Measles vaccine effectiveness and risk factors for measles in Dhaka, Bangladesh

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Objective To evaluate vaccine effectiveness and to assess risk factors for measles in Dhaka, Bangladesh.
Method A case-control study, involving 198 cases with 783 age-matched neighbourhood controls and 120 measles cases with 365 age-matched hospital controls, was conducted in 1995–96 in three large hospitals in Dhaka.
Findings Measles vaccine effectiveness was estimated at 80% (95% confidence interval (CI) = 60–90%) using neighbourhood controls; very similar results were obtained using hospital controls. Visits to a health facility 7–21 days before onset of any symptoms were associated with increased risk of measles compared with neighbourhood (adjusted odds ratio (OR) = 7.0, 95% CI = 4.2–11.6) or hospital (adjusted OR = 1.7, 95% CI = 1.01–2.8) controls. Cases were more likely than controls to come from a household where more than one child lived (adjusted OR = 1.6, 95% CI = 1.1–2.5 versus neighbourhood controls; adjusted OR = 1.8, 95% CI = 1.02–3.0 versus hospital controls).
Conclusions To improve measles control in urban Dhaka missed immunization opportunities must be reduced in all health care facilities by following WHO guidelines. For measles elimination, more than one dose of vaccine would be required.

Keywords Measles vaccine/therapeutic use; Measles/etiology; Cross infection; Immunization; Risk factors; Socioeconomic factors; Case-control studies; Odds ratio; Bangladesh (*source: MeSH, NLM*).

Mots clés Vaccin antimorbilleux/usage thérapeutique; Rougeole/étiologie; Infection hospitalière; Immunisation; Facteur risque; Facteur socioéconomique; Etude cas-témoins; Odds ratio; Bangladesh (*source: MeSH, INSERM*).

Palabras clave Vacuna antisarampión/uso terapéutico; Sarampión/etiología; Infección hospitalaria; Inmunización; Factores de riesgo; Factores socioeconómicos; Estudios de casos y controles; Razón de diferencia; Bangladesh (*fuente: DeCS, BIREME*).

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Voir page 781 le résumé en français. En la página 781 figura un resumen en español.

Introduction

WHO estimates that almost 1 million measles-related deaths occur each year (*1*), the majority (85%) in Africa and Asia. In Bangladesh, measles remains a major cause of childhood morbidity and mortality. Population-based surveillance of 121 018 residents of a poor periurban area in Dhaka reported a measles incidence of 57 per 1000 per year among under-5-year-olds in 2001 (A. Brooks, personal communication, 2001). Among children under 5 years of age attending a large hospital in urban Dhaka in 2000, 5% reported a recent history of measles (A.S.G. Faruque, personal communication, 2000). A nationwide verbal autopsy study among a representative sample of under-5-year-olds who died between 1992 and 1996 reported that 6% of these deaths were due to acute measles and 15% to post-measles diarrhoea or pneumonia (*2*).

As measles vaccine coverage increases, it becomes more important to identify risk factors for measles and target supplementary immunization strategies at high-risk groups. It is also important to provide high-quality immunization services. Vaccine effectiveness is expected to be at least 85% when measles vaccine is administered at 9 months of age (*3–6*), but cold chain and other programme failures have reduced effectiveness in rural (*7*, *8*) and urban (*9*, *10*) areas in developing countries.

Studies in West Africa (*11–13*) and the USA (*14–18*) have shown that nosocomial infection of measles is common among children (*19*). The importance of control of nosocomial transmission of measles in the global context was demonstrated by an outbreak of measles in a Dutch hospital following introduction of measles by an infant from Indonesia (*20*). The WHO Expanded Programme on Immunization advocates a

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policy of immunizing children at every contact with health facilities, but the extent to which this is implemented varies widely.

We conducted a study in Dhaka, Bangladesh in 1995–96 to evaluate measles vaccine effectiveness and identify risk factors for measles.

Materials and methods

The matched case–control study, using two sets of controls, was approved by the ethics committees of the International Centre for Diarrhoeal Disease Research, Bangladesh (ICDDR,B) and the London School of Hygiene and Tropical Medicine. Cases and hospital controls were selected from three large tertiary care hospitals: ICDDR,B hospital (a specialist hospital for diarrhoeal diseases), Dhaka Shishu Hospital (the largest paediatric hospital), and the paediatric department of Dhaka Medical College teaching hospital, which have 300, 300, and 60 beds, respectively. Physicians and study health workers asked each mother attending outpatient or inpatient departments whether her child had had measles in the previous 6 weeks. Children living in urban Dhaka and presenting with a history of measles-like illness in the previous 6 weeks (generalized maculopapular rash of $\geqslant$3 days' duration with a history of fever and cough, coryza or conjunctivitis) were enrolled as cases (*21*).

We aimed to select four neighbourhood controls for each case, by visiting neighbouring households sequentially until four controls were identified. The controls were matched within age ranges (5–8, 9–11, 12–23, 24–35, 36–47, 48–59, 60–83, 84–107 and >108 months) and had no previous history of measles. We also attempted to recruit four age-matched controls from the same hospital, who lived at a similar distance from the hospital as the matched case. Children with pneumonia and pertussis were excluded because of the potential for nosocomial transmission. Poliomyelitis, tuberculosis, and surgical cases were not eligible as controls because our preliminary work suggested that their mothers' perceptions of severity and usefulness of medical care were different from those for measles.

After obtaining their written informed consent, the parents of cases and controls were interviewed by health workers using pre-tested, structured questionnaires. Data collected included age, sex, socioeconomic status, parental education, number of children in the household, history of exposure to measles cases, and distance travelled and time taken to reach hospitals. Immunization status was recorded from documents or from the verbal history given by the parent if no record was available. Respondents were asked whether the child had been to a health facility during the 3 months prior to enrolment, and if so, when the most recent visit had occurred and the reason for it. The same information was then requested for each previous visit, working backwards.

Laboratory assays were performed at ICDDR,B. Measles IgM antibody levels were measured using enzyme-linked immunosorbent assay kits (Enzygnost, Behring Diagnostics, Frankfurt, Germany). Each run of IgM assays included a positive and a negative control. The overall sensitivity of this test (for immunized and non-immunized subjects) for detection of measles IgM in measles cases confirmed by complement fixation test is 97.2% (*22*).

Data analysis

Data were double entered and validated using Epi Info software (*23*). Only measles cases confirmed by measles-specific IgM were retained in the analysis. All comparisons between cases and controls were conducted separately for neighbourhood and hospital controls. Only those children whose parents said they had received measles vaccine at least 2 weeks before enrolment or onset of prodromal symptoms were considered to have been vaccinated (*24*). For health facility visits, exposure was defined as a visit to a health facility at least once 7–21 days prior to the onset of the first symptoms of the episode of illness (fever, cough, difficult breathing, or diarrhoea) (*19*, *25*, *26*) or prior to enrolment of healthy neighbourhood controls. This corresponded to attendance at a health facility within the incubation period of measles.

Conditional logistic regression models (*27*) were used to estimate the effect of measles immunization and health facility visits on the risk of measles, controlling for potential confounding factors. Inclusion of age in logistic regression models made little difference to the results, hence we present data without adjusting for age. We were interested a priori in exploring interactions between vaccine effectiveness and sex, and did so by comparing a multivariable model that included the interaction term with one that excluded it using the likelihood ratio test (*28*).

We also examined risk factors for severe measles cases that had any of the following complications: dehydration, signs of lower respiratory infection, bloody diarrhoea, meningitis, or clinical sepsis. To assess whether risk factors for measles differed in immunized compared with non-immunized children, we conducted analyses stratified by immunization status, using only case–control sets of concordant measles immunization status.

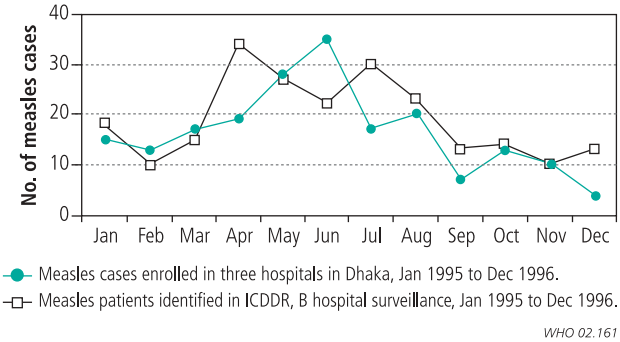
Results

Measles cases were enrolled in each month throughout the study period, with peaks in recruitment in May–August. Similar seasonality of clinically diagnosed measles was reported among a 2% systematic sample of patients attending ICDDR,B during 1995 and 1996 (Fig. 1).

Clinical characteristics of cases and controls

A total of 206 confirmed measles cases were recruited, a median of 10 days (interquartile range, 6–15 days) after the onset of rash. The median age was 17 months (range = 5–118 months). All measles cases had a history of typical morbiliform rash and fever, 68% had watery diarrhoea, and 38% had lower respiratory infections. For almost half of the measles cases, parents reported contact with another child with measles-like rash; this was a household measles case in 33 cases (16%), but parents could not give a precise date of exposure in relation to the study case. The median age of hospital controls was 13 months (range = 6–107 months). The most common illnesses were acute watery diarrhoea (74%), invasive diarrhoea (9%), persistent diarrhoea (5%), chronic otitis media (11%), pyogenic meningitis (3%), upper respiratory tract infection (6%), thrush (4%), and skin infection (7%). For neighbourhood controls, specific symptoms included fever (12%) and cough (28%), with few reports of diarrhoea or other symptoms.

Fig. 1. **Measles cases enrolled in the study and measles patients identified in ICDDR, B hospital surveillance, by month, from January 1995 to December 1996**



Case–control analysis using neighbourhood controls

Of the 206 measles cases, six were removed from hospital by their families or consent was withdrawn, and for two cases no neighbourhood controls could be found. The remaining 198 cases and 783 matched neighbourhood controls were retained. Cases were more likely than controls to be male, non-immunized, have a less educated or working mother, a household head other than the father, and more than one child in the household (Table 1). Household income was slightly lower among cases than controls (data not shown).

The crude and adjusted odds ratios (OR) for receipt of measles vaccine were 0.2 (Table 2); vaccine effectiveness was thus 80% (95% confidence interval (CI) = 60–90%). Among 92 severe measles cases and 364 age-matched controls, vaccine effectiveness was 90% (95% CI = 70–94%).

A total of 27% of cases had visited a health facility 7–21 days before prodrome compared with only 6% of neighbourhood controls. As shown in Table 2, after controlling for measles immunization, sex, socioeconomic status, and number of children in the household, the adjusted OR for a health facility visit was 7.0 (95% CI = 4.2–11.6, P <0.001). There was no significant interaction of age or sex in the association between health facility visit and measles. For the subgroup of severe measles cases, the OR for health facility attendance in this prodromal period was 8.9 (95% CI = 3.6–22.0).

Stratification by immunization status showed that health facility attendance and the presence of more than one child in the household appeared to be greater risk factors for measles in immunized than in non-immunized children. Among the 42 immunized cases with 94 age-matched immunized controls, the OR for health facility attendance was 24.7 (95% CI = 5.3–114.7, P <0.001) and the OR for more than one child in the household was 4.6 (95% CI = 0.8–24.8, P = 0.07). Among 156 non-immunized cases and 344 age-matched non-immunized controls the ORs were 4.1 (95% CI = 2.2–7.8, P <0.001) and 1.4 (95% CI = 0.5–1.4, P = 0.5), respectively.

Children who had attended a health facility 7–21 days prior to onset of illness or enrolment were more frequent users of health facilities in general. Among the 54 cases and 51 controls who visited during the risk period, 41% and 33%, respectively, also attended over the period 21 days to 3 months before onset. For cases and controls, attendance at health facilities was associated with younger age (median age, 13 months compared with 22 months), higher level of education of household head, and higher income, but not with sex or immunization status (data not shown).

Case–control study using hospital controls

Suitable hospital controls could not be found for 80 cases. The median age of cases for whom controls could or could not be found was 14 and 40 months, respectively (P <0.001). There were no significant differences in socioeconomic characteristics (data not shown), and the proportion immunized against measles was virtually identical in cases for which controls could or could not be found: 21% and 22%, respectively.

Cases and hospital controls were comparable with respect to the distance of their residence from the hospitals (5.5 km versus 6.0 km, P = 0.2) and time required to travel to the hospital (30 min versus 40 min, P = 0.8). Cases came from households with less educated parents, more children (Table 1), and lower median incomes (data not shown).

Results using hospital controls were broadly similar to those using neighbourhood controls (Table 2). Vaccine effectiveness was 80% using measles or severe measles cases. Health facility attendance was a significant risk factor, especially among immunized children, although the corresponding ORs were lower than estimated using neighbourhood controls.

Discussion

Vaccine effectiveness

This study evaluated measles vaccine effectiveness and risk factors for measles in a large city with moderately high average vaccine coverage. Vaccine effectiveness was estimated at 80%, irrespective of whether hospital or neighbourhood controls were used. This is within the expected range when measles vaccine is administered at 9 months of age (*3–6*). The estimate of protection by vaccine was slightly higher against severe measles when neighbourhood controls were used, which is consistent with reports that when measles occurs in immunized individuals the illness is less severe (*29*).

For studies of vaccine effectiveness, cases should ideally be ascertained in such a way that the likelihood of detecting them among immunized or non-immunized children is the same. Cases recruited at hospital may represent families with a relatively high use of health facilities, including immunization services. This would tend to bias observed vaccine effectiveness downwards. On the other hand, we had some evidence that measles cases were milder in immunized than in non-immunized children, thus hospital-based recruitment may have increased the observed vaccine effectiveness.

We confirmed measles serologically, thus avoiding the potential bias in vaccine effectiveness from non-specific diagnosis (*9*). Immunization status was only documented in 17% (7/42) of cases and 29% (107/367) of neighbourhood controls and thus was prone to misclassification. However, we did not have adequate statistical power to conduct a statistical analysis on subgroups of children with or without documented measles immunization status. If misclassification was non-differential, this would bias the observed vaccine effectiveness towards zero. There may, however, have been differential misclassification since cases had less educated mothers who might give less accurate information on their child's immunization status (*9*) and are also less likely to take their children for immunization (*30*).

Table 1. **Comparison of selected demographic and socioeconomic characteristics in 198 measles cases and 783 age-matched neighbourhood controls and 120 measles cases and 365 age-matched hospital controls in urban Dhaka, Bangladesh, 1995–96**

Characteristic	No. of measles cases	No. of neighbourhood controls	No. of measles cases	No. of hospital controls
Age group (months)				
5–8	33 (17)[a]	131 (17)	27 (23)	91 (25)
9–11	29 (15)	112 (14)	23 (19)	79 (22)
12–23	51 (26)	201 (26)	35 (29)	112 (31)
24–35	18 (9)	72 (9)	11 (9)	34 (9)
36–47	16 (8)	63 (8)	6 (5)	11 (3)
48–59	21 (11)	84 (11)	10 (8)	17 (5)
60–83	16 (8)	64 (8)	5 (4)	15 (4)
84–107	11 (6)	44 (6)	3 (3)	6 (2)
>108	3 (1)	12 (1)	–	–
Sex				
Male	118 (60)	401 (51)	72 (60)	193 (53)
Female	80 (40)	382 (49)	48 (40)	172 (47)
Received measles vaccine (verbal report)	42 (21)[b]	367 (47)	27 (23)[b]	180 (49)
Household head				
Father	180 (91)[c]	742 (95)	112 (93)	343 (94)
Other	18 (9)	41 (5)	8 (7)	22 (6)
Occupation of household head				
Unemployed	3 (2)	15 (2)	2 (2)	7 (2)
Service	40 (20)	158 (20)	28 (23)	101 (28)
Business	44 (22)	194 (25)	27 (23)	83 (23)
Petty business	3 (2)	24 (3)	2 (2)	14 (4)
Skilled labourer	32 (16)	94 (12)	20 (17)	43 (12)
Unskilled labourer	75 (38)	290 (37)	40 (33)	116 (32)
Other	1 (1)	8 (1)	1 (1)	1
Education of household head				
No schooling	88 (44)	338 (43)	57 (48)[c]	136 (37)
Schooling	110 (56)	444 (57)	63 (52)	232 (63)
Mother's education				
No schooling	134 (68)[d]	450 (58)	76 (63)[d]	178 (49)
Schooling	64 (32)	198 (42)	44 (37)	187 (51)
Mother's occupation				
Housewife	157 (79)[c]	669 (85)	96 (80)	307 (84)
Other	41 (21)	114 (15)	24 (20)	57 (16)
No. of rooms in household				
1	163 (82)	655 (84)	99 (83)	284 (78)
>1	35 (18)	128 (16)	21 (17)	81 (22)
No. children aged <12 years in household				
1	41 (21)	203 (26)	26 (22)[c]	125 (34)
>1	157 (79)	580 (74)	94 (78)	240 (66)

[a] Figures in parentheses are percentages.
[b] $P < 0.001$.
[c] $P < 0.05$.
[d] $P < 0.01$.

Risk factors

Measles was more common in households with more than one child. This could reflect an increased risk of exposure to measles, increased severity of measles (*31*), or both. The association between number of children in the household and measles was somewhat stronger for severe measles cases than for non-severe measles cases (adjusted OR = 1.8 and 1.4, respectively, using neighbourhood controls; 3.1 and 1.5, respectively, using hospital controls), but we lacked the statistical power to determine whether this difference was significant.

Our results showed that visiting a health facility 7–21 days prior to disease onset was a risk factor for measles, suggesting that nosocomial transmission of measles was occurring in urban Dhaka. Previous studies had been conducted during epidemics (*11*, *18*, *32*). Our study shows that even in the absence of a recognized measles outbreak, there is a risk of transmission at health facilities. Over 90% of the health facility visits were said to be due to childhood illness; approximately half were at private practitioner or nongovernmental outpatient clinics and only about one-tenth resulted in hospital admission.

Table 2. **Results of conditional regression models showing odds ratios (OR) and 95% confidence intervals (CI) for health facility visits as a risk factor for measles and severe measles, and for measles immunization as a protective factor against measles and severe measles, adjusted for all covariates for which estimates are provided, urban Dhaka, Bangladesh, 1995–96**

Variable	Using neighbourhood controls				Using hospital controls			
	Measles		Severe measles		Measles		Severe measles	
	Crude OR	Adjusted OR[a] (95% CI)	Crude OR	Adjusted OR[b] 95% CI	Crude OR	Adjusted OR[c] (95% CI)	Crude OR	Adjusted OR[d] (95% CI)
Health care facility visit[e]								
Not visited	1.0[f]	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Visited	6.0[g]	7.0 (4.2, 11.6)[g,h]	7.3[g]	8.9 (3.6, 22.0)[g]	1.5	1.7 (1.0, 2.8)[i]	1.1	1.4 (0.6, 3.6)
Sex								
Male	1.0	1	1.0	1.0	1.0	1.0	1.0	1.0
Female	0.7[i]	0.7 (0.5,1.0)	0.7	0.8 (0.5, 1.4)	0.6	0.7 (0.4, 1.1)	0.9	0.9 (0.4, 2.2)
Measles immunization status								
Not immunized	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Immunized	0.2[g]	0.2 (0.1, 0.4)[g]	0.1[g]	0.1 (0.06,0.3)[g]	0.2[g]	0.2 (0.1, 0.4)[g]	0.2[g]	0.2 (0.07, 0.5)[g]
Mother's education								
No schooling	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Schooling	0.6[j]	0.7 (0.5, 1.1)	0.5[j]	0.6 (0.3, 1.1)	0.6[i]	0.7 (0.4, 1.1)	0.5	0.8 (0.3, 2.0)
Mother's occupation								
Housewife	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Other	0.6[i]	0.7 (0.4, 1.0)	0.6	0.6 (0.3, 1.2)	0.8	0.9 (0.5, 1.7)	1.1	1.4 (0.5, 4.0)
No. of children in household								
One child	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
More than one child	1.4	1.6 (1.1, 2.5)[i]	2.2[j]	1.8 (0.9, 3.6)	1.7[i]	1.8 (1.0, 3.0)[i]	3.3[i]	3.1 (1.0, 9.5)[i]
Household income								
< Median	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
> Median	0.8	0.8 (0.5, 1.2)	0.9	0.9 (0.5, 1.6)	0.7	0.9 (0.5, 1.6)	0.7	0.8 (0.3, 2.1)

[a] OR estimates were based on 198 measles cases and 783 age-matched neighbourhood controls.
[b] OR estimates were based on 92 severe measles cases and 363 age-matched neighbourhood controls.
[c] OR estimates were based on 120 measles cases and 365 age-matched hospital controls.
[d] OR estimates were based on 42 severe measles cases and 125 age-matched hospital controls.
[e] Health care facility visit: visit to a health care facility for any reason 7–21 days before the onset of cough, fever, difficult respiration or diarrhoea, or before recruitment (for controls without any symptom).
[f] Referent.
[g] $P < 0.001$.
[h] Figures in parentheses are 95% confidence intervals.
[i] $P < 0.05$.
[j] $P < 0.01$.

Case–control groups

Neighbourhood controls were less likely than cases or hospital controls to report attendance at health facilities during the 3 months prior to recruitment. Reported attendance rates among neighbourhood controls aged <5 years were similar to those in a study on health-care seeking behaviour in urban slums of Dhaka (*33*). Since cases were recruited in hospitals, at least part of the difference in health facility attendance between cases and neighbourhood controls may reflect an association with the chance of being hospitalized once ill, rather than with exposure to measles. The association with health facility attendance over the study period was, however, also significant when we compared cases with hospital controls. For this case–control group, there was no difference in background health-care seeking behaviour (as assessed by visits 21 days to 3 months previously). We therefore consider that the association represents an increased chance of exposure to measles. The odds ratio for this group may have been biased towards zero, since some of the cases of upper respiratory tract infection and diarrhoea among controls may have been transmitted nosocomially (*34*, *35*).

Missed vaccination opportunities

The target age range for measles vaccination in Bangladesh is 9 months to 2 years. In this study, 61 cases in this age group were not immunized; 21 (34%) had visited health facilities before the incubation period of measles. Since the measles vaccine had an effectiveness of 80%, measles could have been prevented in 17 of these 21 cases if the vaccine had been given during their health facility visits. Severe measles was observed in 30 non-immunized cases in this age group of whom 6 (20%) had visited health facilities before the incubation period. Given the vaccine effectiveness of 90% against severe measles, five of these cases could have been prevented if these children had been immunized during their health facility visits. Opportunities for measles immunization were missed overall for 27 (19%) of 145 non-immunized neighbourhood controls and 36 (47%) of 77 unvaccinated hospital controls in children aged 9 months to 2 years.

Measles remains a disease of public health importance in Dhaka, with substantial numbers of hospital admissions and increased susceptibility to pneumonia and invasive diarrhoea for 6–8 weeks after measles onset (*36*). Although average immunization coverage in Dhaka is reported to be moderately high (65%), in slum areas it is only 52% (*37*).

Approximately 40% of the measles cases in our study were in the target age group for measles immunization, and the majority was not immunized. The continued occurrence of measles in Dhaka reflects programmatic weaknesses in addition to vaccine failure. Measles control can be improved by targeting pockets of low coverage through better coordination among the different agencies providing immunization services, motivating parents regarding the need for measles immunization, and implementing WHO recommendations for using all opportunities to immunize children (*19*). Nonetheless, with a primary vaccine failure rate of 20%, to eliminate measles as a public health problem, a two-dose schedule is likely to be needed, either through routine services or periodic supplementary campaigns.

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Conflicts of interest: none declared.

Résumé

Efficacité du vaccin antirougeoleux et facteurs de risque pour la rougeole à Dhaka (Bangladesh)

Objectif Evaluer l'efficacité du vaccin et les facteurs de risque pour la rougeole à Dhaka (Bangladesh).

Méthodes Une étude cas-témoins portant sur 198 cas et 783 témoins appariés sur l'âge et recrutés parmi les voisins des cas, et d'autre part sur 120 cas et 365 témoins appariés sur l'âge et recrutés parmi des personnes hospitalisées, a été réalisée en 1995-1996 dans trois grands hôpitaux de Dhaka.

Résultats L'efficacité du vaccin antirougeoleux a été estimée à 80 % (intervalle de confiance à 95 % (IC) : 60-90 %) en prenant comme témoins des voisins des cas ; des résultats tout à fait similaires ont été obtenus avec les témoins hospitalisés. On a observé une augmentation du risque de rougeole chez les sujets s'étant rendus dans un établissement de soins 7 à 21 jours avant le début des symptômes par rapport aux témoins du voisinage (odds ratio (OR) ajusté = 7,0 ; IC 95 % : 4,2-11,6) ou aux témoins hospitalisés (OR ajusté = 1,7 ; IC 95 % : 1,01-2,8). Les cas provenaient, avec une plus grande probabilité que les témoins, de ménages comptant plus d'un enfant (OR ajusté = 1,6 ; IC 95 % : 1,1-2,5 par rapport aux témoins du voisinage ; OR ajusté = 1,8 ; IC 95 % : 1,02-3,0 par rapport aux témoins hospitalisés).

Conclusion Pour améliorer la lutte contre la rougeole en zone urbaine de Dhaka, il faudra réduire les occasions manquées de vaccination dans tous les établissements de soins de santé en suivant les directives de l'OMS. Pour éliminer la rougeole, il faudrait utiliser plus d'une dose de vaccin.

Resumen

Eficacia de la vacuna antisarampionosa y factores de riesgo de sarampión en Dacca (Bangladesh)

Objetivo Evaluar la eficacia de la vacuna y los factores de riesgo de sarampión en Dacca, Bangladesh.

Métodos En 1995–1996 se realizó en tres grandes hospitales de Dacca un estudio de casos y controles que abarcó 198 casos con 783 testigos del vecindario emparejados por edades, así como otros 120 casos de sarampión emparejados también por edades con 365 testigos de un entorno hospitalario.

Resultados Comparando con los controles del vecindario, se estimó que la vacuna antisarampionosa tenía una eficacia del 80% (intervalo de confianza (IC) del 95% = 60%–90%); los resultados fueron muy parecidos al utilizar los controles del hospital. Las visitas a un establecimiento de salud 7–21 días antes de la aparición de cualquier síntoma se asociaron a un mayor riesgo de sarampión en comparación con los controles del vecindario (razón de posibilidades (OR) ajustada = 7,0, IC95% = 4,2–11,6) o del hospital (OR ajustada = 1,7, IC95% = 1,01–2,8). Los casos tenían más probabilidades que los controles de provenir de un hogar donde vivía más de un niño (OR ajustada = 1,6, IC95% = 1,1–2,5 frente a los controles del vecindario; OR ajustada = 1,8, IC95% = 1,02–3,0 frente a los controles del hospital).

Conclusión A fin de mejorar la lucha antisarampionosa en las zonas urbanas de Dacca, hay que aprovechar mejor las oportunidades de inmunización en todos los establecimientos de asistencia sanitaria, siguiendo las directrices de la OMS. Para lograr eliminar el sarampión se requerirá más de una dosis de la vacuna.

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