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Retraction

Retracted: Immunization Coverage: Role of Sociodemographic Variables

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The paper titled "Immunization Coverage: Role of Sociodemographic Variables" [1], published in Advances in Preventive Medicine, has been retracted upon the authors' request due to a flaw in data acquisition.

References

[1] B. Sharma, H. Mahajan, and G. D. Velhal, "Immunization coverage: role of sociodemographic variables," *Advances in Preventive Medicine*, vol. 2013, Article ID 607935, 5 pages, 2013.

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Research Article

Immunization Coverage: Role of Sociodemographic Variables

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Children are considered fully immunized if they receive one dose of BCG, three doses of DPT and polio vaccine each, and one measles vaccine. In India, only 44% of children aged 12–23 months are fully vaccinated and about 5% have not received any vaccination at all. Even if national immunization coverage levels are sufficiently high to block disease transmission, pockets of susceptibility may act as potential reservoirs of infection. This study was done to assess the immunization coverage in an urban slum area and determine various sociodemographic variables affecting the same. A total of 210 children were selected from study population using WHO's 30 cluster sampling method. Coverage of BCG was found to be the highest (97.1%) while that of measles was the lowest. The main reason for noncompliance was given as child's illness at the time of scheduled vaccination followed by lack of knowledge regarding importance of immunization. Low education status of mother, high birth order, and place of delivery were found to be positively associated with low vaccination coverage. Regular IEC activities (group talks, role plays, posters, pamphlets, and competitions) should be conducted in the community to ensure that immunization will become a "felt need" of the mothers in the community.

1. Introduction

Immunization is often cited as being one of the greatest public health achievements of 20th century, [1] but effective immunization requires population coverage levels of 90 to 95% depending upon the vaccine-preventable disease [2].

Immunization coverage refers to information on the proportion of children who have received specific vaccines or are up to date with the recommended vaccine schedule. This information is essential for planning immunization programmes, identifying vulnerable groups or areas that require targeting of increased resources, assessing the acceptability of a programme, and predicting likely vaccine-preventable disease epidemics [2].

Children are considered fully immunized if they receive one dose of BCG, three doses of DPT and polio vaccine each, and one measles vaccine. In India, only 44% of children aged 12–23 months are fully vaccinated and about 5% have not received any vaccination at all [3].

In spite of 20 years of efforts and millions of dollars poured into Universal Immunisation programme (UIP), our coverage rate has still not crossed the 50% mark. Immunization coverage showed improvement since National Family Health Survey-1 (NFHS-1), when only 36% of children were fully vaccinated and 30% had not been vaccinated at all. But there was very little change in immunization coverage between NFHS-2 (42%) and NFHS-3 (44%) [3].

Coverage of BCG, DPT, and polio (except "at birth" polio dose) is much higher than all other vaccines. BCG, DPT-1, and polio-1, -2, -3 dose has been received by at least 76% of children, while only 55% of children have received all three doses of DPT. Although DPT and polio vaccinations are given at the same time as part of routine immunization programme, the coverage rates are higher for polio than for DPT (all three doses), undoubtedly because of the pulse polio campaigns. Not all children who begin the DPT and polio vaccination series go on to complete them. The difference between the percentage of children receiving the first and third doses is

21% for DPT and 15% for polio. Around 59% of children aged 12–23 months have been vaccinated against measles. The relatively low percentage of children vaccinated with the third dose of DPT and measles is mainly responsible for the low percentage of fully vaccinated children [3].

Even if national immunization coverage levels are sufficiently high to block disease transmission, pockets of susceptibility may act as potential reservoirs of infection. It is therefore essential to know if under-vaccination is a problem in specific population group, which involves determining inequalities in coverage level. Thus, the present cross-sectional study was undertaken to assess the immunization coverage and various socio-demographic factors affecting the same in an urban slum population of Mumbai, India.

2. Aims and Objectives

To assess the immunization coverage in an urban slum area of Mumbai and determine the various socio-demographic variables affecting the same.

3. Materials and Methods

The present community based descriptive study was conducted at Cheetah Camp urban slum from August 2012 to November 2012. Necessary approvals were taken from Dean of T.N. Medical College, Mumbai, India; Head of PSM Department, T.N. Medical College, Mumbai; in charge of Cheetah Camp Urban Health Centre, Mumbai; and Head of Institutional Ethical Committee (IEC). The study area comes under jurisdiction of M East Ward of Municipal Corporation of Greater Mumbai and is the field practice area of Department of Preventive and Social Medicine of T.N. Medical College, Mumbai.

The study population comprised children aged 12–23 months. Age was confirmed by birth certificate or immunization card or, when it was not available, by asking the mothers (using a standardized Indian calendar and major holidays as reference points).

Complete Immunisation. Children have received BCG, measles, and three doses of DPT, hepatitis B, and OPV each (excluding OPV-0).

Partial/Incomplete Immunization. Children who have received at least one of the above-mentioned vaccines.

Unimmunised Children. Children have not received any vaccine.

3.1. Sample Size and Data Collection. WHO's 30 cluster sampling method was used for evaluation of immunization coverage. [4] Thirty clusters in the community were demarcated based on its population and sector-wise distribution. In Cheetah Camp there were a total of 11 sectors with total population of 79,783 which were represented in Table 1. In order to decide clusters, sampling interval was calculated as follows.

Table 1

Sectors	Total population	Cumulative population	Clusters
A	7650	7650	1, 2
B	10378	18028	3, 4, 5, 6
C	10957	28985	7, 8, 9, 10
D	12812	41797	11, 12, 13, 14, 15
E	11374	53171	16, 17, 18, 19
F	7020	60191	20, 21, 22
G	9350	69541	23, 24, 25, 26
H	1900	71441	
I	943	72384	27
J	5437	77821	28, 29
K	1962	79783	30

$$\text{Sampling interval} = \frac{\text{Total population}}{\text{Total no. of clusters}} = \frac{79,783}{30} = 2660\,(\text{approx.}). \quad (1)$$

So, based on above sampling interval, clusters were formed sector-wise as shown in Table 1.

Seven subjects between age group of 12–23 months were selected from each of the 30 clusters. So, the final sample size was 210 children.

The first household was selected randomly in each cluster and every next household was studied in a sequence, until a total of seven eligible children in the age group of 12–23 months were covered. On reaching the selected household, the mother of the eligible child (12–23 months) was interviewed. If no child belonging to the target population was found, next households were checked till an eligible child was found. Only one child per household was selected.

Preformed, pretested, semistructured questionnaire was used to collect information from mothers regarding socio-demographic parameters, status of immunization of their child, and reasons for noncompliance (if applicable). To maintain privacy, information was collected maintaining utmost privacy as per the convenience of respondents. Time required to complete one interview was 5–7 minutes. The collected data was numerically coded and entered in Microsoft Excel 2007, and then transferred to the SPSS (ver. 19). Data was analyzed using appropriate statistical tests.

4. Results

Study findings revealed that 80.95% of the children were completely immunized while only 1.43% of children had not received any vaccination (Table 2). On assessing individual vaccines (Table 3), the coverage of birth dose of BCG was found to be the highest (97.1%) while coverage of hepatitis

Table 2: Immunization coverage in study area (n = 210).

Immunization status	Frequency	%
Complete	170	81
Incomplete	37	17.6
Unimmunised	3	1.4
Total	210	100

Table 3: Immunization coverage of individual vaccines (n = 210).

Type of vaccine	Received (frequency)	Received (%)
BCG	204	97.1
OPV0	188	89.5
OPV1	203	96.7
OPV2	202	96.2
OPV3	197	93.8
DPT1	203	96.7
DPT2	201	95.7
DPT3	195	92.9
HepB1	200	95.2
HepB2	196	91.4
HepB3	185	88.1
Measles	184	87.6

vaccine was lower than that of OPV and DPT (all three doses). Coverage of Measles vaccine was also below 90%. The main reason for noncompliance was given as child's illness at the time of scheduled vaccination followed by lack of knowledge regarding importance of immunization (Table 4). On assessing various socio-demographic factors, low education status of the mother, high birth order, and place of delivery were found to be positively associated with low vaccination coverage (Table 5).

5. Discussion

The present study was conducted during the period of August to November 2012. Study findings showed higher immunization coverage of 80.95% as compared to NFHS-3 data (43.5%). The results were supported by report of Suresh Sharma, which showed immunization coverage of Maharashtra to be above 70% [5].

The overall coverage for different vaccines ranges from 97.14% for BCG vaccine to 87.61% for measles, which was above the 85% target set by Universal Programme of Immunisation (UIP) in India. A study conducted by Singh and Yadav on immunization status of India showed BCG and measles coverage of 86% and 67% respectively [6]. Similar results were found by Yadav et al. in an urban slum of Jamnagar where coverage of BCG was maximum (94.75%) followed by OPV (84.7%) and, DPT (81.4%) and that of measles was the least (75.7%) [7]. Although DPT and polio vaccinations are given at the same time as part of the routine immunization programme, the coverage rates are higher for Polio than DPT, probably because of the Pulse Polio Programme [8].

Table 4: Factors responsible for noncompliance (n = 110).

Factor	Frequency	%
Child illness	62	56.4
Unawareness	18	16.4
Lack of time	11	10
Away from home	8	7.2
No one to accompany	7	6.4
Card lost	2	1.8
Not required	2	1.8
Total	110	100

The most common reasons for not immunizing the child as cited by respondents were illness of the child (29.52%), unawareness of the need for immunization (8.1%), being busy with other works (5.24%) and visit to native place (3.81%). A study conducted by Kar et al. [9] showed that the major causes for incomplete immunization were illness of child (30.8%), unawareness (23.1%), and migration to native place (23.1%). Another similar study by Nath et al. [10] showed that visit to native place (14.7%), carelessness (11.7%), sickness of child (11.7%), and lack of knowledge (10.4%) were reasons for incomplete immunization.

There was significant association between immunization status of the children and mother's education status, birth order, and place of delivery. A study done by Vikram et al. [11] found significant association between maternal education and child immunization status. A study in urban slums of Lucknow by Nath et al. [10] found that children born at home were found less likely to receive any vaccination. Studies done by Bobo et al. [12] and Brenner et al. [13] revealed that birth order was inversely related to vaccination coverage.

6. Recommendations

More focus should be given on factors which are more amenable to change like illiteracy and lack of knowledge regarding immunization. Outreach workers during their home visits should impart knowledge regarding various vaccines and importance of timely vaccination. Regular IEC activities in the form of group talks, role plays, posters, pamphlets, competitions, and so forth, should be conducted in the community to ensure that immunization will become a "felt need" of the mothers in the community. Health education to mothers should be given at every interface with health facility like ANC/PNC/immunization visits and in under-five clinics.

Revitalize and strengthen routine immunization services with particular reference to urban slum areas, illiterate parents, and population groups or areas hitherto not reached. Address the issues of poor utilization of immunization services, obstacles, and lack of awareness through professionally-designed behaviour change communication interventions. Impact evaluation of improvements ensuing such intervention measures should be meticulously done. As a long-term measure, improving the female literacy and population stabilization will go a long way in achieving universal coverage of immunization.

Table 5: Association of sociodemographic variables with vaccination coverage.

Variable	Immunization status		P value
	Complete (%)	Incomplete/unimmunized (%)	
Sex			
Male (n = 117)	96 (82.1)	21 (17.9)	0.71
Female (n = 93)	74 (79.6)	19 (20.4)	
Mother's education			
Illiterate (n = 30)	19 (63.3)	11 (36.7)	0.017
Primary (n = 23)	16 (69.6)	7 (30.4)	
Secondary (n = 114)	99 (86.8)	15 (13.2)	
Higher secondary (n = 34)	30 (88.2)	4 (11.8)	
Graduate (n = 9)	6 (66.7)	3 (33.3)	
Socioeconomic status (modified Prasad)			
Upper middle (II) (n = 15)	12 (80)	3 (20)	0.49
Upper lower (III) (n = 117)	98 (67)	19 (34)	
Lower (IV) (n = 78)	60 (76.9)	18 (23.1)	
Birth order			
1 (n = 85)	70 (82.4)	15 (17.6)	<0.01
2 (n = 76)	62 (81.6)	14 (18.4)	
≥3 (n = 49)	38 (77.6)	11 (22.4)	
Place of delivery			
Home (n = 18)	12 (66.7)	6 (33.3)	<0.01
Hospital (n = 192)	158 (82.3)	34 (17.7)	

Conflict of Interests

The authors declare that there is no conflict of interests regarding the publication of this paper.

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