

# Factors Affecting Measles Vaccination in Rural Areas of Bahrain

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## ABSTRACT

This study was carried out in the summer of 1985 in the Sitra area of the State of Bahrain to study the factors that affect measles vaccination in rural areas of Bahrain. A systematic sample of 120 children who were born from January — November 1984 was chosen and their mothers were interviewed by trained health educator interviewers. 48.3% of children were vaccinated, 79.3% of them received the vaccine when they were over the age of 9 months, 8.6% of them contracted the disease. A high proportion of mothers who received intermediate and secondary education (66%) and mothers who were exposed to health education were more willing to vaccinate their children (89.6%). Young mothers (less than 25 years of age) were more willing to vaccinate their children (66%).

Measles is not a mild disease, it has been recognised as a serious disease for some 200 years. The Arabian physician Rhazes (AD 860–932) left a classical description of measles but the infectious nature of the illness was not recognised until 125 years ago. For many years there were 200,000–400,000 cases of measles reported annually in the U.S.A.<sup>(1)</sup> In 1846, Panum studied an epidemic of measles in the Faroe Islands and noted that the disease was contagious, that there was an incubation period of 2 weeks, and that the infection appeared to lead to life-long immunity. In 1954, Enders and Peebles reported their success in propagating wild measles virus in primary human renal tissue culture cells. Their success led directly to the development of live measles vaccine which was licensed for use in the U.S.A. in 1963. Since 1963, due to the introduction of the vaccine, only 25,000–50,000 cases per year have been reported in the U.S.A. The vaccine was introduced in Bahrain in 1974 and was administered to infants at the age of 9 months.

According to the statistics and the data of the annual reports of the Public Health Directorate for the years 1982, 1983, 1984, 1985 there were epidemic

waves of measles in Bahrain. In 1985 the number of cases reported from 1 January — 5 June were 1895 (Table 1), which is significantly higher than in previous years.

TABLE 1

### Reported cases of measles

Year	No. of cases
1981	329
1982	1147
1983	438
1984	1134
1985 (1st January – 5th June)	1895

This survey studied the characteristics of mothers who had their children vaccinated against measles and those who did not have their children vaccinated. It was carried out among mothers who have children aged 9–18 months in the Sitra area of Bahrain.

## METHODS

In June 1985 a random sample was chosen from children aged 9–18 months in the Sitra area of Bahrain. Statistics showed that there were 533 live births in Sitra in 1984, all were Bahrainis. We selected our sample from live births during the period January – November 1984, the total was 470 children. To determine the required sample size for a two-sided T test and to attain a 95% precision level we applied the equation

$$N = \frac{(PQ)Z^2}{d^2} \quad (2)$$

N = Sample size required for the specific age group

P = Proportion of vaccinated children  
(assumed 0.5)

Q = Proportion of children who are not vaccinated  
(assumed 0.5)

Z = Level of confidence for 95% — 3 = 1.90

d = Precision (0.05)

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A sample of 120 children were needed for the study. A systematic sampling with a random start was used.

A questionnaire comprising of 12 questions was designed to be used for the interviews with mothers to record information on the social characteristics of family, vaccination history of the child, and also the attitudes towards vaccination against measles.

## RESULTS

120 children who were born between January — November 1984 in Sitra area could be located and their mothers were interviewed. Table 2 shows the general characteristics of the infants and their mothers. 48.3% of children received the vaccine against measles, 79.3% received the vaccine when they were more than 9 months old (Table 3).

**TABLE 2**

**General Characteristics of infants and their mothers**

		No.
Infants Sex	Males	52
	Females	68
		120
Nationality	Bahraini	120
	Non Bahraini	0
		120
Area of residence	Rural	120
	Urban	0
		120
Place of delivery	Hospital	110
	Home	10
		120
Age of mother	< 20 yrs	18
	20–25 yrs	30
	> 25 yrs	72
		120
Education of mother	Illiterate & Elementary	79
	Intermediate, Secondary & above	41
Number of children in the family	1 – 3 children	44
	4 – 6 children	33
	more than 6	43
		120

**TABLE 3**

**No. of vaccinated and non-vaccinated children according to their age.**

	Vaccinated children No.	Non-Vaccinated children No.	Total
Children at 9 months	12	50	62
Children at 9 months and above	46	12	58
		<b>58</b>	<b>62</b>
			<b>120</b>

$X^2 = 41.3$   
 $df = 1$   
 $P \leq 0.0001$

There was no difference between the number of male and female children who received the vaccine. The number of children born to a mother was considered and we found that a higher proportion of mothers who have 1–3 children were willing to have their children vaccinated than mothers who have 4–6 children and 7 children or more (Table 4).

**TABLE 4**

**No. of vaccinated and non-vaccinated children according to the number of mother's children.**

Number of children	Vaccinated children No.	Non-Vaccinated children No.	Total
1–3 children	21	23	44
4–6 children	17	16	33
7 and above	20	23	43
		<b>58</b>	<b>62</b>
			<b>120</b>

$X^2 = 0.13$   
 $df = 2$   
 $P \leq 0.5$

A significantly higher proportion of mothers who were exposed to health education vaccinated their children. (Table 5)

**TABLE 5**

**No. of vaccinated and non-vaccinated children according to the exposure of their mothers to health education.**

	Vaccinated children No.	Non-Vaccinated children No.	Total
Mothers exposed to Health Education	52	25	77
Mothers not exposed to Health Education	6	37	43
	<b>58</b>	<b>62</b>	<b>120</b>

$X^2 = 32.3$   
 $df = 1$   
 $P \leq 0.0001$

A higher proportion of young mothers, less than 25 years, were more willing to vaccinate their children than older mothers, 25 years and above (Table 6).

**TABLE 6**

**No. of vaccinated and non-vaccinated children according to the age of their mother**

Age of mothers	Vaccinated children No.	Non-Vaccinated children No.	Total
< 25	38	10	48
> 25	20	52	72
	<b>58</b>	<b>62</b>	<b>120</b>

$X^2 = 30.9$   
 $df = 1$   
 $P \leq 0.0001$

A significantly higher proportion of mothers who received an intermediate and secondary education

vaccinated their children compared to illiterate and elementary educated mothers (Table 7).

**TABLE 7**

**No. of vaccinated and non-vaccinated children according to the level of education of their mothers.**

	Vaccinated children No.	Non-Vaccinated children No.	Total
Illiterate and elementary	20	41	61
Intermediate Secondary and above	38	21	59
	<b>58</b>	<b>62</b>	<b>120</b>

$X^2 = 12.19$   
 $df = 1$   
 $P \leq 0.001$

Of children who received measles vaccine 8.6% contracted the disease and did not suffer from any complications (Table 8).

**TABLE 8**

**No. of vaccinated and non-vaccinated children according to measles infection.**

	No. of children that contracted the disease	No. of children that did not contract the disease	Total
Vaccinated	5	53	58
Not vaccinated	32	30	62
	<b>37</b>	<b>83</b>	<b>120</b>

$X^2 = 36.4$   
 $df = 1$   
 $P \leq 0.0001$

The most significant reasons for not vaccinating the children are shown in Table 9.

**TABLE 9**  
**Causes for not giving the measles vaccine**

<i>Reasons</i>	<i>No. of children who were not vaccinated</i>
Child already had measles	32
Child was sick	10
There was no time	8
The mother was sick	5
No transport	4
Don't know	3
	<b>62</b>

**DISCUSSION**

It has been shown that 48.3% of children in Sitra were vaccinated against measles, a survey conducted

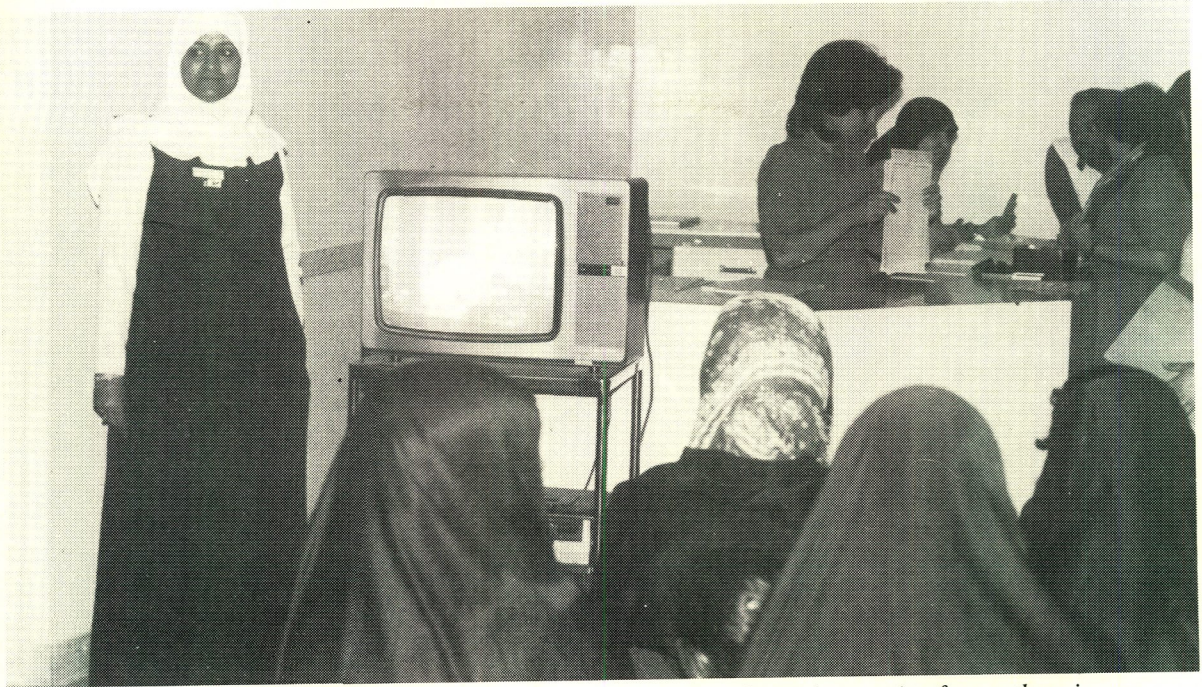
in 1985 by the Communicable Diseases Section indicated a similar pattern<sup>(3)</sup>. The annual reports of the Public Health Directorate in 1982, 1983, and 1984 indicated the same pattern<sup>(4)</sup>.

Our study has shown that women who were exposed to health education were more willing to vaccinate their children against measles. A similar pattern was also found in other surveys <sup>(5,6)</sup>.

Our study has also shown that the vaccine protects the child from contracting the disease and from the complications of the disease once infected. A similar pattern was also found in other surveys conducted by Mandell et al.<sup>(1)</sup> which indicated that the use of vaccine in the U.S.A. was followed by a dramatic decline in the incidence of measles and encephalitis. The study has also shown that as the education of the mothers increased, they were more willing to give their children the vaccine. Our results are similar to a study conducted in Bahrain by the Health Education Section in 1984<sup>(7)</sup>.



*A health educator visiting a family and giving information about the benefits of the measles vaccine.*



*A health educator projecting a local film about the benefits of measles vaccine for mothers in one of our health centres.*



*Measles is not a mild disease, it has been recognised as a serious disease since 200 years ago.*

*The Arabian physician Rhazes (A.O. 860 – 932) left a classical description of measles.*

## CONCLUSION

**In general the proportion of measles vaccination in rural areas of Bahrain is low. Mothers who were exposed to health facility practices which provided health education were more likely to give their children the vaccine.**

**Mothers need a broader education in all aspects of family and home care and should be encouraged to vaccinate their children.**

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