An effective and doable interventional strategy to enhance vaccination coverage — are we ready to change?

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Abstract

Objective: To evaluate the effect of patient reminder calls on improvement of routine vaccination coverage.

Methods: This prospective, interventional study was conducted at Rawal Institute of Health Sciences, Islamabad, Pakistan, from December 2014 to August 2016, and comprised babies enrolled at the time of 1st vaccination. Babies who were given bacillus Calmette-Guérin, oral polio vaccine were included. Mobile phone numbers of parents were noted. The 1st reminder call was given after 7 days if a baby did not report on the scheduled date. Similarly, 2nd and 3rd reminder calls were made after waiting for 7 days each time in case of non-reporting. Record of reporting and reminder calls was reviewed daily till all the enrolled babies crossed 15 months of age (scheduled time for 2nd dose of measles) plus 4 weeks.

Results: A total of 150 babies were enrolled at the time of 1st vaccination. Reporting without call within 01 week of scheduled date ranged from 52(34.66%) to 99(66%) for different vaccines. The 1st reminder call showed maximum improvement in reporting rate. The range of vaccination rate reached from 91(60.66%) to 132(88%). The 2nd call improved coverage rate range from 108(71.99%) to 140(93.33%). The 3rd call improved coverage rate from 113(75.32%) to 144(96%). Overall coverage rate achieved ranged from 112.5(75%) to 144(96%).

Conclusion: Patient reminder calls showed significant effect in improvement of vaccination coverage rate of all antigens.

Keywords: Immunisation, Reminder calls, EPI, Vaccination coverage. (JPMA 67: 1719; 2017)

Introduction

Childhood vaccination has proved to be the most effective public health intervention of the 20th century by saving almost 3 million children globally every year.[1] This became possible by introducing primary vaccination schedule through Expanded Programme on Immunisation (EPI) by the World Health Organisation (WHO) worldwide since 1974.[2] EPI in Pakistan now provides coverage against tuberculosis, diphtheria, tetanus and pertussis (DPT), poliomyelitis, hepatitis B, Haemophilus influenzae, pneumococcal and measles. Immunisation not only protects the recipient but also protects the whole community by reducing circulation of infectious agent.

To get maximum potential benefits of routine vaccination through herd immunity, the WHO has recommended a target of 90% coverage for each individual antigen annually in routine immunisation by 02 years of age.[3] But unfortunately, figures of routine vaccination coverage are quite low in many countries, especially in developing nations.

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Especially in Pakistan, statistics are very discouraging. Different studies and surveys done locally at government and private levels and by international agencies, such as WHO, United Nations Children's Fund (UNICEF) and United States Agency for International Development (USAID), show that coverage ranges from 35.6% to 88%. There is tremendous variation among figures for different antigens in different parts of country, and ethnic, social and economic groups.[4,5] But practically, vaccination coverage remains quite low as compared to standard requirements. WHO statistics of the year 2013 for Pakistan show coverage for DPT3 was 66% and for measles was 61%, which are much below the desired levels.[6]

So, there is a strong need to devise different effective strategies to improve vaccination coverage in developed as well as developing world. Different studies, think tanks, organisations and institutions have recommended multiple strategies for enhancing vaccination coverage.

The most effective and strongly recommended strategies are healthcare provider and parental reminders which include phone calls, auto diallers, mail reminder, calls or letters, text messages and patients portals, according to available resources.[7]

The current study was planned to evaluate the effect of patient reminder calls, especially by mobile phone, on

routine vaccination coverage.

Subjects and Methods

This prospective, interventional study was conducted at Rawal Institute of Health Sciences (RIHS), Islamabad, Pakistan, from December 2014 to August 2016, and comprised babies enrolled at the time of first vaccination. RIHS is located in a densely populated area with residents of low socio-economic status. All vaccinations in the area are provided free of cost by governments health department included in EPI. Approval for the study was taken from institutional ethics review board.

Vaccinator was briefed about the purpose and targets of the study. Parents were told in detail about the purpose of the study and their informed consent was taken in writing. Babies who were given bacillus Calmette-Guérin, oral polio vaccine (BCG+OPV0) at RIHS and whose parents gave consent and provided valid mobile numbers were included in the study. About 80 to 100 newborns receive BCG+OPV0 in the centre every month. Babies were included according to serial number of reporting. It took about 04 months to enrol the participants (who were equivalent to about 40% of the total newborns reporting for BCG +OPV0). The babies were enrolled according to convenience of one vaccinator which he could follow comprehensively. It was almost a type of pilot study in which we wanted to examine gross feasibility and the effect of reminder calls on vaccination turnout. As we were not comparing with any other centres nor did we intend to examine other factors, the sample size was just according to logistics convenience and it was not statistically justified and calculated. Record of family details included address, mobile phone numbers, and educational level and income of each parent. Vaccinator (healthcare provider) was told to keep the record of next vaccination date and note the compliance for given date. If individual did not return within 7 days of the given date, he was to call and remind parents about the vaccination date. He was to wait for 7 days each time before giving second and third reminders. The study was concluded when all enrolled babies crossed 15 months of age (scheduled time for 2nd dose of measles).

Vaccinator was paid Rs1,000 per month extra for mobile phone calls.

Data was analysed by comparing reporting percentages without call and after each call.

Results

A total of 150 babies were enrolled in the study. Vaccination compliance without call for different antigens was as following: BCG+OPVo in 150(100%) children, penta-1+opv-1+pneumococcal-1 in 99(66%), penta-2+opv-2+pneumococcal-2 in 89(59.3%), penta-3+opv-3+pneumococcal-3 in 82(54.6%), measles-1 in 53(35.3%) and measles-2, in 52(34.6%) children.

After 1st call, improvement in vaccination coverage was noted as following: for penta-1+opv-1+pneumococcal-1 33(22%) participants, penta-2+opv-2+pneumococcal-2 31(20.6%), penta-3+opv-3+pneumococcal-3 41(27.3%),

Table-1: Overall Vaccination Coverage Achieved.

Vaccine Name	Total	Completed n(%)	Non-Compliant n(%)
BCG+OPV	150	150 (100)	Nil
Penta I + PCV I + OPV	150	144 (96)	06 (4)
Penta II +PCV II + OPV	150	134 (89.33)	16 (10.67)
Penta III + PCV III + OPV	150	133 (88)	17 (12)
Measles I	150	124 (82)	26 (18)
Measles II	150	113 (75)	37 (25)

BCG: Bacillus Calmette-Guérin
OPV: Oral polio vaccine
PCV: Pneumococcal conjugate vaccine.

Table-2: Effect of Reminder Calls.

Vaccine	Reminder Call	Reported n(%)	Total n(%)
Panta I + PCV I +OPV	Without call	99 (66)	99(66)
Panta I + PCV I +OPV	1st Call	33 (22)	132(88)
Panta I + PCV I +OPV	2nd Call	08 (5.33)	140(93.33)
Panta I + PCV I +OPV	3rd Call	04 (2.66)	144(96)
Panta II + PCV II +OPV II	Without call	89 (59.33%)	89(59.33%)
Panta II + PCV II +OPV II	1st Call	31 (20.66%)	120(80%)
Panta II + PCV II +OPV II	2nd Call	07 (4.66%)	127(84.66%)
Panta II + PCV II +OPV II	3rd Call	07 (4.66%)	134(89.33%)
Panta III + PCVI II +OPV III	Without call	82 (54.66%)	82(54.66%)
Panta III + PCV III +OPV III	1st Call	41 (27.33%)	123(81.99%)
Panta III + PCV III +OPV III	2nd Call	08 (4.66%)	131(87.32%)
Panta III + PCV III +OPV III	3rd Call	02 (1.33%)	133(88.65%)
Measles I	Without Call	53 (35.33%)	53(35.33%)
Measles I	1st Call	43 (28.66%)	96(63.99%)
Measles I	2nd Call	19 (12.66%)	115(76.65%)
Measles I	3rd Call	09 (06%)	124(82.65%)
Measles II	Without Call	52 (34.66%)	52(34.66%)
Measles II	1st Call	39 (26%)	91(60.66%)
Measles II	2nd Call	17 (11.33%)	108(71.99%)
Measles II	3rd Call	05 (3.33%)	113(75.32%)

OPV: Oral polio vaccine
PCV: Pneumococcal conjugate vaccine.

measles-1 43(28.6%), and measles-2 39(26%).

After 2nd call, vaccination coverage improved as follows: for penta-1+opv-1+pneumococcal-1 8(5.3%) children, penta-2+opv-2+pneumococcal-2 7(4.6%), penta-3+opv-3+pneumococcal-3 8(4.6%), measles-1 19(12.6%) and measles-2 17(11.3%).

After 3rd call, improvement in vaccination coverage was: for penta-1+opv-1+pneumococcal-1 4(2.6%), penta-2+opv-2+pneumococcal-2 7(4.6%), penta-3+opv-3+pneumococcal-3 2(1.3%), measles-1 9(6%) and measles-2 5(3.3%).

Overall coverage achieved after 3 reminder calls was very encouraging. Dropouts included those who could not be contacted as well as those who did not report in spite of reminders (Table-1).

Maximum improvement was observed after 1st call for all vaccines (Table-2).

We also tried to collect information about education status and income of each parent, but it was not comprehensive and lacked authenticity. So it was not incorporated in study effects.

Discussion

Pakistan is still among the countries having quite high mortality rate in children under 5 years of age (87/1,000 live births). Unfortunately, half of total deaths in Pakistan occur in children < 5 year of age as compared to 8-10% in developed world.[8] Almost one-third of these deaths are due to vaccine preventable diseases.[9] Due to poor vaccination coverage we have not been able to achieve millennium development goals (MDGs) set for 2015 (under-5 mortality rate 52/1,000 live births). Our routine vaccination coverage is quite low and unfortunately variation among different studies and surveys is so wide (ranging from 35.6% to 88%) that it becomes difficult to explain. However, demographic health survey 2006-2007 indicated only half of target children fully immunised.[10] The WHO's figure is around 66%.

Figures from our regional and other developing countries are also quite high as compared to Pakistan. Studies conducted in Bangladesh and India showed full vaccination coverage of 82.5% and 61%, respectively. The WHO's figure for Afghanistan for the year 2013 is 90%.[11,12]

To achieve WHO-recommended target rate of 90% for routine vaccination coverage, different countries, organisations and institutions have recommended multiple strategies to improve immunisation coverage rates. These include patient reminder calls, find an immunisation champion in your practice, to hold vaccine clinics at hours that are convenient for families, to give provider feedback, include all recommended vaccinations at every visit, strong provider recommendations, provide prompt and standing orders, educate staff, educate patients and their parents, and maintain patients records (Massachusetts Department of Public Health Immunisation Programme).[13]

However, Williams et al. conducted a systematic review of studies on primary care strategies to improve childhood immunisation uptake in developed countries. They analysed 46 studies on this topic and concluded that parental and healthcare reminders are the best strategies to improve immunisation coverage.[7] Parental reminders were the most effective intervention which increased uptake up to 11% in intervention arms. An important point to remember is that uptake rates in developed countries are already quite high and this rise is over and above. Unfortunately, no such studies are available in developing countries. In our study, parental reminder call proved to be almost similarly effective and the overall vaccination coverage rate reached up to 96% for Penta-I + OPV-I and pneumococcal conjugate vaccine-I (PCV-I). The rate remained more than 88% and 89% for 2nd and 3rd doses of these antigens, respectively. Measles-I uptake reached 82% and measles-2 coverage up to 75%.

Another important point is that without call reporting, the rate was almost 50% of the achieved rate. The 1st reminder call showed most significant effect (rise of about 23% for penta-1+opv-1+pneumococcal-1 and 27% for measles); 2nd and 3rd reminder calls further improved coverage rate, but increase noted was progressively low. This shows that even one reminder call gives significant increase. This strategy has proved to be very effective and doable because of availability of mobile phone networks countrywide and their usage by almost all strata of population. Mobile messages and reminder letters may not be as effective due to lower literacy rates and other administrative problems involving different departments like courier services.

This strategy is most cost-effective also. Additional expense of only Rs1,000 per month was quite sufficient for reminder calls.

This strategy included involvement of healthcare provider (vaccinator) by default, hence augmenting the effect of intervention.

Although some private health centres and healthcare providers are already using these mobile phone call

reminders and text messages as reminders for scheduled vaccination dates, their impact is negligible because all vaccination but 3% is provided by the government sector.[14] Federal and provincial government health departments have extensive network of vaccinators, lady health workers and other health professionals providing routine vaccinations. All these workers have mobile phones and paying only Rs1,000/ month extra for reminder calls can enhance vaccination coverage rate to above 90%, which is the WHO-recommended target.

This can bring dramatic improvement in control of vaccination preventable diseases and reduce disease burden tremendously. The total cost of vaccination coverage for an individual is only 15 US dollars. But treatment cost of these preventable diseases is tremendous.[15] Moreover, Pakistan is one of two countries still harbouring polio virus transmission and facing travel sanctions and humiliation. We need to concentrate on this problem to regain our status and self-respect.

Another significant factor was income of parents. Low-income groups have lower rates of compliance due to multifactorial reasons. However, the response to reminder calls showed no difference.

Conclusion

Parental reminder calls were found to be very effective and doable strategy. Strong initiative should be taken at government level to examine its feasibility and implementation countrywide. Pakistan is lacking far behind desired targets of routine vaccination coverage set by the WHO. Hence our society is still facing the menace of many communicable but preventable diseases while the rest of the world has got rid of them decades ago.

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