Vaccination Status in Children Aged 12-23 Months and Predictors in Şanlıurfa

Şanlıurfa'da 12-23 Aylar Arasındaki Çocuklarda Aşılama Durumu ve Belirleyicileri

Zeynep ŞİMŞEK, MD,[a]
İbrahim Halil İNAKÇI,[b]
İbrahim KORUK, MD,[a]
Kabil SHERMATOV, MD[c]

Departments of
[a]Public Health,
[c]Pediatrics,
Harran University Faculty of Medicine,
[b]Health Division,
Şanlıurfa Gynecology and Obstetrics Hospital, Şanlıurfa

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Yazışma Adresi/*Correspondence:*
Zeynep ŞİMŞEK, MD
Harran University Faculty of Medicine,
Department of Public Health,
Şanlıurfa,
TÜRKİYE/TURKEY
zsimsek@harran.edu.tr

ABSTRACT Objective: Vaccinations are one of the simplest and most effective preventive interventions to protect the health of children. The objective of this study was to examine the vaccination status in children aged 12-23 months, and to determine predictors to vaccination in order to improve vaccination services. **Material and Methods:** In this cross-sectional survey, a population-based representative sample, at 95% confidence level, 511 children aged 12-23 months were selected from rural and urban areas of Sanliurfa between November 2006 and February 2007. 'Socio-demographic Information Form' developed by researchers, 'Child Vaccination Form', and 'Reasons for Vaccination Failure Form'developed by World Health Organization were used to data collection. **Results:** Out of children 511, 50.1% were male, and 49.9% were females, the mean age of the children was 16.8 ± 3.6 months. About 53% of children had received a complete set of vaccines, 45.6% were lacking some of the vaccinations and 1.4% of them had no vaccination. According to the logistic regression, maternal education, distance to the health care center, and language spoken at home were significant predictors of the status of the vaccination ($p< 0.05$). The majority of the barriers were related to vaccine knowledge and accessibility to primary healthcare services. **Conclusions:** The vaccination ratio was lower than the Turkish National Target. Based on the findings of this study, increasing the schooling of women, facilitating the accessibility of primary healthcare services by rising the number of health care centers and health professionals, giving sustainable mobile health services by home visits, and providing community health education programme may overcome the barriers for vaccination in this particular community.

Key Words: Vaccination; child

ÖZET Amaç: Aşılama çocuk sağlığını korumada en basit ve etkili yöntemlerden biridir. Bu çalışmada aşılama hizmetlerini geliştirmek için 12-23 aylar arasındaki çocuklarda aşılama durumunu ve belirleyicilerini saptamak amaçlanmıştır. **Gereç ve Yöntemler:** Kesitsel tipteki bu çalışmada, Şanlıurfa .ilinin kentsel ve kırsal bütün yerleşim yerlerini temsil edecek şekilde %95 güven düzeyinde 511 çocuk seçilmiş ve Kasım 2006-Şubat 2007 tarihleri arasında saha çalışması yapılmıştır. Veri toplamada araştırmacılar tarafından geliştirilen 'Sosyo-Demografik Bilgi Formu' ve Dünya Sağlık Örgütü tarafından geliştirilen 'Çocuk Aşılama Formu', ile 'Aşılama Hizmetleri Başarısızlık Nedenleri Formu' kullanılmıştır. **Bulgular:** Toplam 511 çocuğun %50.1'i erkek, %49.9'u kız ve yaş ortalaması 16.8 ± 3.6 aydır. Çocukların %53'ü tam aşılı, %45.6'sı kısmen aşılı ve %1.4'ü aşısızdır. Lojistik regresyon analizine göre, annenin öğrenimi, sağlık ocağına uzaklık ve evde konuşulan dil aşılama durumunu etkileyen değişkenler olarak belirlenmiştir ($p< 0.05$). **Sonuç:** Çalışmanın bulguları, bağışıklama oranının Türkiye ulusal hedefinin altında olduğunu göstermiştir. Aşılama engellerinin çoğunluğu, aşılama bilgisi ve temel sağlık hizmetlerine erişim ile ilgilidir. Çalışmanın bulgularına dayalı olarak, il genelinde kadınların okula gitmelerinin sağlanması, sağlık ocağı sayısı, personel sayısının artırılması ve ev ziyareti yoluyla temel sağlık hizmetlerine erişimin sağlanmasının yanı sıra halka yönelik sağlık eğitim programlarının gerektiği düşünülmektedir.

Anahtar Kelimeler: Aşılama; çocuk

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Childhood vaccinations are among the most successful and cost-effective public health interventions for the prevention of child mortality and morbidity, so the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) made a sequence of decisions about immunization and included it into primary healthcare programmes. WHO estimates that 2 million child deaths were prevented through vaccination in 2003.[1] Therefore, immunization is mentioned in the Declaration of Alma-Ata, 'Health for All by the Year 2000', 'Health for All in the 21st Century', 'Convention on the Rights of the Child', 'World Assembly for Children', 'Expanded Programs on Immunization' and 'Declaration of Innocenti'.[2-5]

Their use has led to the eradication of smallpox, regional elimination of measles and polio, and substantial reductions in the morbidity and mortality attributed to diphtheria, tetanus, and pertussis. However, childhood infectious diseases remain the leading cause of death worldwide. According to The State of the World's Children 2006 Report, industrialized countries reached DTP3 (measure of the success of the routine immunization program) coverage of higher than 95%, while coverage in Sub-saharan Africa was 65% and that in the developing countried was 76%.[6] Today, over 100 million children under one year of age are immunized every year with the required three doses of diphtheria-tetanus-pertussis (DTP) vaccine. However, 24 million children are not being reached with vaccines: in 2007, over 10% of children under one year old in developing countries were not receiving even one dose of DTP vaccine, compared with 2% in industrialized countries.[7] As such, monitoring the levels of vaccination coverage and determining barriers over time in different communities are very important.

The national vaccination schedule in Turkey was revised in 2007, and the vaccination programme for the year 2007 included Bacille Calmette-Guérin (BCG), oral polio vaccine (OPV), diphtheria, tetanus, pertussis (DTP), measles and hepatitis B vaccine (HBV), measles, mumps, rubella (MMR), haemophilus influenza type b (Hib). All routine vaccinations are provided free of charge in primary healthcare centers in Turkey based on the Socialization of Health Services Law dated 1961. The Expanded Programme of Immunization (EPI) aims a coverage rate of 95% for each antigen and a full vaccination rate of 90% for children under 1 year of age.[8,9]

According to the Turkish Demographic and Health Survey reported in 2008, vaccination coverage rates in the Southeastern Anatolia were as follows: 95.1% for BCG, 97.1% for DTP first dose, 89.3% for DTP second dose, 82.5% for DTP third dose, 94.2% for OPV first dose, 86.4% for OPV second dose, 79.6% for OPV third dose, 70.9% for measles, and 59.2 % for full vaccination (BCG, measles and three doses of DPT and OPV). There is still a big gap between the EPI targets and the vaccination coverage rates in our country (respectively; BCG 96%; DTP 97.3%, 91.6%, 88.5%, Polio 96.5%, 91.5%, 87.4%, measles 83.2%, full vaccination 73.9%) and in our region.[10]

Many studies have examined factors or barriers that contribute to whether or not children are up to date on recommended immunizations as well as immunization compliance rates. These factors are family's lack of knowledge or inaccurate perception about the importance of vaccines, logistical barriers (accessibility to health care due to poor roads, inadequate transportation, inconvenient office hours, long waiting lines), poverty, missed oppurtunity, religious, cultural factors, birth order, size of family, number of siblings, gender, young parental age, single parent, poverty, family mobility, settlement area (rural, urban), health staff's attitudes, education status of parents, minority, race, and political instability.[11-20] Health managers in health districts need more community-based information about the vaccination status of their population in order to define the priorities, determine the barriers, and plan and implement interventions that aim to improve vaccination coverage in their localities. The objective of the present study was to determine the vaccination coverage for children aged 12-23 months, and barriers to immunization in Sanliurfa for establishing strategies to improve the vaccination services.

MATERIAL AND METHODS

In this cross-sectional survey, we used the Lot Quality Technique (LOT) developed by World Health Organization in order to monitor the quality of immunization and other health services. The World Health Organization recommends this method as it is a rapid and economic sampling technique.[21]

Şanlıurfa is one of the province of Southern Anatolia conducted The Southern Anatolia Project (The Turkish acronomy is GAP region) that is a water based and human centered development effort which aims to improve the living standards and quality of life in this region through an integrated, sustainable program at a regional scale has been conducted. Şanlıurfa has a surface area of 75.358 km^2, total population of the province was 1.443.442 according to the 2000 General Population Census. Primary healthcare services of Sanliurfa are provided through 73 healthcare centres. Thirteen of these were located in the the city centre, 19 were peripheral municipality health centres, and 40 were in villages during this study. We defined the lot as every primary healthcare center catchment area. The number of children aged 12 to 23 months was about 43.300 (Target population= 1.443.442 x 0.03 = 43.303). We decided to reach 461 children at confidence level 99% and 6% level of accuracy. However we calculated the number of women 461/73= 6.3, rounded up to 7 women in each lot. So 511 children were included in the study, and all of them were reached. In each lot, 7 houses were selected randomly from household lists. In each lot, face-to-face interviews were conducted with seven families who had children aged 12-23 months. The children enrolled in this study were visited in their homes. After explaining the aim of the study, it was taken informed consent by children's parents or caregivers, and questionnaires were filled out all. The vaccination status of each child was determined by interviewing the mother, if the mother was not at home, the questionnaire was answered by the person who had the best knowledge about the child.

According to the Turkish immunization programme during this research period, a child who receives one dose of Bacille Calmette-Guérin (BCG), three doses of diphtheria, tetanus toxoid and pertussis (DTP) and oral polio, one dose of measles and three doses of hepatitis B is defined as 'fully vaccinated'. We used the same definition for 'fully vaccinated' as the Turkish immunization programme.

In the study, 'Socio-demographic Information Form' developed by researchers according to the characteristics of population (age, gender of child, birth order, household size, education of parents, ages of parents, job of father, ethnic group 'language spoken at home', distance to the healthcare center) 'Child Vaccination Form', and 'Reasons for Vaccination Failure Form' developed by WHO were used to data collection.

Data were evaluated using SPSS programme. Chi-square test and logistic regression analysis were used in the statistical analyses. Predictive factors were included in the subsequent models if they were significantly associated at the $p< 0.05$ level with any outcome variable in the bivariate analysis. Logistic regression models of outcome were estimated to determine independent associations of independent variables with the coverage of EPI. These models fit the Hosmer and Lemeshow analysis and linear models according to F analysis.

RESULTS

The sample was consisted of 256 (50.1%) boys and 255 (49.9%) girls, with the mean age of 16.8 ± 3.6 months. The average household size was 6.99 ± 3.3. The mean age of mothers was 29.7 ± 6.2, and of fathers was 33.7 ± 7.5. A great majority of mothers (94.1%) were housewives, and 72% of fathers were employed. The educational status of parents was as follows: primary school (5 years) (28.8% mothers, 64.4% fathers); secondary school and upper (4.9% mothers, 17.2% fathers). Overall, 57.5% of the mothers were illeterate compared with 9.8% of the fathers. In terms of family residence, 34.2% lived in urban, 65.8% in rural areas. According to the ethnicity, 17.6% was Turkish, 20.5% was Arabic, 61.8% was Kurdish. While 42.1% of parents went to the healthcare center by walking, 53.2% used vehicle.

As shown in Figure 1, only 53.0% of children were fully vaccinated, 45.6% of the children were partially vaccinated and 1.4% had never been vaccinated. 74.8% of the children in this study had vaccination cards. Discontinuous vaccination rate was 19.4%.

Reasons for vaccination failure of 240 children reported by their caregivers are shown in Table 1. The majority of the barriers were related to knowledge (being unaware of the need for vaccination or the next dose, not knowing the place or time of vaccination, fear of side effects, and rumors), accessibility of the primary healthcare center and lack of health professionals.

TABLE 1: Reasons for vaccination failure reported by caregivers.

Reasons for vaccination failure (n= 240)	n	%
Knowledge		
Unaware of need of vaccine	100	41.7
Unaware of need to return for next dose	81	33.8
Illness or malnutrition of child	89	37.1
Place and time of vaccination unknown	64	26.7
Fear of side effects	31	13.4
Fear of infertility	13	5.4
Accessibility to health care		
Unavailability of healthcare workers	68	28.3
Place of healthcare center too far away	30	12.5
Inconvenient office hours	9	3.8
Other reasons		
Put off the futher time	24	10.1
Neglect	13	5.4
Mother is very busy	7	2.9
Family problems	3	1.3

FACTORS RELATED TO VACCINATION COVERAGE

In preliminary analyses, we examined the influences of socio-demographic variables including gender, age, birth order of the child, education of parents, age of parents, job of fathers, residence type, size of family, language spoken at home and distance to healthcare center, and having vaccination certificate on full vaccination (Table 2). No significant differences was found between age and gender of child, age of parents, vaccination sertificate and full vaccination rate ($p > 0.05$). The vaccination coverage was significantly higher in the children of literate parents ($p < 0.05$). While the coverage rate was 43.2% in the children of illeterate mothers, it was 64.1% in those of primary school graduates and 84% in secondary/higher school graduates. When fathers' education level was taken into account the same patern was seen in the coverage rates (ie. 34%, 50.9%, and 72.7%, respectively). In terms of fathers' job, seasonal workers' children had a lower vaccination rate than the others because of family mobility (44.1% vs. 64.3%). Having full vaccination was significantly less likely in rural areas (47.6%) than urban areas (63.4%) ($p < 0.05$). The higher the number of birth order, the lower the vacination rate (fifth and upper children, 44.9%; fourth and lower, 60.5%) ($p < 0.05$). Vaccination rates also varied among different ethnic groups (Turkish 82.2%, Arabic 43.8%, Kurdish (47.8%) ($p < 0.05$). Full vaccination rates differed significantly according to the distance to health care center (walking distance 64.1%, by vehicle 44.6%) ($p = 0.001$).

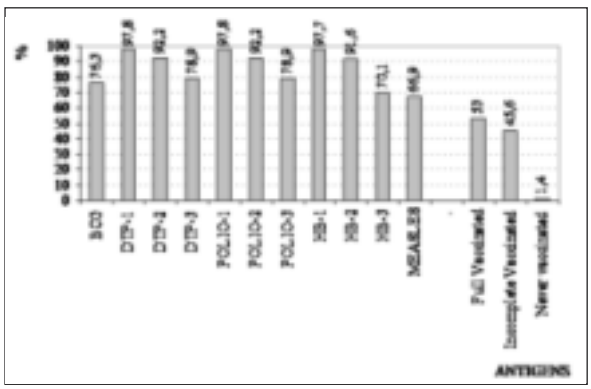

FIGURE 1: Vaccination coverage of children aged 12–23 months.

MULTIVARIATE ANALYSIS

In logistic regression analysis, access to health care center, maternal education, and spoken language at home were found to influence whether a child was full vaccinated or not (Table 3). According to the results, children of families living close to the healthcare center were 2.0 times more likely to be fully vaccinated than those living far from the healthcare center. If a mother was literate, her child

TABLE 2: Characteristics used in the analyses for the sample by vaccination status.

Independent Variables	Full vaccinated		Not full vaccinated		Total		
	n	%	n	%	n	%	X;P
Gender							
Girls	145	56.9	110	43.1	255	49.9	
Boys	126	49.2	130	50.8	256	50.1	2.99;0.08
Settlement Area							
Urban	111	63.4	64	36.6	175	34.2	
Rural	160	47.6	176	52.4	336	65.8	11.55;0.001
Language spoken at home							
Turkish	74	82.2	16	17.8	90	17.6	
Arabic	46	43.8	59	56.2	105	20.5	37.8;0.001
Kurdish	151	47.8	165	52.2	316	61.8	
Education of mother							
Illeterate	127	43.2	167	56.8	294	57.5	
Literate	144	66.4	73	33.6	217	42.5	26.8;0.001
Education of father							
Illeterate	17	34.0	33	66.0	50	9.8	
Literate	254	55.1	207	44.9	461	90.2	8.06;0.005
Distance to healthcare center							
By walking	139	64.1	76	35.3	215	42.1	21.1;0.001
By vehicle	132	44.6	164	55.4	296	57.9	
Job of father							
Stable work	146	64.3	81	35.7	227	44.4	20.8;0.001
Seasonal work	125	44.0	159	56.0	284	55.6	
Birth order							
<4th	189	57.6	139	42.4	328	64.2	
>5th	82	44.8	101	55.2	183	35.3	7.74;0.005
Vaccination Certificate							
Yes	203	53.1	179	46.9	382	74.8	
No	68	52.7	61	47.3	129	25.2	0.007;0.933
Total	271	53.0	240	47.0	511	100.0	

was 1.65 times more likely to be full vaccinated than child whose mother was illiterate. When the language spoken at home was Turkish, the child was 3.03 times more likely to be full vaccinated than a child whose family's language was Kurdish or Arabic.

To identify the reason of why did the language spoken at home (Kurdish or Arabic) effect the vaccination status, we examined the demographic and social variables according to the Turkish and Kurdish or Arabic population. As shown in Table 4, majority of Arabic and Kurdish population lived in rural areas, less educated, and unsufficient health services ($p< 0.05$). Therefore, vaccination rate in these group was lower than the Turkish population. While settlement area, birth order, and having vaccination card did not effected the vaccination status in each population, job of father, and education of mother effected in all ethnic group. Education of father and distance to the health care centers were the significant variables in vaccination of Arabic and Kurdish children.

DISCUSSION

Vaccination is a proven tool for controlling and eliminating life-threatening infectious diseases and is

TABLE 3: Results of logistic regression of being full-vaccinated.

Independent variables	B	Wald	P	Exp (B)	Confidence Interval (%95)
Distance to healthcare center (close)	0.698	5.798	0.016	2.009	(1.139)-(3.545)
Paternal education (literate)	0.465	1.955	0.162	1.593	(0.829)-(3.058)
Maternal education (literate)	0.498	5.275	0.022	1.646	(1.076)-(2.519)
Spoken Language at home (Turkish)	1.110	11.326	0.001	3.034	(1.590)-(5.790)
Size of household	0.084	4.148	0.042	0.920	(0.848)-(0.997)
Birth order	0.059	1.374	0.241	1.061	(0.961)-(1.170)
Job of father(stable officer or worker)	0.380	3.455	0.063	1.462	(0.980)-(2.183)
Residence type (urban)	0.354	1.269	0.260	0.702	(0.379)-(1.299)

TABLE 4: Characteristics of the sample by vaccination status according to the language spoken at home.

			Language spoken at home			
		Turkish			Arabic/Kurdish	
Independent Variables	**Full vac. n (%)**	**Not Full n (%)**	**Total n (%)**	**Full vac. n (%)**	**Not Full n (%)**	**Total n (%)**
Settlement Area						
Urban	50(79.4)	13(20.6)	63 (70.0)	61(54.5)	51 (45.5)	112 (26.6)
Rural	24(88.9)	3 (11.1)	27 (30.0)	136(44.0)	173(56.0)	309 (73.4)
X;P		1.173;0.279			3.607; 0.058	
Education of mother						
Illeterate	11(61.1)	7 (38.9)	18 (20.0)	116(42.0)	160(58.0)	276 (65.6)
Literate	63(87.5)	9 (12.5)	72 (80.0)	81 (55.9)	64 (44.1)	145 (34.4)
X;P		**6.860;0.009**			**7.306; 0.007**	
Education of father						
Illeterate	2(100.0)	0.(0.0)	2 (100.0)	15 (31.3)	33 (68.8)	48 (11.4)
Literate	72(81.8)	16 18.2)	88 (97.8)	182(48.8)	191(51.2)	373 (88.6)
X;P		0.442; 0.506			**5.257; 0.022**	
Job of father						
Stable work	66(86.8)	10(13.2)	76 (84.4)	80 (53.0)	71 (47.0)	151 (35.9)
Seasonal work	8 (57.1)	6 (42.9)	14 (15.6)	117(43.3)	153(56.7)	270 (64.1)
X;P		**7.134; 0.008**			**3.620; 0.037**	
Distance to healthcare center						
By walking	56(83.6)	11(16.4)	67 (74.4)	83 (56.1)	65 (43.9)	148 (35.2)
By vehicle	18(78.3)	5 (21.7)	23 (25.6)	114(41.8)	159(58.2)	273 (64.8)
X;P		0.332; 0.565			**7.908; 0.005**	
Birth Order						
<4th	63 (8.0)	12(16.0)	75 (83.3)	126(49.8)	127(50.2)	253 (60.1)
>5th	11(73.3)	4 (26.7)	15 (16.7)	71 (42.3)	97 (57.7)	168 (39.9)
X;P		0.973; 0.324			2.306; 0.129	
Vaccination Card						
Yes	63(79.7)	16(20.3)	79 (87.8)	140(46.2)	163(53.8)	303 (72.0)
No	11(100.0)	0 (0.0)	11 (100.0)	57 (48.3)	61 (51.7)	118 (28.0)
X;P		2.710; 0.100			0.150; 0.698	
Total	**74 (82.2)**	**16(17.8)**	**90 (100.0)**	**197(46.8)**	**224(53.2)**	**421 (100.0)**
Household size						
	Mean(Sd)	Mean(Sd)	t;p	Mean(Sd)	Mean(Sd)	t;p
	5.7 (2.5)	5.7 (1.9)	.023;0.982	6.8 (2.7)	7.6 (3.8)	2.486;0.013

estimated to avert over 2 million deaths each year. It is one of the most cost-effective health investments, with proven strategies that make it accessible to even the most hard-to-reach and vulnerable populations. Certain diseases in childhood period may require universal immunization of a population to control. Such efforts usually target infants in the first year of life so that immunity is completed as early as possible before the risk of infection. In this cross sectional epidemiological study, in Şanlıurfa the vaccination rate in children aged 12-23 months was 53%. This finding showed that the goal of EPI was far from being met.

Vaccination certificates are given to parents by the staff at health centres, and this is a good indicator of the efficiency of vaccination services. The dates of vaccines introduced and the next vaccination are shown on the certificate, which is important for following vaccination services and for avoiding irregular attendence for vaccination. In our study, about 75% of the children had vaccination certificates. In TPHS 2008, 91.3% of the children aged 12-23 months had vaccination certificates in Eastern regions of Turkey compared with 95.9% for the whole country.[10] In Şanlıurfa, vaccination certificate is necessary to obtain 'green card' which is given to poor people and register to primary school. Therefore, in our study, vaccination certificate ratio is higher than the other regions.

Vaccination coverage was 76.3% for BCG in our study. In TPHS 2008, it was 96% for the whole of Turkey and 95.1% for the Southeastern Anatolia Region (SEAR). In the data of 'The State of the World's Children 2006', BCG coverage for Turkey was 88%.[10] Therefore, low coverage for BCG is a problem for the SEAR and not for the whole country.

The success of routine vaccination program has been measured by the coverage achieved with the third dose of diphtheria-tetanus-pertussis vaccine (DTP3) among children aged 12-23 months.[6] The vaccination coverage was determined to be 78.9% for the third dose of DTP. It was 82.5% TPHS 2003 for the SEAP region and 88.5% for the whole country.[9] DTP3 coverages were; 98% in industrialized countries, 65% in Sub-saharan Africa was and that 76% in the developing countried was.[6]

Hepatitis B is one of the major threats to public health in the world. The prevalence of HBV infection in the southeastern region of Turkey was 7%.[22] Vaccination coverage for the third dose of hepatitis B was 70.1% in our study. In the data of 'The State of the World's Children 2006', the percentage of hepatitis B vaccine was 77% for Turkey. Assuming that 77% is correct for the whole country, 70% is low for the SEAP region because the percentage of HBV carriers is higher in the SEAP region than in Turkey as a whole. In the data of 'The State of the World's Children 2006', the percentage of Hepatitis B vaccine was 95% for Italy. It was, on average, 90% in a study in Italy. As of 2004, 102 WHO member States had H-B3 coverage ≥ 80%.[23]

Of vaccine-preventable diseases, measles remains one of the most important causes of childhood morbidity and mortality in developing countries. Of this study population, about 66.9% had been vaccinated against measles. For control or elimination of measles, it is mandatory to increase the number of vaccinated people in the community. In the Turkish Demographic and Health Survey Report in 2008, measles vaccination coverage was 83.2% in whole county and 70.9% in SEA region.[10]

Despite the progress, more must be done to target the 24 million children, mainly in developing countries, who are proving difficult to reach with vaccines. Identifying and implementing strategies to overcome the barriers to access must be a top priority, given the right of every child to protection from preventable diseases. Many of the unimmunized children live in isolated rural areas without easy access to health facilities. Some live in fragile states where public services are weak or non-existent and where access to health facilities may be severely restricted due to ongoing conflict. Others live in poor, densely populated urban areas and informal settlements, or among displaced populations that are on the move and especially difficult to reach.[7]

In this study, some barriers were determined. If the language spoken at home was Kurdish or Arabic, their child was 3 times more likely to be not full vaccinated than a child whose family's language was Turkish. In this region, health care professionals speak formal language (Turkish), generally mothers speak own mother language as Kurdish or Arabic. Therefore, language between caregivers and healthcare workers is a significant barrier to immunization. This finding was supported by the parents' reports on vaccination failure. Families did not know why immunization is needed, how it works, what the time interval is or the side effects are. Many researchers reported that an inability to communicate with a healthcare provider not only creates a barrier to accessing healthcare but also undermines trust in the quality of medical care received and decreases the likelihood of appropriate follow-up.[24-28] Furthermore, lack of a common language between client and healthcare provider can result in diagnostic errors and inappropriate treatment.[27] Clients should be able to understand the nature and purpose of the healthcare services they receive.

In our study, majority of the mothers lacked of the knowledge related to vaccination. Accurate communication increases the likelihood of immuization. Healthcare organization should offer and provide language assistance services, including bilingual staff and interpreter services. Anderson and et al searched for studies that examined the effectiveness of bilingual providers, bilingual staff members serve as-professionally trained interpreters on improving three outcomes: client satisfaction, racial or ethnic differentials in utilization and treatment, and health status measures.[27]

Poor education was the most frequent reason given by parents for failure to vaccinate. Every level of education that the mother had above illiteracy increased the probability of full vaccination. The importance of maternal education has been shown in other studies.[10,11-20] Thus, building the capacity of mothers through basic education is a key long-term strategy to improve vaccination rate in developing-countries communities. More work is needed to develop shorter-term maternal educational strategies targeted toward improving women health outcomes in developing countries, particularly at the community level. Therefore, parental education, especially women's education must be taken into account, and some Turkish courses on reading and writing should be spread.

In this study, another important predictor of vaccination coverage was distance to health care center. Intensive outreach services including regular home visits by community health workers who are empowered to immunize children in the home on a regular basis are needed.[16] This could be another strategy in our region for increasing vaccination coverage. We propose that, in order to meet the aim of EPI, people working in primary healthcare centers should take better advantage of the 'childhood observation' procedure in Turkey, which involves health professionals visits to all children until 6 years old, as well as to act as consultants for the families about vaccinations according to the Socialization Act of Health Services since 1961 based on outreach activities. Especially in the home visits, they should make sure that they carry the vaccines with them and vaccinate all children who have inadequate doses. Another important finding, in this study, about 55% of the fathers were seasonal migratory farmworker. Farmworkers' children did not receive immunizations according to recommended guidelines. Therefore, efforts should be focus on improving the healthcare system and management.

Vaccine delivery is a safe and cost-effective method to prevent natural infections causing significant morbidity and mortality. However, with increasing vaccine delivery and decreasing infectious disease morbidity, adverse events, both real and postulated, have became important in the world. As an important point, despite concerns about vaccine safety, vaccination is safer than accepting the risks for the diseases these vaccines prevent. Therefore, the goal of vaccine development should be to achieve the highest degree of protection with the lowest rate of adverse events.[29]

In this study, the majority of the barriers were related to vaccine knowledge such as the una-

wareness of the need for vaccination, the timing of the next dose, the place and time of vaccination, as well as the fear of side effects, rumors and inaccessibility of the primary healthcare services. Some researchers found that-especially among the poorest populations-is a lack of information and understanding about the importance of vaccines and immunization. In some communities, the value of an intervention that "helps healthy people to stay healthy" may suffer in comparison with medicines that can visibly heal the sick. And where parents lack a basic understanding of how vaccines work, children may be vaccinated once but fail to return for the required follow-up doses. To counter these and other misconceptions, well-targeted information and structured and sustanable community health education program are needed to transform a community's "passive acceptance" of immunization into a well-informed demand for vaccines that can protect their children against life threatening diseases.[7] World Health Organization reported that the fear of immunization, fanned by reports of adverse events that are rumoured or suspected of being related to vaccines. With everincreasing access to Internet-based information, an unsubstantiated rumour about vaccines can rapidly circle the globe and undermine immunization services, sparking outbreaks of disease and untold deaths. Since fear of vaccines and immunization often stems from a lack of information, people need to know how safe a vaccine is and how it can reduce disease and deaths. Therefore, community health education programme is very important to reach the national immunization target.

Not surprisingly, the United States' Centers for Disease Control and Prevention (CDC) put vaccination at the top of its list of ten great public health achievements of the 20th century. Furthermore, in 2008, a panel of distinguished economists convened by the Copenhagen Consensus Center-an international meeting that advises governments how best to spend aid and development money-put expanded immunization coverage for children in fourth place on a list of 30 cost effective ways of advancing global welfare. The ten most cost-effective solutions to major global challenges, Copenhagen Consensus 2008. These are; 1-Micronutrient supplements for children (vitamin A and zinc) Malnutrition, 2- The Doha development agenda Trade; 3- Micronutrient fortification (iron and salt iodization) Malnutrition, 4- Expanded immunization coverage for children Diseases, 5- Biofortification Malnutrition, 6- Deworming and other nutrition programmes at school Malnutrition & Education, 7- Lowering the price of schooling Education, 8- Increase and improve girls' schooling Women and development, 9- Community-based nutrition promotion Malnutrition, 10- Provide support for women's reproductive role.[7] In 2002 WHO, UNICEF, and other partners devised the Reaching Every District (RED) strategy is designed to strengthen immunization delivery at the district level, by encouraging district-level immunization officials to adopt the principles of "good immunization practice", such as the identification and resolution of local problems, the organization of regular outreach vaccine delivery services, and the involvement of communities in ensuring adequate functioning of immunization services.[30] In an effort to promote a common understanding of what a health system is, WHO has defined six "building blocks" that make up a health system.[31]

In conclusion, to achieving national immunization goals in our region, strengthening healthcare system and management including deliver effective, sufficient healthcare centers and professionals, mobile healthcare services for farmworkers, a well-functioning health information system based on primary healthcare services, and effective health education program through engaging a network of community leaders such as religious leaders, muhtars, and informal leaders of community are the most important steps.

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