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Review Article

Comparison of Immunization in Iran and Turkey in 1980- 2013

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Abstract

Immunization is today one of the safest, most cost-effective, and powerful means of preventing deaths and improving lives. Over the years, all countries of the world have incorporated an increasingly broad immunization agenda in their public health interventions. Immunization programmes are now routinely reaching over 80 percent of children under one year of age. Iran and Turkey with a population of nearly the same, are in the neighborhood and the aim of this study is to compare the vaccination situation in the two countries from 1980 to 2013.

Key words: Immunization, Iran, Turkey, Vaccination.

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Received date: Jun 24, 2014 ; Accepted date: Jul 22, 2014

Introduction

Forty years ago, in May 1974, the 27th World Health Assembly resolved to build on the success of the smallpox eradication programme and established the Expanded Programme on Immunization (EPI) to ensure that all children, in all countries, benefited from life-saving vaccine.

The EPI launched at that time recommended the use of vaccines to protect against six diseases: tuberculosis (BCG), diphtheria, tetanus, pertussis (DTP vaccine), measles and poliomyelitis.

Thanks to the progress accomplished by countries, immunization is today one of the safest, most cost-effective, and powerful means of preventing deaths and improving lives. Over the years, all countries of the world have incorporated an increasingly broad immunization agenda in their public health interventions. Immunization programmes are now routinely reaching over 80 percent of children under one year of age.

The continued discovery, research and development of new and improved vaccines has made immunization even more effective in combating major causes of childhood illness and death. Indeed, the number of vaccines available today to protect infants, children and also now adolescents and adults against infectious diseases has increased substantially.

The push for universal childhood immunization in the 1980s, the last stages of the polio eradication effort and the intensified efforts launched in all regions to introduce new vaccines, eliminate measles and rubella, eliminate maternal and neonatal tetanus have acted as a catalyst to bring other health services to previously unreached children.

The public and private sectors are entering a new era of cooperation where the contribution of all partners is important (1).

Babies are born with protection against certain diseases because antibodies from their mothers were passed to them through the placenta. After birth, breastfed babies get the continued benefits of additional antibodies in breast milk. But in both cases, the protection is temporary. Immunization (vaccination) is a way of creating immunity to certain diseases by using small amounts of a killed or weakened microorganism that causes the particular disease.

Microorganisms can be viruses (such as the measles virus) or they can be bacteria (such as pneumococcus). Vaccines stimulate the immune system to react as if there were a real infection — it fends off the "infection" and remembers the organism so that it can fight it quickly should it enter the body later.

History of Vaccination

The first human vaccines against viruses were based using weaker or attenuated viruses to generate immunity. The smallpox vaccine used cowpox, a poxvirus that was similar enough to smallpox to protect against it but usually didn’t serious illness. Rabies was the first virus attenuated in a lab to create a vaccine for humans.

Vaccines are made using several different processes. They may contain live viruses that have been attenuated (weakened or altered so as not to cause illness); inactivated or killed organisms or viruses; inactivated toxins (for bacterial diseases where toxins generated by

the bacteria, and not the bacteria themselves, cause illness); or merely segments of the pathogen (this includes both subunit and conjugate vaccines) (1-4).

Fig.1: WHO via Images from the History of Medicine (NLM),Preparation of measles vaccine

Immunization against vaccine-preventable diseases is essential to reaching Millennium Development Goal 4 on reducing under-five mortality by two thirds by 2015. This is because millions of children die from diseases that can be prevented through vaccines. Progress is being made. For example, in 2010 an estimated 109 million children under the age of one were vaccinated with three doses of diphtheria-tetanus-pertussis (DTP3) vaccine.

Immunization is also a key strategy to ensure global health and to respond to the threat of emerging infections such as pandemic influenza (Table.1).

Tabale 1: Types of vaccines

Vaccine type	Vaccines of this type on U.S. Recommended Childhood (ages 0-6) Immunization Schedule
Live, attenuated	Measles, mumps, rubella (MMR combined vaccine) Varicella (chickenpox) Influenza (nasal spray) Rotavirus
Inactivated/Killed	Polio (IPV) Hepatitis A
Toxoid (inactivated toxin)	Diphtheria, tetanus (part of DTaP combined immunization)
Subunit/conjugate	Hepatitis B Influenza (injection) *Haemophilus influenza* type b (Hib) Pertussis (part of DTaP combined immunization) Pneumococcal Meningococcal
Vaccine type	**Other available vaccines**
Live, attenuated	Zoster (shingles)
Inactivated/Killed	Yellow fever Rabies
Subunit/conjugate	Human papillomavirus (HPV)

Read 10 facts on immunization

- Immunization prevents between 2-3 million deaths every year.

- Immunization prevents deaths every year in all age groups from diphtheria, tetanus,

pertussis (whooping cough), and measles. It is one of the most successful and cost-effective public health interventions.

-More children than ever are being reached with immunization.

In 2010, an estimated 109 million children under the age of one were vaccinated with three doses of diphtheria-tetanus-pertussis (DTP3) vaccine. These children are protected against infectious diseases that can have serious consequences like illness, disability or death.

-An estimated 19.3 million children under the age of one did not receive DTP3 vaccine.

Seventy percent of these children live in ten countries, and more than half of them live in WHO's Africa and South-East Asia regions.

- Over 1 million infants and young children die every year from pneumococcal disease and rotavirus diarrhoea

- A large number of these deaths can be prevented through vaccination.

- Public-private partnerships facilitate the development and introduction of vaccines.

For example, a new vaccine which prevents the primary cause of epidemic meningitis in sub-Saharan Africa, meningococcal A, MenafriVac, was introduced in Burkina Faso, Mali and Niger last year. At the end of 2011. Cameroon, Chad and Nigeria are vaccinating more than 22 million individuals with the vaccine which has the potential to eliminate the leading cause of meningitis epidemics in Africa.

-The supply of influenza vaccines has been significantly expanded.

The expansion has been possible as a result of WHO supporting the efforts of vaccine manufacturers to produce and license influenza vaccines in 11 developing countries.

- Global measles mortality has declined by 74%.

Global measles mortality has been reduced from an estimated 535 300 deaths in 2000 to 139 300 in 2010, thanks to intensified vaccination campaigns.

- Polio cases have decreased by over 99%.

Since 1988, polio cases have decreased by over 99%, from an estimated 350 000 cases to 1352 reported cases in 2010. The reduction is the result of the global effort to eradicate the disease. Only three countries – Afghanistan, Nigeria and Pakistan) – remain polio-endemic, down from more than 125 in 1988.

- Annual deaths from neonatal tetanus have fallen.

Neonatal tetanus deaths have declined to an estimated 59 000, down from 790 000 deaths in 1988.

- Immunization provides an opportunity to deliver other life-saving measures.

Immunization not only protects children from vaccine-preventable diseases. It also serves as an opportunity to deliver other life-saving measures, such as vitamin A supplements to prevent malnutrition, insecticide-treated nets for protection against malaria and deworming medicine for intestinal worms. In addition, the benefits of immunization are increasingly being extended across the life course to include adolescents and adults, providing protection against life-threatening diseases such as influenza, meningitis, and cancers that occur in adulthood.

General information about Iran

Iran, a Middle Eastern country south of the Caspian Sea and north of the Persian Gulf, is three times the size of Arizona. It shares borders with Iraq, Turkey, Azerbaijan, Turkmenistan, Armenia, Afghanistan, and Pakistan. Capital is Tehran and total population in 2013 was 77'447'000 .

General information about Turkey

Turkey is considered to be the gateway between Europe and Asia; it is an Eurasian country located on the Mediterranean stretching across the Anatolian peninsula in southwest Asia and the Balkan region of southeastern Europe. It is bordered by the Black Sea, the Marmara Sea, the Aegean Sea and Mediterranean Sea and Capital is Ankara. Total population in 2013 was 74'933' 000.

Results

Development status in Iran and Turkey shown at (Table.2) (1). Results shows mortality rate at under 5 years at children in Turkey is lower than Iran.

Table 2: Development status in Iran and Turkey in 2013

Development status: (Iran)	Developing	GNI / capita (US$):	5'780	Infant (under 12 months) mortality rate:	15
		GDP / capita (US$):	15'586	Child (under 5 years) mortality rate:	18
Development status: (Turkey)	Developing	GNI / capita (US$):	10'950	Infant (under 12 months) mortality rate:	12
		GDP / capita (US$):	18'975	Child (under 5 years) mortality rate:	14

Population data in thousands shown at (Table.3) (1). Results shows Iran's birth rate and Surviving infants rate is higher than Turkey.

Table 3: Population data in Iran and Turkey at 1980-2013

Iran-Population data in thousands								
	2013	2012	2011	2010	2009	2000	1990	1980
Total population	77'447	76'424	75'424	74'462	73'543	65'911	56'362	38'890
Births	1'455	1'454	1'445	1'427	1'401	1'228	1'839	1'748
Surviving infants	1'433	1'431	1'420	1'401	1'375	1'191	1'751	1'604
Pop. less than 5 years	7'090	7'003	6'833	6'556	6'339	6'317	9'313	6'927
Pop. less than 15 years	18'440	18'120	17'834	17'586	17'489	22'850	25'543	16'988
Female 15-49 years	22'950	22'832	22'682	22'507	22'268	17'571	12'228	8'518
Turkey-Population data in thousands								
	2013	2012	2011	2010	2009	2000	1990	1980
Total population	74'933	73'997	73'059	72'138	71'241	63'174	53'995	43'906
Births	1'261	1'268	1'275	1'282	1'288	1'356	1'407	1'551
Surviving infants	1'246	1'253	1'259	1'264	1'269	1'315	1'316	1'385
Pop. less than 5 years	6'355	6'362	6'363	6'359	6'366	6'571	6'648	6'641
Pop. less than 15 years	19'224	19'249	19'261	19'262	19'278	19'364	19'575	17'588
Female 15-49 years	20'288	20'075	19'859	19'647	19'442	17'275	13'675	10'403

The number of reported case at 1980 to 2013 shown at (Table.4) (1).

Table 4: Number of reported cases in Iran and Turkey at 1980-2013

Iran- Number of reported case								
Diseases								
Diphtheria	190	150	132	106	58	18	373	139
Japanese encephalitis	_	_	_	_	_	_	_	_
Measles	189	332	73	538	262	11'874	5'341	31'130
Mumps	_	_	_	_	_	10'417	_	_
Pertussis	1'415	1'329	650	464	590	94	1'230	20'395
Polio*	0	0	0	0	0	3	15	80
Rubella	32	30	20	24	11	1'154	_	_
Rubella (CRS)	0	0	0	0	49	_	_	_
Tetanus (neonatal)	3	2	3	2	3	13	26	_
Tetanus (total)	10	13	18	14	8	27	30	86
Yellow fever	_	_	_	_	_	0	_	_
Turkey-Number of reported case								
Diseases								
Diphtheria	0	0	1	0	0	4	20	86
Japanese encephalitis	_	_	_	_	_	_	_	_

Measles	7'405	349	111	7	4	16'244	11'372	8'618
Mumps	597	834	1'609	1'525	2'180	_	_	_
Pertussis	33	18	242	48	11	510	454	1'520
Polio*	0	_	0	0	0	0	24	182
Rubella	81	43	1'734	64	97	_	_	_
Rubella (CRS)	0	0	1	0	1	_	_	_
Tetanus (neonatal)	0	0	0	2	0	26	67	_
Tetanus (total)	15	11	24	25	12	38	123	48
Yellow fever	_	_	0	0	0	_	_	_
* Polio refers to all polio cases (indigenous or imported), including polio cases caused by Vaccine derived polio viruses (VDPV);" "it does not include cases of Vaccine-associated paralytic polio (VAPP) and cases of non polio acute flaccid paralysis [AFP]).								

Percentage target population vaccinated by antigen in Iran and Turkey betwen 1980 to 2013 is showed at (Tables 4,5) (1). Results shows vaccination status in Iran in these years is better than the Turkey.

Table 4: Percentage target population vaccinated by antigen in **Iran**

Percentage target population vaccinated by antigen						Hovering over an antigen reveals its fuller definition						
	Most recent coverage survey					Official country estimates						
Vaccine	year	result	method	% card seen	2013	2012	2011	2010	2009	2000	1990	1980
BCG	1989	92	EPI		100	100	99	99	99	99	95	7
DTP1	1986	94	EPI		98	98	99	99	99	100	_	_
DTP3	1989	88	EPI		98	99	99	99	99	100	91	32
HepB_BD					99	96	99	99	99	99	_	_
HepB3					99	98	99	99	99	100	_	_
Hib3					_	_	_	_	_	_	_	_
JapEnc					_	_	_	_	_	_	_	_
MCV	1996	96	MICS	98	98	98	99	99	99	100	85	39
MCV2					97	97	99	99	99	100	_	_
PCV1					_	_	_	_	_	_	_	_
PCV3					_	_	_	_	_	_	_	_
Pol3	1989	88	EPI		98	99	99	99	99	100	90	38
Rota1					_	_	_	_	_	_	_	_
Rota_last					_	_	_	_	_	_	_	_
Rubella1					98	98	99	99	_	_	_	_
TT2plus					25	95	20	22	30	46	63	1
PAB					_	_	_	_	_	_	_	_
VAD1					_	_	_	_	_	_	_	_
YFV					_	_	_	_	_	_	_	_
° indicates that more than 1 survey occurred that year												

Table 5: Percentage target population vaccinated by antigen in **Turkey**

Percentage target population vaccinated by antigen						Hovering over an antigen reveals its fuller definition						
	Most recent coverage survey					Official country estimates						
Vaccine	year	result	method	%	2013	2012	2011	2010	2009	2000	1990	1980

				card seen								
BCG	2007	96	DHS	73	96	96	96	97	96	82	16	74
DTP1	2007	97	DHS	73	97	97	98	98	97	92	_	_
DTP3	2007	89	DHS	73	98	97	97	97	96	85	74	42
HepB_BD					99	97	97	_	_	_	_	_
HepB3	2007	86	DHS	73	97	97	96	96	94	71	_	_
Hib3					98	97	97	97	96	_	_	_
JapEnc					_	_	_	_	_	_	_	_
MCV	2007	89	DHS	73	98	96	98	97	97	86	67	27
MCV2					98	85	86	91	88	_	_	_
PCV1					97	97	98	_	_	_	_	_
PCV3					97	97	96	93	_	_	_	_
Pol3	2007	89	DHS	73	98	97	97	97	96	85	74	63
Rota1					_	_	_	_	_	_	_	_
Rota_last					_	_	_	_	_	_	_	_
Rubella1					98	96	98	97	97	_	_	_
TT2plus	1997	29	DHS	39	61	62	57	51	57	36	18	_
PAB					_	_	_	_	_	_	_	_
VAD1					_	_	_	_	_	_	_	_
YFV					_	_	_	_	_	_	_	_

° indicates that more than 1 survey occurred that year

Immunization Schedules in Iran and Turkey has shown at (Tables 6,7) (1). The program planning shown two countries according to their regional conditions, have immunization programs for children and adults.

Table 6: Immunization Schedule in **Iran**,2013

Immunization Schedule			
Vaccine	Schedule	Entire country	Comment
BCG	birth;	Yes	
DT	2, 4, 6, 18 months; 6 years;	Yes	
DTwP	2, 4, 6, 18 months; 6 years;	Yes	
HepB	birth; 2, 6 months;	Yes	also specified high risk group, HCWs, Medical students
Influenza	> 65 years;	Yes	pregnant women, healthcare workers and persons with chronic disease
MMR	12, 18 months;	Yes	
Measles		Yes	Measles outbreak response
MenAC		Yes	military
OPV	birth; 2, 4, 6, 18 months; 6 years;	Yes	
Td		Yes	repeated every 10 years - military and pregnant women
Varicella		Yes	Children with lymphatic and hematologic malignancies and their siblings
YF		Yes	travelers

Table 7: Immunization Schedule in **Turkey**, 2013

Immunization Schedule			
Vaccine	Schedule	Entire country	Comment
BCG	2 months;	Yes	
DTaPHibIPV	2, 4, 6, 18 months;	Yes	

DTaPIPV	6 years;	Yes
HepA	18, 24 months;	Yes
HepB	birth; 1, 6 months;	Yes
MMR	12 months; 6 years;	Yes
OPV	6, 18 months;	Yes
Pneumo_conj	2, 4, 6, 12 months;	Yes
Td	1st contact; +1, +6 months; +1, +1 years;	Yes
Varicella	12 months;	Yes

Conclusion

New data released show that under five mortality rates have dropped by 49% between 1990 and 2013 thanks to affordable interventions such as immunization. But overall progress is still short of meeting the global target of a two-thirds decrease in under five mortality by 2015. In 2013, 2.8 million babies died within the first month of life, which represents about 44% of all under five deaths. Compared results of immunization during the 1980 to 2013 between two country (Iran and Turkey), represents a better immunization status in Iran compared to Turkey; despite the fact that the Turkish population was lower than the Iran, and development indicators in Turkey, was better than of Iran (1-12).

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