (44.1)
	≥25	66 (55.9)
Gender of infant	Female	54 (45.8)
	Male	64 (54.2)
Mother age (years)	21-34	86 (79.2)
	≥35	32 (27.1)
Pregnancy count	First	51 (43.2)
	2 and above	67 (56.8)
Child count	1-2	78 (66.1)
	3 and above	40 (33.9)
Unintended pregnancy	No	118 (100.0)
	Yes	0 (0.0)
Pregnancy type	Normal	114 (96.6)
	Assisted reproductive techniques	4 (3.4)
Residency	Urban	15 (12.7)
	City	103 (82.3)
Family type	Extended	8 (6.8)
	Nuclear	110 (93.2)
House hold count	≤4	71 (60.2)
	≥5	47 (39.8)
Cross-cousin marriage	Yes	13 (11.0)
	No	105 (89.0)
Mother education (years)	≤8	29 (24.6)
	≥9	89 (75.4)
Father’s education (years)	≤8	26 (22.0)
	≥9	92 (78.0)
Mother’s occupation	Yes	24 (20.3)
	No	94 (79.6)
Father’s occupation	Yes	91 (77.1)
	No	27 (22.9)
Total income	Adequate	95 (80.5)
	Non-adequate	23 (19.5)

		n (%)
Prenatal care*	Never	9 (7.6)
	Primary health care	68 (57.6)
	Secondary health care	61 (51.7)
	Tertiary health care	8 (6.8)
	Private care	41 (34.7)
Birth place	Home birth	4 (3.4)
	Secondary health care	62 (52.5)
	Tertiary health care	7 (5.9)
	Private care	45 (38.1)
Postnatal care*	Never	14 (11.9)
	Primary health care	51 (43.2)
	Secondary health care	50 (42.3)
	Tertiary health care	8 (6.8)
	Private care	45 (38.1)
Informed about vaccination*	Never informed from a health care personnel	13 (11.0)
	Primary health care p	105 (89.0)
	Secondary health care	18 (15.3)
	Tertiary health care	7 (6.0)
	Other than health care personnel	30 (25.4)
Information about vaccine	Affect my decision	41 (34.7)
	Not affect my decision	77 (65.3)

*More than one choice the sum is more than 100

		n (%)
I believe that vaccination is unnecessary as there are no vaccine preventable diseases as before.	Yes	85 (72.0)
	No	33 (28.0)
I believe it is more effective to protect the child from diseases with herbal and/or natural methods.	Yes	104 (88.1)
	No	14 (11.9)
I find it contrary to my religious beliefs	Yes	12 (10.2)
	No	106 (89.8)
I don't trust it because it comes from abroad	Yes	96 (81.4)
	No	22 (18.6)
I think it will hurt my kid's intelligence and brain	Yes	94 (79.7)
	No	24 (20.3)
I'm worried that vaccines have too many side effects such as fever, restlessness, allergies.	Yes	98 (83.1)
	No	20 (16.9)
I think there are harmful chemicals in it	Yes	99 (83.9)
	No	19 (16.1)

were added in the first seven months of 2017 (19). In a study conducted in Israel, it was shown that social media groups created for polio vaccines, especially those on Facebook were effective in than academic and medical sources/authorities in parents' decisions related to vaccination (20).

Of the participants that refused vaccination, 66.7% stated that they trusted scientific sources and publications that provided evidence for the harmful effects of vaccination. On the other hand, 45.7% did not trust scientific publications regarding the positive effect of vaccines because they were dominated by pharmaceutical companies (21). An important finding of the study was that more than half of the mothers and/or fathers that trusted scientific essays, books, etc. and more than half of those that did not trust these sources had received formal education for nine or more years.

Well-known people participate in local television programs to discuss nutrition, natural food, and natural life and write books on this subject. This is seen as an important factor in influencing the vaccine decision indirectly instead of directly (14). Another interesting finding obtained from the study was that the vaccine rejection decision of approximately 23 out of every 100 families had been affected by the information provided by healthcare personnel.

Qualitative Data of the Research

The final question of the research posed to the participants was "Can you briefly summarize the reason why you refused to have your child vaccinated?". The most striking responses are given below:

1. "Vaccines are applied by the state in Turkey. The state dwells on vaccines more than anything. There must be a reason for the government dwelling on vaccines so much. I don't think they do this for our benefit.
(Mother is 28, finished high school, housewife;

father is 32, academician).

2. "There are wars in Syria and Africa. They're killing the children's parents and giving their kids free vaccinations (smiles sarcastically). I don't believe that these vaccines were given in a good intent. I think there is a different reason underlying vaccination. For instance, maybe they are using them as a guinea pig.
(Mother and father are 30 years old; both are teachers).
3. "The fact that the vaccines come from abroad is so dangerous. America and Europe do not want our children to develop their brains. Everything that comes from abroad should be examined and should not even be taken."
(Mother is 25 years old, graduated from secondary school, housewife; father is 28, graduated from high school, tradesman).
4. "The vaccine market is a malevolent commercial market. For example, the company producing diabetes medication is also producing chocolate and candy. Is it a coincidence? The owners of vaccine-producing factories do not vaccinate their own children (Gives an exclusive name). In addition, doctors are very lacking in terms of information and research on these issues. For example, have you ever undertaken research about vaccines?"
(Mother is 32 years old; father is 33 years old; both are teachers).
5. "Nearly 50 vaccines are given until the age of two. As if all children have the same type of body. There should be a test before vaccination. I researched it. What if the child has immunodeficiency? What will happen then? Scientifically, these must be determined. Science is in the hands of foreign powers though. There is a documentary that three American doctors made; I recommend you watch it."
(Mother is 27 years old, graduated from university, housewife; father is 29 years old, graduated from university, police officer).
6. "Do you know why children in Africa are vaccinated? To kill them slowly by making them suffer, grow sick, and become helpless. Vaccines may be necessary but in today's world, they are malevolent. A 'make them sick and sell them drugs' policy is being applied. Do you know that doctors who refused vaccines in Europe were mysteriously

Table 4. The sources effective in vaccine refusal

	n (%)
Social media/internet	72 (61.0)
Scientific materials support vaccine refusal	54 (45.8)
Mediatic persons	36 (30.5)
Health personnel	27 (22.9)
Religious materials	7 (5.9)
*More than one choice the sum is more than 100	

killed?”

(Mother is 31 years old; father is 32 years old; both are research assistants).

7. “America gave us milk powder as a favor for years, they said “do not give breast milk; give formula”... Now they are saying “sorry”. Well, who will give the account of the past? Are people guinea pigs? It is not obligatory in their country but it is obligatory in the places that they are trying to exploit (smiles sarcastically). What would you think if you were me? There are also brave doctors who do not recommend the vaccine; they are the exception. I wish all the doctors were like them.
(Mother is 25 years old, finished primary education, housewife; father is 29 years old, finished secondary school, tradesman).
8. “Vaccinated children become infertile when they grow up. For example, my brother/sister has never been vaccinated. Now he/she has a child. One of our neighbors had his/her child vaccinated and he/she did not have any children because of the vaccination. It is said that vaccines cause many diseases.
(Mother is 32 years old, finished primary school, housewife; father is 36 years old, finished primary school, worker).
9. “The heavy metals in the vaccines are very dangerous. As a country, the effects of substances in vaccines can be investigated. If you want, you can research them on the internet. Additionally, vaccine factories produce two things: guns and vaccines. Isn’t that scary? Drug companies support the publication of pharmacology books. It is like first breaking something that is working and then selling products to fix it.”
(Mother is 31 years old, graduated from university, housewife; father is 32 years old, graduated from university, academician).
10. “Natural methods, such as phytotherapy is more valuable than a vaccine. They vaccinate children but what will happen 10-20 years later? There is mercury, aluminum, DNA fragments inside it, and these substances remain in the body for years. After all these elements are introduced, then it is said that autism, Down’s syndrome, and other syndromes increase.”
(Mother is 25 years old, graduated from university, physical education teacher; father is 30 years old, graduated from university, teacher).

11. “Vaccination is contrary to the natural balance of the body, of evolution and creation. A baby is given a lot of vaccines in first two years, in which time he/she has never become sick. It is too dangerous. Vaccination is a market created by drug mafias. Doctors are also very inexperienced. They impose vaccination on the public, but I’m not angry with them because they are a part of the system; they cannot act contrary to what the companies say. If they act in opposition, their salaries will be reduced or they will lose their jobs.

(Mother is 26 years old, graduated from university, teacher; father is 26 years old, graduated from university, teacher).

12. “I do not believe in different hodjas (religious teachers). In hadith, it is narrated that ‘There is no treatment with things that are forbidden by religion’. They (vaccines) contain pig genes. I never get my child vaccinated.”
(Mother is 29 years old, graduated from university, housewife; father is 30 years old, graduated from university, teacher).
13. “People are being vaccinated with flu vaccine, but nothing changes in the next year. The vaccines have little protection. Does America or Europe have a positive attitude to us? Of course, no. I am an imam. Even if there is no compulsion in religion, they impose the vaccine as if it is a verse. It cannot be just with threat and imposition. Nobody knows the side effects; nobody tells the truth. Vaccines contain mercury and other chemicals... People wonder why they insist on vaccination when there are so many harmful things in it...”
(Mother is 23 years old, graduated from high school, housewife; Father is 25 years old, graduated from university, imam).

Conclusion

The development of technology has led to almost the whole of the earth being able to easily access all kinds of information by pressing a few keys on a computer keyboard. However, this access to information has negative as well as positive effects, and this has an impact on the acceptance of vaccination. Recent media coverage has referred to ‘diseases caused by vaccine’ rather than ‘diseases prevented by vaccine’. This propaganda has had an impact on the increase of vaccine rejection. The most important advantage of our study was that it covered one of the largest regions

in Turkey and was undertaken by the face-to-face interview method.

Although the research was planned as a fact-check type to determine the causal relationships in vaccine rejection, it had to be carried out as a descriptive type of research due to logistical problems and difficulties arising from relationships with personnel in public sector. For this reason, interpreting the research in terms of causality should be treated with caution.

Ethics

Ethics Committee Approval: The vaccine refusal forms were collected from the provincial health directorates after obtaining the approval of the local ethics committee (80576354-050-99/116, 26.06.2018) and the necessary permission from the relevant public institutions.

Conflict of Interest: No conflict of interest was declared by the authors.

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