Vaccine Hesitancy and Refusal: A Case Study of Amasya

Aşı Tereddüdü ve Reddi: Bir Amasya Örneği

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ABSTRACT

Objective: This study conducted with parents who have vaccination hesitation or refused to be vaccinated in Amasya is aimed to determine the factors that affected their decision.

Material and Methods: In this study, the characteristics of families who refused to vaccinate their children in Amasya in 2019–2020 were questioned and compared with a group of families who had their children vaccinated.

Results: In the study group, thinking that there are harmful substances in the vaccine, thinking that the vaccine will harm the child, and not giving confidence because all childhood vaccines come from abroad were stated as the three most expressed reasons for not vaccination. The rate of prenatal screening tests, sugar loading and tetanus vaccine was found to be significantly higher in the study group who refused vaccination compared with the control group. Having negative experiences related to vaccination (OR = 6.57) and not taking measures for communicable diseases (OR = 32.64) were positively associated with not having the vaccine.

Conclusion: This study is one of the limited number of studies evaluating parents' sociodemographic characteristics and attitudes toward vaccination. Due to the provision and financing of vaccines, families have concerns related to confidence in vaccines. The fact that vaccination is necessary not only for individuals but also for social immunity should be explained to all individuals in society considering modern scientific knowledge.

Key Words: Childhood, Immunization, Vaccine Hesitancy, Vaccine Refusal

ÖZ

Amaç: Amasya'da aşı tereddüdü yaşayan veya aşı yaptırmayı reddeden ebeveynler ile yapılan bu çalışmada onların kararını etkiyen faktörleri belirlemek amaçlanmıştır.

Gereç ve Yöntemler: Bu araştırma, 2019-2020 yılı içinde Amasya ilinde çocuklarına aşı yaptırmayı reddeden ailelerin özellikleri sorgulanarak, aşı yaptıran bir grup aile ile karşılaştırılmıştır.

Bulgular: Çalışma grubunda aşının içinde çocuğa zararlı maddelerin olduğunu düşünme, aşının çocuğa zarar vereceğini düşünme ve bütün çocukluk çağı aşılarının dış ülkelerden geldiği için güven vermemesi aşı yaptırmama nedenleri ile ilgili en çok ifade edilen üç neden olarak belirtilmiştir. Aşı yaptırmayı reddeden çalışma grubunda doğum öncesi tarama testleri, şeker yükleme ve tetanos aşısı yaptırmayanların oranı kontrol grubuna göre anlamlı derecede yüksek olarak saptanmıştır. Aşıyla ilgili olumsuz deneyimlere sahip olma (OR= 6.57) ve bulaşıcı hastalıklara yönelik tedbir almama (OR= 32.64) aşıyı yaptırmamayla pozitif yönde ilişkili bulunmuştur.

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Sonuç: Bu çalışma ebeveynlerin sosyodemografik özellikler ile aşıya tutumlarını değerlendiren sınırlı sayıdaki çalışmalardan biridir. Aşıların temini ve finansmanından dolayı ailelerde aşılara karşı güven endişesi mevcuttur. Aşılamanın sadece bireysel değil toplumsal bağışıklık için gerekli olduğu gerçeği toplumdaki tüm bireylere çağdaş bilimsel bilgiler ışığında anlatılmalıdır.

Anahtar Sözcükler: Çocukluk Çağı, Bağışıklama, Aşı Reddi, Aşı Tereddüdü

INTRODUCTION

Vaccination is known as the most effective method for preventing infectious diseases and it has also been reported that vaccination contributes to major global reductions in morbidity and mortality of diseases and even eradicated some diseases. For example, smallpox is completely and poliomyelitis is almost eradicated by vaccination campaigns. Vaccination provides both individual and herd immunity, so as the number of vaccinated individuals in society increases, the probability of contact of unvaccinated people with the disease decreases, and accordingly, the prevalence of the disease in that community gradually decreases (1). However, herd immunity can only be acquired when most of the population is immune to that infectious disease by vaccination. However, the growing number of individuals who hesitate or refuse vaccinations is a threat to herd immunity.

Vaccine hesitancy is defined by the World Health Organization Strategic Advisory Group of Experts on immunization as "to delay in acceptance or refusal of vaccines despite the availability of vaccine services" (2). According to the Strategic Advisory Group of Experts on Immunization, this situation is not just about trust in vaccines. It is linked with different factors such as socio-cultural characteristics of families, religious beliefs, etc. (3, 4).

Although vaccine refusal movements have been present for many decades, it has accelerated with the 1998 Lancet paper that implied a link between MMR vaccine and autism. Although this paper was then withdrawn and this claim has been refuted, it naturally gave a golden opportunity for anti-vaccine activists who seek a foundation for their thesis. The discourses of these groups have reduced the vaccination rates of some vaccines. In 2015, the measles immunization rate declined to 85% in Italy and 88% in entire Europe (5). According to 2017 WHO data, the rate of immunization with diphtheria, tetanus and pertussis vaccines has declined to 92% in Europe and 91% in the United States. The measles vaccination rate for the first dose has decreased to 92% that was above 95% in 2012 and the rate for two doses decreased to 54% (6).

Such declines in vaccination rates have voiced concerns regarding the increase in the prevalence of such diseases. For example, a report of European Centre for Disease Prevention and Control (ECDC) published in 2017 indicated that the number of measles cases has increased almost thrice compared to the previous year and 87% of the people diagnosed were not vaccinated (7). In France, more than 22,000 cases of measles were reported between January 2008 and May 2012 and it was stated that this outbreak was largely caused by unvaccinated individuals. Furthermore, WHO reported that most of the 29,150 measles cases in Europe in 2013 were unvaccinated people. Moreover, the large measles epidemic that started in May 2013 in the Netherlands was linked to Orthodox Protestants who refused vaccination on religious grounds (8). Due to the above-mentioned events, WHO identified vaccine hesitancy as one of the ten biggest health threats in 2019 (9).

However, in Turkey, because of a lawsuit filed in 2015, the court decided to obtain parental consent for the vaccine and the number of vaccine refusal cases increased dramatically as this decision became popular in the newspapers and social media. The number of families who refuse to vaccinate their child (ren), which was 183 in 2011, has exceeded twenty-three thousand as of 2018 (10).

In fact, many countries have mandatory childhood vaccination policies and even some countries ban unvaccinated children from attending schools. However, vaccination is not mandatory in Turkey and there is no legal sanction for parents who refuse to vaccinate their child (ren). However, recently, parental refusal of childhood vaccines has been considered to child neglect and there are serious debates on this issue. In 7 of 9 cases of vaccine refusal in the USA, the court considered the case as neglect (11). However, parental refusal to childhood vaccines is not legally considered child neglect in Turkey. On the other hand, because vaccination is not just about individual immunization but also has an impact on herd immunity, the relevant article of the constitution stating "Fundamental rights and freedoms also includes the duties and responsibilities of the individual toward society, his family, and other individuals" clearly states the necessity of vaccination (12).

People who refuse vaccination put forward many reasons such as vaccines are toxic due to the chemicals they contain, they can have various side effects, companies producing vaccines may be malicious due to large financial returns, natural immunity or natural methods are more effective in protecting against diseases (13). Furthermore, in addition to perceptions about the safety, efficacy and importance of vaccines, religious beliefs across society are used by anti-vaccine activists. For example, a survey conducted by WHO and UNICEF in 154 countries showed the fact that vaccines do not have a halal certification was identified as a reason for vaccine refusal (14). The reasons for vaccine refusal or hesitancy may vary from country to country and region to region. To decrease the rates of vaccine refusal, countries need solid and reliable data sources. In this

regard, a literature survey revealed that only a limited number of studies have been conducted in Turkey on parents who have vaccine hesitancy or refused vaccination. Therefore, this study aims to identify the factors affecting parents' vaccine refusal decisions and to develop solutions.

MATERIAL and METHODS

This case control study examines the characteristics of parents who refuse childhood vaccinations in Amasya province and compares them with a parents group who accept childhood vaccinations.

A total of 37 families residing in Amasya province in 2019–2020 and refusing childhood vaccinations included in the national immunization schedule of the Ministry of Health for their child (ren) according to the data of the Provincial Health Directorate were determined as the study group. All families were included in the study without sampling. To compare the characteristics of parents, family health centers were consulted and 76 families (about twice the sample size) residing in Amasya province and vaccinated their child (ren) were included in the study as the control group. The ages of the children in both groups are in the range of 0–4 years.

These 76 parents that consisting the control group were randomly chosen by drawing lots from Family Health Centers records. Seven families in the study group refused to participate in the study and 3 families could not be contacted. Also, 6 children were not vaccinated according to doctor advice due to immunodeficiency. Thus, the survey was conducted with 21 families (13 mothers and 8 fathers were surveyed) who refused to vaccinate their child (ren). Regarding the control group, a family with missing data was excluded from the study and survey was conducted with 75 families (57 mothers and 18 fathers were surveyed).

Data Collection Instruments

The data for this study were collected by data collection instruments developed by the authors. The survey consists of questions regarding the sociodemographic characteristics of parents (age, education level and employment), whether they implemented preventive measures in addition to vaccines to prevent infectious disease, ss where they obtained their current knowledge about vaccines, whether they had sufficient information on vaccines and receive medical care during pregnancy. This survey was applied to both parent groups. However, some additional questions were asked to the sample group, such as reasons for refusing to vaccinate their child (ren) and conditions in which they may agree to vaccinate. On the other hand, some different questions were also asked the control group, such as whether they knew the reasons for parents who refuse childhood vaccinations and the possible methods to persuade them to vaccinations.

Before beginning the research, the parents were informed about the study and the survey was then applied. The participants were responded to surveys by telephone interview.

The ethical approval was received from the Erciyes University Ethical Committee (dated 12.02.2020 and numbered 2020/95) and research permission was received from Amasya Provincial Health Directorate (dated 19.02.2020 2020 and numbered 68724985–772.02).

Analysis of Data

The data obtained in this study were analyzed using the SPSS 21 statistical software package and Stata 14.1 software. While continuous variables are presented as mean and standard deviation values, categorical variables are shown as frequency and percentages. To compare mother and father age between both groups, the Mann–Whitney U test was applied. Chi-square and Firth's logistic regression analysis was performed to determine which answers of the participants were related to vaccination status. Parents who agreed and refused to vaccinate their child (ren) were determined as dependent variables and receiving screening tests, having a glucose tolerance test, and getting tetanus vaccination during pregnancy and negative vaccination experience, implementing precautionary actions against infectious diseases, and opinion about COVID-19 vaccination was accepted as independent variables. Only survey items determined as significant by Chi-square analysis were included in the analysis. Firth's logistic regression analysis is a statistical method for two or more variables used to determine variables related to rare events and with small sample sizes (15). Results of Firth's logistic regression analysis were presented by odds ratios (OR) and 95% confidence intervals for the odds ratio. A significance level of $p < .05$ was used in all statistical analyses.

RESULTS

Sociodemographic characteristics of both families who agreed or refused to vaccinate their children and the comparisons between groups are presented in Table I. As shown in Table I, the age of the fathers who refused childhood vaccinations was significantly higher than those who agreed to vaccinate their children. No significant differences were found in other variables. While 23.8% of the families in the study group stated that they got some of their children vaccinated, 4.8% declared that they refused childhood vaccinations for all their children. A total of 98.7% of the parents in the control group stated that their children received all childhood vaccinations.

Table I: Socio-demographic characteristics of the study and control groups

Socio-demographics Variables	Study Group n=21 (%)	Control Group n=75 (%)	p
Age of Mothers	29.81±5.60	28.52±5.41	0.322
Age of Fathers	31.76±4.40	29.28±5.26	0.020
Education Level of Mothers			
Primary	3 (14.3)	14 (18.6)	.894
Secondary	11 (52.4)	38 (50.7)	
College and above	7 (33.3)	23 (30.7)	
Education Level of Fathers			
Primary	2 (9.6)	9 (12.0)	.826
Secondary	9 (42.9)	34 (45.3)	
College and above	10 (47.6)	32 (42.7)	
Employment of Mothers			
Employed	3 (14.3)	20(26.7)	.240
Unemployed	18 (85.7)	55 (73.3)	
Employment of Fathers			
Employed	20 (95.2)	72 (96.0)	.877
Unemployed	1 (4.8)	3 (4.0)	
Total	21 (100.0)	75 (100.0)	

Table II: Refusal reasons of study group families for childhood vaccinations

Variables	Study Group n=21 (%)
Vaccinations contain substances that can be harmful to their children's health (mercury, aluminum, etc.)	18 (85.7)
Vaccinations may harm this child	17 (81.0)
Lack of trust in vaccinations since they exported from abroad	15 (71.4)
Vaccinations may contain religiously prohibited substances (pork products, etc.)	10 (47.6)
Concerns about vaccinations may cause autism	9 (42.9)
Getting affected by anti-vaccine comments made by well-known specialists and persons through TV and media	9 (42.9)
Observation of side effects on this child after a previous dose	6 (28.6)

Multiple items were selected.

Frequencies and percentages regarding the refusal reasons for families for childhood vaccinations are given in Table II. The three most frequently reported reasons for refusing childhood vaccinations were believing that vaccinations contain substances that can be harmful to children's health, vaccinations can harm their children, and lack of trust in vaccinations since they are exported from abroad.

Frequencies and percentages regarding possible situations/conditions in which parents can be persuaded to get their children vaccinated are given in Table III.

The analysis results regarding the behavior and attitudes of both groups toward receiving medical care during pregnancy are presented in Table IV.

Table III: Situations/conditions in which parents can be persuaded to get their children vaccinated

Variables	Study Group n (%)
If vaccines are domestic and national production	17 (81.0)
If an unvaccinated child gets sick or dies	3 (14.3)
If the president, health minister, or political party leaders declare that it is safe to get vaccinated	3 (14.3)
If well-known doctors or specialist on TV or media declare that it is safe to get vaccinated	2 (9.5)
If my spouse or family elders force me	2 (9.5)

Table IV: Certain behaviors and attitudes of study and control groups during pregnancy

Variables	Study Group n=21 (%)	Control Group n=75 (%)	p
Were you examined by a doctor/health personnel during pregnancy?			
Yes	21 (100.0)	74 (98.7)	1.000
No	0 (0.0)	1 (1.3)	
Did you receive a tetanus vaccine during pregnancy?			
Yes	11 (52.4)	61 (81.3)	0.015
No	10 (47.6)	14 (18.7)	
Did you get double and quad screening tests during pregnancy?			
Yes	10 (47.6)	63 (84.0)	0.002
No	11 (52.4)	12 (16.0)	
Did you have a glucose tolerance test during pregnancy?			
Yes	9 (42.9)	59 (78.7)	0.004
No	12 (57.1)	16 (21.3)	
Did you have a newborn blood spot (heel prick) test after birth?			
Yes	21 (100.0)	75 (100.0)	-
No	0 (0.0)	0 (0.0)	
Did you have a newborn hearing screening after birth?			
Yes	21 (100.0)	72 (96.0)	1.000
No	0 (0.0)	3 (4.0)	
Did you give vitamin D & iron supplements to your baby?			
Yes	19 (90.5)	62 (82.7)	0.511
No	2 (9.5)	13 (17.3)	
Total	21 (100.0)	75 (100.0)	

Table V: Certain behaviors and attitudes of study and control groups towards vaccines

Variables	Study Group n=21 (%)	Control Group n=75 (%)	p
Do you think that you have sufficient vaccine knowledge?			
Sufficient	16 (76.2)	36 (48.0)	0.054
Insufficient	4 (19.8)	22 (29.3)	
Not sure	1 (4.8)	17 (22.7)	
Where did you get your knowledge on vaccines?			
Internet/social media	12 (57.1)	33 (44.0)	0.237
Health personnel	5 (23.8)	33 (44.0)	
TV, newspaper, etc.	3 (14.3)	4 (5.3)	
From family, relatives, neighbors, or friends	1 (4.8)	5 (6.7)	
Has anyone in your family or any of your relatives ever had a negative immunization experience?			
Yes	6 (28.6)	4 (5.3)	0.007
No	15 (71.4)	71 (94.7)	
Do you implement precautionary actions against infectious diseases in addition to vaccines?			
Yes	11 (52.4)	0 (0.0)	0.0001
No	10 (47.6)	75 (100.0)	
Do you get seasonal flu vaccines?			
Yes	3 (14.3)	15 (20.0)	0.755
No	18 (85.7)	60 (80.0)	
Will you/your child get rabies vaccine if you/ your child is bitten by a rabid animal?			
Yes	13 (61.9)	73 (97.3)	0.0001
No	8 (38.1)	2 (2.7)	
Do you consider getting a Covid-19 vaccine?			
Yes	4 (19.0)	35 (46.7)	0.003
No	8 (38.1)	7 (9.3)	
Not sure	9 (42.9)	33 (44.0)	
Total	21 (100.0)	75 (100.0)	

The analysis results regarding behaviors and attitudes of both groups toward vaccines are shown in Table V.

As shown in Table VI, negative immunization experiences (OR= 6.57) and not implementing precautionary actions against infectious diseases (OR= 32.64) are positively correlated with vaccine refusal. In other words, individuals who have had a negative immunization experience and tried avoiding infectious diseases using methods other than vaccination are significantly more likely to not get vaccinated than those vaccinated individuals.

Table VI: Results of Firth's logistic regression analysis

Variables	OR	95% CI OR	p
Will you get rabies vaccine if you or your child is bitten by a rabid animal?			
No (Reference)			
Yes	0.13	0.01, 1.47	0.100
Do you consider getting a Covid-19 vaccine?			
No (Reference)			
Not sure	0.89	0.14, 5.60	0.898
Yes	0.95	0.13, 7.20	0.963
Did you receive a tetanus vaccine during pregnancy?			
No (Reference)			
Yes	0.53	0.11, 2.66	0.440
Did you get double and quad screening tests during pregnancy?			
No (Reference)			
Yes	0.56	0.11, 2.69	0.465
Did you have a glucose tolerance test during pregnancy?			
No (Reference)			
Yes	0.35	0.07, 1.77	0.203
Has anyone in your family or any of your relatives ever had a negative immunization experience?			
No (Reference)			
Yes	6.57	1.22, 35.48	0.029
Do you implement precautionary actions against infectious diseases in addition to vaccines?			
Yes (Reference)			
No	32.64	5.21, 204.48	0.001

DISCUSSION

There has been an increase in global vaccine refusal and hesitation recently. However, only a few studies conducted so far on groups refusing childhood vaccinations in Turkey. In this study, no significant correlation was found between the children in the group that refused vaccination and the control group regarding the age of mothers, education level and employment status of parents. However, a significant relationship was obtained between groups for the age of fathers. The mean age of fathers who refused to vaccinate their child (ren) was significantly higher than those in the control group. Regarding this finding, different results have been reported in the literature. For example, the results of a study conducted in Croatia showed that the probability of vaccine hesitancy increases significantly at relatively younger ages (16). Another study suggests that the young population has relatively insufficient knowledge about vaccine-preventable diseases and pandemics caused by infectious diseases (17). However, Topçu et al.(18) conducted a study with families who refused vaccination and found that no significant difference existed between parental age and vaccine refusal (18).

Recently, many concerns were raised by parents about immunization practices due for many reasons. However, only a few of these are concerns are based on scientific evidence and such concerns/claims have never been clinically proven. Nevertheless, people continue making such claims about vaccines. The most frequently stated concern about vaccines is related to vaccine ingredients. Similarly, according to the results of this paper, the most frequently stated reason by parents for vaccine refusal is that they believe that vaccines contain harmful ingredients and have some potentially dangerous side effects such as autism and infertility. Also, similar reasons were reported in other studies on vaccine refusal and hesitation (19–23). In a qualitative study by Bond and Nolan conducted with 45 families, they found that parents have concerns regarding the short- and long-term side effects of vaccinations and that vaccinations may cause genetic changes (24). A study investigated the reflection of the autism/vaccine hypothesis that exists in media and it was reported that although unscientifically based, contradictory information on the internet feeds concerns about the vaccine and therefore, reduces vaccine acceptance. The low health literacy rate in society and the fact that individuals do not know how to reach the right information can be considered risks that increase vaccine refusal. Also, although the hypothesized link between the measles vaccine and autism has not been clinically proven, some parents' concerns about the MMR vaccine causes such problems to continue to affect vaccination rates significantly (25, 26). Those who refuse vaccinations believe that the likelihood of contracting diseases that can be prevented by vaccination is lower than the side effects and risks associated with the vaccine (23).

According to our findings, the fact that there is no domestic production of vaccines in Turkey and that all childhood vaccines come from abroad is determined as an important reason for vaccine refusal among families. However, the fact that the vaccines come from abroad strengthens the claims that the vaccines contain religiously prohibited substances, thus families' confidence in vaccines decreases. According to a literature survey, the rate of those who consider foreign production of vaccines as a problem was determined 18% and 9% by Hough-Telford et al. (27) and Massimi et al. (28), respectively. Furthermore, İlter conducted a study with families who refuse vaccinations and he found that about 70% of families believe that vaccines are recommended to protect the commercial interests of pharma companies (29). To strengthen the public confidence in vaccines and reduce vaccine refusal rates, starting domestic production of vaccines could be very effective. Likewise, families' comments in our study that they get their child (ren) vaccinated if vaccines are domestic production can be considered evidence for this claim.

Moreover, we examined parents' behavior regarding receiving medical care during pregnancy. In the group who refused childhood vaccinations, the ratio of mothers who did not make screening tests, a glucose tolerance test and tetanus vaccine during pregnancy was found to be significantly higher than those in the control group ($p<0.005$). Statements made to prevent vaccine refusal are more effective on parents when the person making the statement is perceived as trustworthy (30). Having information about families, dealing with their problems and being perceived as reliable people are critical factors for Family Health Center personnel, who provide services at the first stage, in reducing vaccine refusal rates. However, providing adequate and proper medical care during pregnancy, establishing accurate, reliable and effective communication between health personnel and families are factors that positively affect not only maternal health but also infant-child health.

Our study revealed that the most frequently used information sources by the parents in both groups were the internet and social media. These were followed by health personnel. Today, the internet is central to the rapid spread and popularity of concerns about vaccines. The fact that families can access and question any kind of information easily emerges as an increasing threat. In a study, 52.0% of the participants stated that they consider the information available on the internet is reliable (31). Furthermore, in a study by Callender conducted in the USA in 2016, it was found that 32% of the information on vaccines contained anti-vaccine statements (32). Consistent with this finding, according to the results of a study examining newspaper reports about the anti-vaccine movement in Turkey, the number of newspaper reports in 2018 was found to be significantly higher than in previous years (33). Research has shown that people come together and affect each other easily with technological advances. Increasing confidence in healthcare workers who provide care at the first stage and receive information about vaccines, which is one of the important issues in child health, from these workers are critical in addressing vaccine hesitancy.

Our findings also showed that implementing precautionary actions against infectious diseases in addition to vaccines is significantly higher in the study group who refused childhood vaccinations than those in the control group. Parents, who do not trust in vaccines to protect from infectious diseases, stated that they implement several practices such as eating naturally, following hygiene rules and taking herbal supplements to strengthen their immunity. A literature survey revealed that there are many reports highlighting similar results. Topçu et al. (18) determined that the use of complementary and alternative medicine is significantly higher in the group who refuse vaccines than those in the control group. Furthermore, in a qualitative study by Benin et al. (34), they found that parents who refuse vaccines rely on natural treatments and herbs. Moreover, a study conducted with a population in Croatia pointed out that religiosity and the use of alternative medicine increase the likelihood of vaccine refusal (16). Among parents who hesitate to vaccinate their children, some have serious concerns regarding the relative efficacy of vaccine immunity vs. natural immunity acquired through the natural infection,

some parents prefer their children to acquire natural immunity (35,37). Misinterpreting natural immunity has also emerged as an important reason for increased vaccine refusal by parents that hesitates to vaccine their children. The chickenpox that the parents had during their childhood is an important factor in the emergence of this misconception. However, families are not aware of the serious complications that may arise because of this disease. According to a study conducted in Australia, the rate of support for vaccination is lower in individuals who practice alternative medicine (38). A qualitative study was conducted with 29 families in South Australia who refused some or all vaccinations and it was found that complementary medicine treatments are recognized as reliable methods more natural, chemical-free, with no side effects and exclude big pharma companies' concerns for earning money (20).

CONCLUSION and RECOMMENDATIONS

Although many studies have examined vaccine refusal and hesitancy behaviors in different segments of society, only a limited number of studies have been conducted with individuals who refuse vaccination. From this perspective, it can be argued that more comprehensive, long-term, and more detailed studies are needed on vaccine refusal to determine and implement policies that will increase the confidence of society.

Another factor related to vaccine refusal and hesitancy is about the safety of vaccines. Parents have concerns regarding the safety of vaccines because of their supply and financing methods. Accordingly, supporting domestic vaccine production and informing parents would are central to reducing vaccine refusal rates. The vaccine production has been carried out in Turkey since the Ottoman Empire period and the necessary infrastructure already exists, therefore making the necessary investments in vaccine production will contribute to increasing levels of trust in society.

TV, internet, and social media platforms are the most effective tools for reaching large audiences in today's constantly developing and evolving technology. However, information pollution about vaccines on these platforms, which the public often use to obtain information on divergent fields, also causes some concerns among parents. In this regard, healthcare personnel have important responsibilities. Increasing the health literacy rates in the public and driving them to use reliable sources to obtain information is critical.

All individuals in society should be informed using contemporary scientific knowledge that vaccination is necessary not only for individual immunity but also for herd immunity. In this regard, healthcare personnel working at the first level have a great responsibility. Parents should be informed about vaccines while they receive medical care during pregnancy. Furthermore, note that immunization is a social responsibility to ensure the protection of the most vulnerable groups in society also by acting together in immunization.

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