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Immunization Coverage in the Measles-Rubella Control Mass Campaign in Kashan, Iran

H. Almasi, H.R. Gilasi and A. Moradi
Kashan University of Medical Sciences,
Kashan, Iran

Abstract: The purpose of this study was to evaluate Measles-Rubella (MR) vaccination coverage in the population covered by Kashan University of Medical Sciences. This study conducted in Kashan city from Isfahan province of Iran in 2004. In a descriptive-analytic study, using Lot Quality Assurance Sampling (LQAS) method, a sample population of 400, enrolled. Chi-square and Fisher's exact tests were used for analyzing. Out of 400 people, aged 5 to 25 enrolled in this study, 388 (97% CI = 94.7-98.1) had been inoculated with MR vaccine. Reasons for not being inoculated were: pregnancy 4 people (33.3%), non chalance 2(16.7%), worry about adverse reactions of vaccine 2(16.7 %), being too busy 2(16.7%), contraindication for vaccination 1(8.3%) and wrong beliefs in 1 person (8.3%). MR vaccination card had been issued for 393 people (98.2%). All cases had been informed about campaign. Television and Radio had the greatest role in informing people about campaign. In comparison with similar projects in other countries, implementation of mass vaccination in a short time implies on the success of authorities in this campaign. Totally, it seems that Kashan University of Medical Sciences had achieved nicely in the studied district and has reached the desired coverage.

Key words: Measles, Rubella, (LQAS) method, vaccination

INTRODUCTION

Vaccination against measles is an effective measure to control the disease. It can decrease annual rates of morbidity and mortality as 80 and 4.5 million, respectively. However, measles involves 30 million and kills 880,000 people annually, because vaccination coverage is not equally high. Measles is leading cause of 40% of total 2 million deaths due to vaccine preventable diseases. More than half of deaths due to measles occur in Africa. On the World Health Organization Meeting in 1989, decreasing 90% in morbidity and 95% in mortality of measles determined as a goal. The dead line for this goal was considered the year 2000 for America, 2007 for Europe and 2010 for Eastern Mediterranean region (CDC., 2003).

In May 2000, WHO, UNICEF and American CDC, forming a technical work group to revise the situation of measles control and necessary measures for its elimination in the world, presented some strategies to intensify control measures especially in the countries and regions with the greatest burden of disease (WHO, 1998).

In Eastern Mediterranean region, the incidence of measles has decreased from 193 per 100,000 in 1981 to 6.8 per 100,000 in 2001. Complementary mass campaign of measles vaccination programs has been achieved in 14 of 18 countries without polio since 1994. More than 50 million children have been vaccinated in these programs. However, the coverage of routine measles vaccination is still under 60% in Afghanistan, Sudan, Somalia, Jibuti and Pakistan, where 34% of whole population of the region are settled. Mortality of children under 5 in these countries is estimated 81,000 in year. Therefore, it is essential that more facilities be allocated to these five countries in order to eliminate measles by the year 2010 (Gaafar *et al*., 2003).

On the other hand, most of these children are exposed to malnutrition and other risk factors. So immunization programmes in order to decrease mortality and disability of children in these countries is of utmost importance. The mass campaign vaccination programmes in order to promote immunity level of susceptible

Corresponding Author: Dr. H. Almasi, Kashan University of Medical Sciences, Kashan, Iran

individuals and prevention of epidemics, as well as Eastern Mediterranean countries has performed in other countries such as: Kenya, Burkina Faso, Zimbabwe, Hong Kong, Romania, Albania, Brazil, Kyrgyz republic, Turkey, Afghanistan and Malawi (Silvia *et al*., 2003; Shuk *et al*., 2002; Miriam *et al*., 2003; Malawi Ministry of Health, 2000; Kyrgyz Republic Ministry of Health, 2001; Chantal *et al*., 2003; Adriana *et al*., 2003; Dadgar *et al*., 2003).

Status of measles in Iran has been changed during 2-3 recent years. Most of measles cases occur in puberty and post puberty ages. The number of cases is higher than expected (Mahdavi, 2001). With respect to recent conditions and changing epidemiologic status of the disease, aimed elimination of measles and congenital rubella syndrome, the country-wide project of Measles-Rubella vaccination mass campaign was done from 6 December 2003 to 1 January 2004. Teams at hospitals and urban and rural health centers and mobile functional teams in schools, dormitories, barracks, prisons, isolated villages and farm, vaccinated target population who were all 5-25 year-old people of the country (CDC., 2003).

One of the essential needs of such these programmes is their evaluation by an exact and standard method. Several different methods are available for this evaluation. Lot Quality Assurance Sampling (LQAS) is one of them, which is based on binomial distribution. When this method is used, it is possible to compare sample units (lot), judge about their situation with respect to standard or expected level and finally estimate the ratio of desired attribute in whole studied population (Lanata and Roberts, 1992).

One of the advantages of above-mentioned method in comparison with other methods is that it has more reliability in estimation of immunization coverage in studied population. Also, this method can evaluate the immunization coverage in each sub group of the population and compare it with others. On the other side, both quality of immunization and sufficiency of needed materials and equipment for each unit (lot) can be concurrently evaluated. Also with respect to determination of expected or standard level for immunization coverage or quality of campaign, it is feasible to check that whether the coverage or quality of immunization in each lot is higher or lower than expected or standard level. In this way the failed lots will be identified for complementary measures in order to increase the coverage and quality of immunization in them (WHO, 2002).

MATERIALS AND METHODS

This was a descriptive-analytic study in which the coverage of complementary immunization of measles and rubella in people aged 5-25 estimated by LQAS method. This study conducted in Kashan city from Isfahan province of Iran in 2004.

Sample size to estimate immunization coverage determined 400 people. Considered sample population divided to "lots". Lots were population covered by health centers of Kashan University of Medical Sciences. Number of households determined in each lot, were selected by cluster sampling, each cluster consisted 10 households. Then, one member of each selected household, aged 5-25, was selected by random sampling. Data on immunization situation of these selected individuals gathered through interview. Chi-square and Fisher's exact tests were used for analysis. Performance of lots was judged based on thresholds levels of above 95% and below 65% (WHO, 1996).

RESULTS

Out of 400 studied people aged 5-25, 388 people (97% CI= 94.7-98.1) had inoculated MR vaccine and 12 people (3%) hadn't inoculated it. Table 1 shows the coverage of Measles-Rubella vaccination mass campaign according to demographic data of enrolled cases. Based on desired upper and lower threshold levels, vaccination coverage in 15 health centres was acceptable (89%) and in two centres (11%) was unacceptable. As a whole, vaccination coverage in urban and rural population covered by KUMS was acceptable (Table 2).

Reasons for not being inoculated were: pregnancy 4 people (33/3%), non chalance 2 (16.7%), worry about adverse reactions of vaccine 2 (16.7%), being too busy 2 (16.7%), contraindication 1 (8.3%) and wrong beliefs in 1 case (8.3%) (Table 3).

MR vaccination card had been issued for 393 cases (98.2%). Three hundred and ninety six cases (99%) were satisfied with given services during vaccination. Of 49 married women in this study, 42 (91.3%) had been asked about pregnancy before inoculation. All studied cases had been informed about mass campaign before or during campaign. In comparison with other mass media, Television and Radio had the greatest role in informing people about campaign (Table 4).

Table 1: Immunization coverage of Measles-Rubella mass campaign in Kashan population in relation to demographics of participants

Variable	Levels of variable	Inoculated No.	Inoculated (%)	Non inoculated No.	Non inoculated (%)	Total No.	Total (%)	Test result
Place of living	City	319	7/96	11	3/3	330	100	Fisher exact test p-value = .70
	Village	69	6/98	1	4/1	70	100	
	Total	388	0/97	12	0/3	400	100	
Sex	Mal	190	4/98	3	6/1	193	100	Fisher exact test p-value = 0.14
	Female	198	7/95	9	3/4	207	100	
	Total	388	0/97	12	0/3	400	100	
Family size	>5	197	3/96	8	7/3	207	100	Fisher exact test p-value = 0.16
	≥5	189	9/97	4	1/2	193	100	
	Total	388	0/97	12	0/3	400	100	
Age (year)	5-10	66	3/94	4	7/5	70	100	χ^2 = 9.46 p-value = 0.02
	11-15	86	100	0	0	86	100	
	16-20	120	2/99	1	8/0	121	100	
	21-25	116	3/94	7	7/5	123	100	
	Total	388	0/97	12	0/3	400	100	
Educational level in head of household	Illiterate	60	100	0	0	60	100	χ^2 =2.33 p-value =0.67
	Primary school	178	2/96	7	8/3	183	100	
	Secondary school	64	0/97	2	0/3	66	100	
	High school	62	9/96	2	1/3	64	100	
	Higher education	26	3/96	1	7/3	27	100	
	Total	388	0/97	12	0/3	400	100	

Table 2: Performance evaluation of health centers in achieving desired coverage in Measles-Rubella mass campaign

Health center Type	No.	Health center name	Immunization coverage: Accepted No.	Accepted %	Non-accepted No.	Non-accepted %	Total No.	Total %	Decision making level	Judgment about Coverage
Rural	1	Ozwar	10	100	0	0	10	100	1	Accepted
	2	Wadeghan	20	100	0	0	20	100	2	Accepted
	3	Kalleh	19	0/95	1	0/5	20	100	2	Accepted
	4	Ghohrood	10	100	0	0	10	100	1	Accepted
	5	Varkan	10	100	0	0	10	100	1	Accepted
	Total		69	6/98	1	4/1	70	100	7	Accepted
Urban	6	Booali	27	0/90	3	0/10	30	100	3	Non-accepted
	7	Amirkabir	67	7/95	3	3/4	70	100	7	Accepted
	8	Ravand	19	0/95	1	0/5	20	100	2	Accepted
	9	Moslem ibne aghil	29	7/96	1	3/3	30	100	3	Accepted
	10	Soltan mirahmad	10	100	0	0	10	100	1	Accepted
	11	Ghamsar	18	0/90	2	0/10	20	100	2	Non-accepted
	12	Zidy	10	100	0	0	10	100	1	Accepted
	13	Josheghan ghali	19	0/95	1	0/5	20	100	2	Accepted
	14	Navvab	30	100	0	0	30	100	3	Accepted
	15	Golabchi	40	100	0	0	40	100	4	Accepted
	16	Fine bozorg	50	100	0	0	50	100	5	Accepted
	Total		319	7/96	11	3/3	330	100	33	Accepted

Table 3: Reasons of not participating in Measles-Rubella mass campaign in Kashan population

(%)	No.	Frequency reasons
33.3	4	Pregnancy
8.3	1	Contraindication for vaccination
16.7	2	Lacking enough time
16.7	2	Adverse reaction
16.7	2	Non-chalance
8.3	1	Wrong belief
100	12	Total

Table 4: Role of different media in informing people about Measles-Rubella control mass campaign in Kashan population

(%)	No.	Frequency media
76.0	304	Radio and Television
12.0	48	Health centers
10.5	42	School
0.3	1	Placard
1.0	4	Newspaper
0.3	1	others
100	400	Total

DISCUSSION

Elimination of measles and congenital rubella in a country depends on the presence of an efficient and prefect health system, suitable intersection coordination and public cooperation. Results of this study showed that the coverage of measles and rubella vaccination mass campaign in target population was more than 95%. This result, considering the presence of some non-settled population in the region and passive implementation of the project, indicates that the health system has achieved the desired immunization coverage with merit. Also, coordination, intersection and people cooperation has been effective. The difference among rates of vaccination coverage for age groups was statistically significant. Having a look at reasons for not being inoculated reveals

that 41.6% of non-inoculated cases had been due to pregnancy or contraindication, that are reasonable causes.

According to the results all people were informed about the campaign. More than 75% of people were informed through television and radio. This reveals the great role of television and radio in giving information about health-related problems and programmes. Therefore more usage of this medium in health programmes, especially in health education, is recommended.

Upper threshold of 95% and lower threshold of 65% were considered to determine immunization coverage. These thresholds were selected because the high coverage in this programme is of high importance. According to results, general performance of urban and rural health centres covered by KUMS in the field of immunization coverage was acceptable. However, in some centres the vaccination coverage was not acceptable.

In general and in comparison with similar projects in other countries, the results of this study implies on the success of authorities in this mass campaign. This campaign was an essential step for elimination of measles and congenital rubella in the country. To complete the elimination of measles and congenital rubella in future years, further measures such as surveying the immunity situation of vaccinated groups by seroepidemiologic studies should be done. Measles cases should be detected and confirmed by exact epidemiologic and laboratory studies. Transmission chain of these diseases should completely cut by additional complementary vaccination programmes.

Systems for epidemiologic surveillance of disease should be established for diseases that are target of elimination and eradication programmes. Epidemiologic details for every outbreak should be identified and disease producing viruses should be investigated for genotype. These data are needed for directing vaccination strategies in order to eliminate and ultimately eradicate of the diseases.

With regard to the results of previous studies based on LQAS method, it seems that this method is a rapid, cheap and effective one to evaluate primary health care services especially immunization programmes. It is of adequate efficacy to determine coverage rate (Salari, 1996).

Where as in this method, the necessity of determination of a standard is stressed; it is possible to compare each lot with standard as well as other lots. Therefore the difference between present coverage and standard coverage may be measured as a good criterion to evaluate performance of service-presenting staff in order to compensate the defects (Goshtasbi, 2000).

In this type of study, it is feasible to calculate vaccination coverage with regard to number of true service receiving in each district. Also, the probability of presenting a service above the standard lever for service provider and the probability of receiving a service under standard level for service receiver is measurable (Valades and Weld 1995; Lemeshow, 1991)

With respect to the result of this study and other studies, it seems that using LQAS method to evaluate the coverage of services and exact detection of administrational problems is more efficient in a geographic area in the size of a university or a health services office in a city, than larger geographic regions. LQAS method can evaluate all parts of an executive system including resources, data, processes and effectiveness of a service.

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